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ELEMENTS

OF

MEDICAL JURISPRUDENCE.

BY

THEODRIC ROMEYN BECK, M.D.

PROFESSOR OF THE INSTITUTES OF MEDICINE, AND LECTURER ON MEDICAL JURISPRUDENCE IN THE COLLEGE OF PHYSICIANS AND SURGEONS OF THE WESTERN DISTRICT OF THE STATE OF NEW YORK, ETC. ETC.

AND

JOHN B. BECK, M.D.

PROFESSOR OF MATERIA MEDICA AND MEDICAL JURISPRUDENCE IN THE COLLEGE OF PHYSICIANS AND SURGEONS, NEW YORK; ONE OF THE PHYSICIANS TO THE NEW YORK HOSPITAL, ETC. ETC.

Fifth Edition,

BROUGHT DOWN TO THE PRESENT TIME:

Including the Notes of Dr. Dunlop and Dr. Darwall.

LONDON:

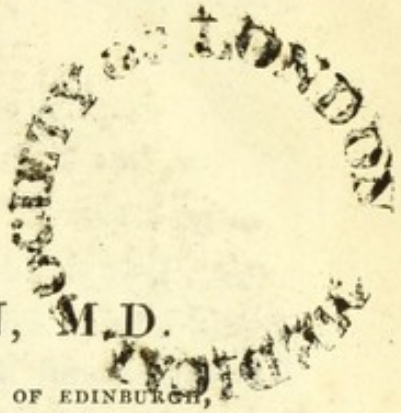
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TO

ROBERT CHRISTISON, M.D.

PROFESSOR OF MATERIA MEDICA IN THE UNIVERSITY OF EDINBURGH, FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS, AND OF THE ROYAL SOCIETY OF EDINBURGH, ETC. ETC.

WHOSE NUMEROUS AND IMPORTANT CONTRIBUTIONS

TO THE SCIENCE OF

MEDICAL JURISPRUDENCE

HAVE ENLARGED ITS VALUE AND INCREASED ITS STABILITY,

THIS WORK

IS,

WITH HIS PERMISSION, RESPECTFULLY INSCRIBED,

BY

THE AUTHORS.

PREFACE.

In preparing the present edition of this work for the press, I have found that an amount of labour was required, equal to that originally bestowed on it. This has arisen from the numerous and important additions made to the science of Medical Jurisprudence during the last ten years. It has hence been necessary to revise every chapter, and several indeed have been nearly rewritten. I have also added essays on two subjects, not previously noticed, viz. Insurance upon Lives, and Medical Evidence. In its present extended, and, as I trust, improved form, I can only ask for it a portion of the favour with which my first efforts were so kindly received.

Besides the numerous printed works, from which I have derived most of my materials, and to which I have always given due credit, I must not omit acknowledging the use of the Manuscript Lectures of the late Professor Stringham, and of Dr. William Dunlop. For the former, I am indebted to the kindness of his surviving relatives, M. Hunt and J. S. Stringham, Esquires; and for the latter, as delivered at Edinburgh, to their author.

Drs. Dunlop and Darwall, the successive editors of the English editions, also enriched the work with numerous and valuable notes. These I have preserved in the present edition, not only for their intrinsic worth, but as a mark of respect and gratitude for their labours.

I have continued to derive much assistance from the New York State Library, and the libraries of the Western Medical

College and the Albany Institute; while many of my legal and medical friends have allowed me the freest access to their private collections.

The chapter on Infanticide, originally contributed by my brother, has been again furnished by him in an enlarged and greatly improved form. I have considered it a bare act of justice, that the author of so important a portion of the work should be associated with me on the title page.

T. R. B.

Albany, November, 1835.

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INTRODUCTION.

MEDICAL JURISPRUDENCE, Legal Medicine, or Forensic Medicine, as it is variously termed, is that science which applies the principles and practice of the different branches of medicine to the elucidation of doubtful questions in courts of justice. By some authors, it is used in a more extensive sense, and also comprehends MEDICAL POLICE, or those medical precepts which may prove useful to the legislature or the magistracy. I shall employ it at this time in its restricted sense.*

Traces of this science are to be found as early as the institution of civil society. Thus in the Jewish law, indications of it may be observed in the distinction established between mortal wounds, and those not so, and the inquiries prescribed in cases of doubtful virginity. Among the Egyptians, according to Plutarch, it was ordained, that no pregnant woman should suffer afflictive punishment — while the Romans, even from that early period in which Numa Pompilius flourished, grounded many of their laws on the authority of ancient physicians and philosophers. *Propter auctoritatem doctissimi Hippocratis*, is a phrase frequently met with in their decisions †, and the emperor Adrian, in extending the term of legitimacy from ten months (the period fixed by the Decemvirs), to eleven, was influenced, in so doing, by the prevailing sentiments of the physiologists of that day. ‡ Some detached, but striking medico-legal facts, are also mentioned by the Roman historians. Thus, the bloody remains of Julius Cæsar, when exposed to public view, were examined by one Antistius, who declared, that out of twenty-three wounds which had been received, but one was mortal, and that had penetrated the thorax, between the first and second ribs. The body of Germanicus was also inspected, and by indications conformable to the superstitions of the age, it was decided that he had been poisoned.§

The code of Justinian contains many provisions appertaining to this science, which we shall have frequent occasion to quote in the subsequent pages. Some of these indeed are incorporated into the laws of almost every civilized country at the present day.

All the laws of the ancients, however, and all the facts drawn from their history, are to be considered as merely the first glimmerings of

* If a general term be necessary to include both these sciences, I should prefer that used by the Germans; viz. STATE MEDICINE.

† Belloc, p. 6. ‡ Foderé, Introduction, p. xiv. § Ibid. p. xxx.

knowledge on this subject — and knowledge, too, founded on the imperfect diagnostics which medicine afforded at that early period. It was never ordained that physicians should be examined on any trial, until after the middle ages, and we are indebted to the emperor Charles the Fifth of Germany, for the first public enactment, prescribing it as necessary, and thereby recognizing its value and importance. In the celebrated criminal code which was framed by him at Ratisbon, in 1532, and which is known by the name of the "*Constitutio Criminalis Carolina*," or the Caroline Code, it is ordained that the opinion of medical men shall be formally taken in every case where death has been occasioned by violent means — such as child-murder, poisoning, wounds, hanging, drowning, the procuring of abortion, and the like.

"The publication of such a code very naturally awakened the attention of the medical profession, and summoned numerous writers from its ranks."* It was the first regular commencement and origin of legal medicine, and it required only such an enactment to apprehend the utility of which it was susceptible.

The kings of France soon became aware of the value of similar institutions. In 1556, Henry the Second promulgated a law, by virtue of which, death was inflicted on the female who should conceal her pregnancy, and destroy her offspring. In 1606, Henry the Fourth, presented letters patent to his first physician, by which he conferred on him the privilege of nominating two surgeons in every city and important town, whose duty it should exclusively be to examine all wounded or murdered persons, and to make reports thereon; and in 1667, Louis the Fourteenth formally declared, that no report should be valid unless it had received the sanction of at least one of these surgeons.† At a subsequent period (1692), physicians were by law associated with surgeons in these examinations.

The writers who have investigated the science of medical jurisprudence are numerous, and many of them have displayed great talent and acuteness. Some have noticed it as a system, while others have examined detached parts. I shall content myself with mentioning the more distinguished, as a catalogue of all these authors, with the titles of their works, would uselessly fill several pages.

Fortunatus Fidelis is probably the earliest writer on the science. He was an Italian, and his work, "De Relationibus Medicorum," was published in 1598, at Palermo. Paulus Zacchias soon followed him, in his great work, entitled "Questiones Medico-Legales," which appeared at Rome between 1621 and 1635.‡ This distinguished man rose to great eminence in his profession, and was physician to Pope Innocent the Tenth. He died in 1659, in the 75th year of his age. His treatise on legal medicine, although partaking of the superstition of the age in which he lived, is still a most valuable record of facts, and a permanent monument of the talents of the author. The following is a

* Paris' Medical Jurisprudence, vol. i. p. x.
† Foderé, vol. i., Introduction, p. xxxii.
‡ Life of Zacchias, prefixed to his *Questiones Medico-Legales.*

general outline of the contents of the first volume :—*First book.* Age : Legitimacy : Pregnancy : Superfœtation and Moles : Death during Delivery : Resemblance of Children to their Parents.—*Second book.* Dementia : Poisoning.—*Third book.* Impotence : Feigned Diseases : The Plague and Contagion.—*Fourth book.* Miracles : Rape.—*Fifth book.* Fasting : Wounds : Mutilation : Salubrity of the Air, &c. The second volume is principally filled with a discussion of casuistical questions.

In later times, no very distinguished authors have appeared in this country, although its physicians have not been deficient in the investigation of particular subjects. Tortosa, is spoken of, by Dr. Paris, as the best Italian systematic writer of the present century.

In Germany, Bohn was among the earliest writers, but his treatise is confined to a consideration of wounds. The *Pandects* of Valentini, which appeared in 1702, and which were shortly followed by his *Novellæ*, form a very complete and extensive retrospect of the opinions and decisions of preceding writers on legal medicine. They consist indeed of medico-legal cases, and the consultations of distinguished physicians, and of medical and legal faculties on them. Alberti, Zittman, Teichmeyer, Fazelius, Goelicke, Hebenstreit, Plenck, Daniel, Sikora, Ludwig, and Metzger, are also German authors of eminence in this branch of learning. But one of the most valuable and comprehensive collections that has ever appeared, is that edited by Schlegel. It consists of upwards of forty dissertations on various parts of medical jurisprudence, written by his countrymen at different periods during the eighteenth century, and is alike honourable to the national character, and the individuals whose investigations appear in it.

In our own days, the indefatigable industry and great learning of the Germans have furnished important contributions to the science. From a host of names, I will only select those of Henke, Bernt, Gmelin, Emmert, Jaeger, Kopp, Hecker, Hoffbauer, Remer, and Wagner.

Foderé, in his sketch of the history of the science in France, considers Ambrose Paré as the earliest writer on it in that country. His chapter on Reports, and his observations on feigned diseases, indicate the talents for which he is still famous at the present day, and in such estimation were his works held in his native country, that for more than a century, they formed the sole guide of the French surgeon. To him succeeded Gendri in 1650; Blegni in 1684, and Deveaux in 1693 and 1701. Their works were particularly intended for the benefit of surgeons, from whom, as I have already stated, the examiners in medico-legal cases were selected.

Louis is, however, considered, and with great justice, as the individual who first promulgated a just idea of the science to his countrymen. He investigated several important points with great ability —such as the certainty of the signs of death, protracted gestation, drowning, and the proofs that distinguish hanging through suicide, from hanging as an act of murder. His consultations also in various cases, and which are preserved in the Causes Célèbres, abound in various and instructive learning. Some of his opinions gave rise to

animated discussions, and thus excited public attention to these subjects generally. Winslow, Lorry, Lafosse, and Chaussier, also deserve notice among the French writers, while towards the conclusion of the eighteenth century, Professor Mahon, with several others, published in the "*Encyclopedie Methodique*," copious dissertations on Medical Jurisprudence.*

In 1796, Foderé published the first edition of his work in three octavo volumes, under the title of "*Les lois eclairées par les sciences physiques, ou Traité de médecine légale et d'Hygiène publique.*" This learned physician was a resident of Strasburg, and the author of several other treatises of deserved reputation. In 1807, the system of Mahon, late Professor of Legal Medicine, and the History of Medicine in the School of Medicine at Paris, appeared, with notes, by M. Fautrel, and about the same time, Belloc, a surgeon at Agen, published his sensible and useful treatise in one volume. Marc, in 1808, presented a translation from the German, of the Manual of Rose on Medico-Legal Dissection, and enriched it with valuable notes, besides adding two most instructive dissertations — one on the *docimasia pulmonum*, and the other on *death by drowning*. In 1812, Ballard published a translation, also from the German, of Metzger's Principles of Legal Medicine. This work is peculiarly valuable for the great learning displayed in its notes, and the opportunity thus afforded of becoming acquainted with the sentiments of authors whose writings are either inaccessible, or in some degree antiquated.

After bestowing great labour during several years, a second edition of his treatise was published by Foderé in 1813. It was now extended to six volumes — four on legal medicine, and two on medical police, and was undoubtedly, at the time of its publication, the most valuable systematic work on the science in the French language.†

After a few years there appeared in Paris one of the most original publications that the present age has yet afforded. I refer to the system of Toxicology by Orfila, a Spaniard by birth, but naturalized and permanently resident in France. This is copious, beyond all former treatises, in original experiments, and it has done much to increase our knowledge of the action and the tests of individual poisons. The career of Orfila, so splendidly commenced, has been successfully and ardently pursued; and his lectures on Legal Medicine, his work on Juridical Disinterments, and his numerous essays on detached subjects, have all served to improve and advance his favourite science.

In 1821, Professor Capuron published on legal medicine, so far as it relates to midwifery. Briand, Biessy, Esquirol, Georget, Falret, Marc, and many others, have either written regular treatises, or published on some one or other of the subjects included in the range of legal medicine. The most valuable French work, however, of the present day, is the *Annales D'Hygiène et de Médecine Légale.* This is issued

* Foderé, vol. i., Introduction, p. xxxvii, &c.

† Professor Foderé died at Strasburg in February of the present year (1835), in the 72d year of his age.

quarterly, and is conducted by some of the ablest medical men in the kingdom.

The first work, professing to treat of Medical Jurisprudence, that appeared in England, was the production of Dr. Farr. This was in 1788, and in his preface he mentions that it is derived from Fazelius' Elements of Forensic Medicine. It is brief and imperfect, extending only to one hundred and forty duodecimo pages. It arrived at a second edition in 1814. The "*Medical Ethics*" of Percival contain some useful facts, and Dr. William Hunter, in his essay "*On the Uncertainty of the Sign of Murder in the Case of Bastard Children*," examined a most important and leading subject in medical jurisprudence. In 1815, Dr. Bartley of Bristol published a few essays on some points connected with midwifery.

Dr. Male of Birmingham, in 1816, presented the first English original work of any magnitude or value, on medical jurisprudence. A second edition appeared in 1818. In 1821, Dr. John Gordon Smith published his excellent treatise, entitled "*The Principles of Forensic Medicine, systematically arranged and applied to British Practice.*" This work has passed through several editions. Dr. Smith also published separate treatises on Medical Evidence, and on the examination of Witnesses, and was much engaged as a lecturer on the science.*

In 1823, an elaborate and able work on "Medical Jurisprudence," in three octavo volumes, was offered to the British public by the eminent Dr. Paris and Mr. Fonblanque, a barrister. Since that time, the Manual of Dr. Ryan, the valuable and copious Treatise of Professor Christison on Poisons, undoubtedly the best in the language, and the contributions of the writers in the Cyclopedia of Practical Medicine, are among the most important additions to our knowledge of the subject.

I must not, however, omit to mention the many valuable as well as original communications on the science, contained in the British Medical Periodicals, and particularly in the Edinburgh Medical and Surgical Journal. Here the productions of Drs. Andrew Duncan, jun. and Christison are to be found, illustrating every subject on which they touch.

Dr. Andrew Duncan, jun. was the first professor of Medical Jurisprudence in any British University. His venerable father had, for some years previous, urged its importance on the public, and even delivered, I believe, a course of private lectures†, but it was not until 1806 that Dr. Duncan, jun. received his appointment. ‡

* Dr. Smith died not long since. "To him," I may say, in the language of Dr. Conolly, "the science of Medical Jurisprudence will always remain indebted, and it ought never to be forgotten, that he was one of the first to show, and zealously to advocate, what all now acknowledge, its usefulness and dignity."

† A sketch of the subjects included in the sciences of Medical Jurisprudence and Medical Police, may be found in an Analysis of Dr. Duncan's, sen., Memorial, presented to the patrons of the University at Edinburgh, in 1798. (Coxe's Medical Museum, vol. v., Appendix, p. 74.)

‡ Dr. Gordon Smith, in the introduction to his second edition, (p. 18.) says, that Dr. Duncan received the appointment in 1806. Dr. Paris, (Introduction, p. xxvi.) on the contrary, mentions 1803, as the period.

On the removal of Dr. Duncan to the chair of Materia Medica, he was succeeded by Dr. Christison, who again, on the death of the former, succeeded his teacher and friend. Dr. Traill, is the present professor of Medical Jurisprudence at Edinburgh.

Among the earlier lecturers on this science in Great Britain, may be named Dr. George Pearson, W. T. Brande, Esq., Dr. Harrison, Dr. Elliotson, Dr. Gordon Smith, and Dr. Ryan. By a regulation of the Society of Apothecaries, adopted a few years since, an attendance on a course of lectures on Forensic Medicine was made a requisite for examination, and the result has been a large increase in the number of teachers. I have prepared, from various sources, a list of these during the medical sessions of 1833–34, and 1834–35, which will be found in the subjoined note. *

	* *Session* 1833–34.	*Session* 1834–35.
University of Edinburgh	Dr. Traill.	Dr. Traill.
London University	Dr. A. T. Thomson.	Dr. A. T. Thomson.
King's College, London	Dr. T. Watson.	Dr. T. Watson.
Guy's Hospital	Mr. A. Taylor.	Mr. A. Taylor.
St. Bartholomew's Hospital	Dr. Roupell and Dr. George Burrows.	Dr. G. Burrows.
St. George's Hospital	Dr. Seymour and Mr. C. Hawkins.	Dr. H. Davies.
St. Thomas's Hospital	Dr. Lister and Mr. R. Phillips.	Dr. Lister and Mr. R. Phillips.
London Hospital	Dr. Cobb, Dr. F. H. Ramsbotham, and Mr. Pereira.	The same.
Westminster Hospital	- - -	Dr. R. H. Graham.
Theatre of Anatomy, Webb Street, Maze Pond	Dr. Southwood Smith and Mr. Cooper.	The same.
Theatre of Anatomy, Little Windmill Street	Dr. Sigmond, Dr. Jewell, and Mr. Everett.	Dr. Jewell and Mr. Everett.
Central School of Medicine, St. George and St. James's Dispensary	Dr. Wyatt Crane.	
Western Dispensary	Dr. Clendenning.	
Medical School, Aldersgate Street	Dr. W. Cummin.	Dr. W. Cummin.
Westminster School of Medicine	Dr. Ryan and Mr. Crump.	
School of Anatomy, Medicine, Giltspur Street	Mr. Barnes and Mr. Wheeler.	Mr. Hemming and Mr. Barnes.
Charing Cross Hospital	- - -	Dr. Sigmond, Dr. Chowne, and Mr. Maugham.
Medical School, Westminster Dispensary	- - -	Dr. Ryan.
Theatre of Anatomy and Medicine, adjoining St. George's Hospital	- - -	S. D. Broughton, *medical*, and J. W. Wilcock, *legal*.
School of Medicine, Medical Dispensary, 13. Fore Street, Cripplegate	- - -	Dr. Venables and Dr. Blundell.
Practical School of Medicine, founded by J. Brookes, Blenheim Street	- - -	Dr. Litchfield.
Medical School, Brown Square, Edinburgh	Dr. Fletcher.	Dr. Fletcher.
Lecturer in Edinburgh	- - -	Dr. Howison.
Royal College of Surgeons, Ireland	Dr. T. Beatty.	Dr. T. Beatty.
Dublin School of Anatomy, Surgery, and Medicine, Digges Street	Dr. G. C. Watson.	
School of Medicine, Anatomy, and Surgery, Park Street, Dublin	Dr. Thomas G. Geoghegan.	
Leeds School of Medicine	Dr. Disney Thorpe.	Dr. Disney Thorp.
Manchester School of Medicine	Mr. Ollier.	Mr. Ollier.
Birmingham School of Medicine	Dr. Birt Davies.	Dr. Birt Davies.
Sheffield Medical School	Mr. Palfreyman and Mr. Thomas.	The same.
Bristol Medical School	Dr. J. A. Symonds and Mr. Herepath.	Dr. Symonds.
Newcastle-upon-Tyne	Dr. George Fife.	
Andersonian University, Glasgow	Mr. Watt.	Mr. Watt.
Medical School, Portland Street, Glasgow	Dr. Pagan.	
Sheffield School of Anatomy and Medicine	- - -	Dr. Thompson and Mr. Law.
Liverpool Royal Institution	- - -	F. R. Philip, M.B., and Dr. Malins.
Nottingham	- - -	C. Attenburrow.

The Lecturers on Medical Jurisprudence in London, during the Sessions of 1831–32, and 1832–33, are mentioned in the Lancet, N.S., vol. ix. p. xvi., and vol. xi. p. i.

This brief outline may suffice to give some idea of the ardour, with which medical jurisprudence is investigated in Europe. Undoubtedly it has made the most rapid progress during the last twenty years, but its benefits to the community and to the profession are but just developing.*

In turning to my native country, I must premise, that as our literature has been, in a great degree, derived from that of Great Britain, so the objects of study will frequently be those which are there the most popular. Hence, probably, the reason why medical jurisprudence attracted but little attention until of late years. In 1810, the venerable and distinguished Dr. Rush delivered an introductory lecture in the University of Pennsylvania (and which was published in 1811), in which he dwelt in an eloquent and impressive manner on the importance of the study. In the conclusion, he thus forcibly establishes the utility of the science:— "To animate you to apply to the study of all the subjects enumerated in the introduction to our lecture, I beg you to recollect the extent of the services you will thereby be enabled to render to individuals and the public: fraud and violence may be detected and punished; unmerited infamy and death may be prevented; the widow and the orphan may be saved from ruin; virgin purity and innocence may be vindicated; conjugal harmony and happiness may be restored; unjust and oppressive demands upon the services of your fellow citizens may be obviated; and the sources of public misery in epidemic diseases may be removed, by your testimony in courts of justice." †

In 1819, Dr. Thomas Cooper, formerly a judge in Pennsylvania, and lately president of the college of South Carolina, republished, in one volume, several English tracts on medical jurisprudence; viz. Farr, Dease, Male, together with Haslam on Insanity. To these he added copious notes, and a digest of the law relative to Insanity and Nuisance. This compilation has proved a very useful introduction to the study of the science. If to these be added the publication of the first edition of the present work, the reprints of Ryan and Chitty, the former with notes by Dr. Griffiths, Professor Ducatel's Manual of Toxicology, and the Manual of Dr. Williams, I shall have noticed the principal American publications on the science. Several valuable inaugural dissertations, with numerous cases and essays in the medical journals, must, however, be also mentioned, in order to complete the enumeration of what has been done in the United States.

The individual who first delivered a course of lectures on Medical Jurisprudence in this country was the late James S. Stringham, M.D., of New York. Having been a pupil of this gentleman, and thus derived my first impulse to the study, I may be indulged in adding a few particulars of his life.

Dr. Stringham was a native of the city of New York, and received

* A copious list of authors on the science may be found in the notes to Metzger, pp. 285—306.; in Brendel, p. 61.; but, above all, in Wildberg's Bibliotheca Medicinæ Forensis. Berlin, 1819.

† Rush's Introductory Lectures, p. 392.

there the elements of a classical education. He graduated at Columbia College in 1793. Having selected medicine as his profession, he became a pupil of the late Dr. Samuel Bard and Dr. Hosack, and diligently attended to all the branches of medicine then taught in New York. He subsequently repaired to Edinburgh, became a student in the University, and in 1799 received from it the degree of M.D.

Shortly after his return to his native country, he was elected Professor of Chemistry in Columbia College, and for several years delivered lectures on that science. In 1804, he voluntarily added to these a course on legal medicine. The popularity of this secured its repetition during each succeeding session until his resignation.

In 1813 he was appointed Professor of Medical Jurisprudence in the College of Physicians and Surgeons of New York, but his health shortly thereafter became impaired, and he died at the island of St. Croix (whither he had gone under the hope of improvement) on the 29th of June, 1817.

Besides his inaugural dissertation, "*de absorbentium systemate*," Dr. Stringham was the author of several essays and papers in the medical Journals of the day. He published in the *New York Medical Repository* an account of the efficacy of Digitalis purpurea in allaying excessive action of the sanguiferous system; a description of a remarkable species of intestinal vermes; an account of the violent effects of corrosive sublimate, and a case of hydrocephalus: in the *Philadelphia Medical Museum*, a paper on the diuretic effects of mercury in a case of syphilis, and in the *Edinburgh Medical and Surgical Journal*, a paper on the yellow fever of America.

A syllabus of the Lectures of Professor Stringham is contained in the American Medical and Philosophical Register.* The subjects noticed by him were as follows:—Age, propriety of the cæsarean operation, virginity, and rape; concealed pregnancy, pretended pregnancy, quickening, abortion, superfœtation, monstrosity, hermaphrodites, impotence, and sterility; feigned diseases, concealed diseases, poisons, medico-legal dissection, wounds, infanticide, death from hanging and drowning, medical etiquette, effects of particular manufactories on health, salubrity of water.

In 1812–13, Dr. Charles Caldwell (now of the Transylvania University, Kentucky,) delivered a course of lectures on Medical Jurisprudence at Philadelphia. In 1815 I was appointed to this duty in the Western Medical College. Not long after, Dr. Walter Channing was appointed Professor of Midwifery and Medical Jurisprudence in Harvard University. Dr. Williams, late Professor in the Berkshire Medical Institution, and Dr. Hale, of Boston, each lectured on the science in the winter of 1823. Since that period, all our medical schools have more or less made it a subject of instruction.

It only remains to offer some observations on the arrangement that has been adopted in the present work.

Some writers endeavour to divide the subjects, according to the courts before which they may arise, and thus devote separate chap-

* Vol. iv. p. 614.

ters to civil and criminal cases. It will, however, be readily perceived that this must render the study confused. Pregnancy, for example, may be a subject of inquiry on a plea for a delay of execution, or on the application of an heir for his property. In both instances its signs require examination. So also with insanity and several other topics. It will hence only lead to repetition to adopt this division. Foderé has escaped from the difficulty by including these subjects under the title of "*Médecine Légale Mixte*," applicable both to civil and criminal cases, but this is evidently an evasion. Dr. Gordon Smith arranges his subjects into three parts: — 1. Questions that regard the extinction of human life. 2. Questions arising from injuries done to the person, not leading to the extinction of life: and 3. Disqualifications for the discharge of social or civil functions.

I must confess that I have found a difficulty to attend all these attempts at arrangement, which is probably insurmountable. The subjects comprehended under the science are not of a nature to admit of a division similar to that proposed by either of the above writers. I have preferred noticing each head of discussion separately and independently. Before a legal tribunal they must be thus investigated, and the nearer we approach in our studies to this, the easier will be their application to practice.*

The general arrangement is thus, I apprehend, not a matter of great moment, but on taking up a distinct topic, the first question which I have proposed to myself has been the following: *How can the examination of this point come before a judicial tribunal?* Having ascertained and stated this, I proceed to notice the physiological, pathological, or chemical facts, that are necessary to be known in the supposed case — advert to the difficulties to be encountered in the investigation — and offer, if necessary, some observations on the conformity of the law to the present state of medical knowledge. A collection of detached essays of this description (for they evidently are detached in their subjects and in their application) must prove in a great degree useful, both to the lawyer and the physician, since it enables them, in their respective capacities, to review the information that is immediately applicable to a particular instance before

* I subjoin some of the latest divisions proposed, from which the reader can select such as appear most comprehensive, as well as discriminating. Dr. Elliotson's division is into three parts. 1. Those subjects which respect the human body in health. 2. Those which respect it when labouring under disease. 3. Those which respect it when deprived of its life, or suffering from violence calculated to destroy its life. Dr. Elliotson supposed this original, but subsequently found in Valentini a similar division into physiological and pathological (Introductory Lecture, p. 5.). Dr. Thomson's and Professor Amos' division is as follows: — 1. Subjects connected with social relationship. 2. Connected with the constitution of society, and under this are arranged, legitimacy, insurance, and insanity. 3. Subjects connected with personal safety and life. (London University Calendar, 1832, p. 176.) Lastly, Dr. George Burrows divides the subject into two parts. 1. All questions relating to the death or injury of individuals, whether arising from violence, accidents, or any other sudden cause. 2. All questions relating to the social condition of individuals, and which may become the subject of legal inquiry. (Introductory Lecture, p. 13.)

them. That my former imperfect attempt has met in some degree with the approbation of the learned and wise in both professions, is my best reward for the labour bestowed on it.

Memorandum. — A catalogue of books consulted will be found at the end of the work.

MEDICAL JURISPRUDENCE.

CHAPTER I.

FEIGNED DISEASES.

Objects for which diseases are feigned. Diseases most readily feigned. General rules for their detection. Various divisions that have been proposed. Diseases that have been feigned: Fevers—diseases of the heart, including alterations of the pulse—consumption—hepatitis—rheumatism—lumbago—sciatica—pain in the hip and knee—tic douloureux—hæmoptysis—hæmatemesis—bloody urine—hæmorrhoids—menstruation—jaundice—paleness of the skin—cachexia—diarrhœa—dysentery—involuntary stools—vomiting—apoplexy—vertigo—paralysis—epilepsy—convulsions—chorea—catalepsy—syncope—hysteria—somnolency—hydrophobia—tetanus—nostalgia—scrofula—scurvy—cutaneous affections—incontinence of urine—gonorrhœa—stricture—excretion of calculi—near-sightedness—ophthalmia—amaurosis—night-blindness—deafness—deaf and dumb—stuttering and stammering—tumours—hydrocephalus—emphysema—dropsy—tympanitis—physconia—prolapsus of rectum and uterus—polypus of the nose—hydatids—Barbadoes leg—hydrocele—hernia—contractions and deformity—lameness—distortions—ulcers—cancers—petechiæ—ozœna—fistula in ano—wounds, fictitious and factitious—fractures—maiming. Of impostors—feigned abstinence.

Diseases are generally feigned from one of three causes—fear, shame, or the hope of gain. Thus, the individual ordered on service will pretend being afflicted with various maladies, to escape the performance of military duty; the mendicant, to avoid labour, and to impose on public or private beneficence; and the criminal, to prevent the infliction of punishment. The spirit of revenge, and the hope of receiving exorbitant damages, have also induced some to magnify slight ailments into serious and alarming illness.

The extent and finish to which the art of feigning diseases is carried, are various, and differ in different countries. Of his own nation, Foderé observed, at the time when the conscription was in full force in France, "that it is at present brought to such perfection, as to render it as difficult to detect a feigned disease, as to cure a real one."* So also in England, from the efforts required to carry on her

* Foderé, vol. ii. p. 452.

wars with Napoleon, cases of feigned diseases greatly multiplied in her armies and navies. A favourite object with many was to obtain a discharge from the service, either with or without a pension.

Against such impositions, the police of every well-regulated country should direct its energies. A severe injury may not only be inflicted on individuals through them, but the public morals may be deteriorated. In almost every age, impostors have sprung up who affect various maladies, and operate on the superstition or the curiosity of the vulgar. And even the higher ranks of society, from motives as unworthy, have occasionally, like the courtiers of Dionysius and Louis XIV., given a sanction to such practices.

It will readily be observed, that a knowledge of this subject may frequently be necessary both in civil and criminal cases, and also in the due administration of MEDICAL POLICE. To prevent the necessity of repetition, I shall consider it at length under the present division of our subject.

All maladies are not equally capable of being feigned. It is difficult to pretend those whose diagnostic symptoms are certain and established, and whose natural course it is to effect a great change in the system, and to alter the various secretions and excretions in a perceptible manner. But such, on the contrary, as are variable and uncertain in their symptoms, and characterised by little or no change in the external appearance, or where the correctness of an opinion depends much on the statement which the patient may give, are most liable to be feigned. Of the first class may be named inflammations, continued fevers, purulent expectoration, &c.; and of the last, insanity, epilepsy, and pain. Not unfrequently, however, various substances are used to aid in misleading the examiner; and thus the entire skill of a medical man is often called into exercise, to ascertain the real state of the patient.

Zacchias, in his elaborate and learned work, has given five general rules for the detection of feigned diseases, which are so discriminating as to have received the sanction of most succeeding writers. A detail of these will illustrate their universality of application, and the ingenuity of their author.

1. The first is, that the physician must, in all suspected cases, inquire of the relatives and friends of the suspected individual, what are his physical and moral habits. He must ascertain the state of his affairs, and inquire what may possibly be the motive for feigning disease—particularly whether he is not in immediate danger of some punishment, from which this sickness may excuse him. It was on this principle, he observes, that Galen detected the imposture of his servant, who, when ordered to attend his master for a long journey, complained of an inflammation of the knee. He inquired into the habits and character of the slave, and ascertained that he was much attached to a female, whom this journey would compel him to leave. This, combined with the little alteration that so painful an affection as the one named induced, led him to examine the part, and at last to ascertain that the swelling was occasioned by the application of the *thapsia* or *bastard turbith*, and which being prevented, the tumour disappeared.

2. Compare the disease under examination, with the causes capable of producing it; such as the age, temperament, and mode of life of the patient. Thus, artifice might be suspected, if a person in high health, and correct in his diet, should suddenly fall into dropsy or cachexia; and again, if insanity should suddenly supervene, without any of its premonitory symptoms. It is contrary to experience to find such diseases occur without some previous indications.

3. The third rule is derived from the aversion of persons, feigning disease, to take proper remedies. This, indeed, will occur in real sickness; but it rarely happens when severe pain is present. Any thing that promises relief is generally acceptable in such cases; those, on the contrary, who feign, delay the use of means. Galen (says Mahon*) thus ascertained deceit in another case. An individual complained of a violent colic, on being summoned to attend an assembly of the people. Suspecting artifice, he prescribed only a few fomentations, although this same person had not long before been cured of the same complaint by the use of *philonium*. Of this, however, he never spake, nor indeed seemed the least anxious for medical aid.

4. Particular attention should be paid to the symptoms present, and whether they necessarily belong to the disease. An expert physician may thus cause a patient to fall into contradiction, and lead him to a statement which is incompatible with the nature of the complaint. To effect this, it is necessary to visit him frequently and unexpectedly.

5. The last direction is to follow the course of the complaint, and attend to the circumstances which successively occur. Thus the inflammation of the knee above noticed should have produced fever, and increased in violence, according to the common course, when no remedies are applied.†

Before proceeding to notice separately the various diseases that may be feigned, it will be proper to advert to a species of simulation mentioned by Zacchias, under the name of *simulatio latens*. By this he understands a case in which disease is actually present, but where the symptoms are falsely aggravated, and greater sickness is pretended than really exists. This may be more difficult of detection in some respects; and it requires, like the cases above noticed, the skill of the physician, and that, too, of one experienced in the history of disease, to guide aright. Generally speaking, it will be his duty to steer a middle course between too great incredulity and too great confidence, and where the interests of a third person are not liable to be affected, to lean towards the patient. I can, however, imagine that cases have occurred in which disease has been magnified in order to increase damages, or to revenge insult. Here the conduct of the medical examiner must be cautious, and he should carefully apply the rules already laid down.‡

Several divisions of feigned diseases have been suggested. Thus,

* Mahon, vol. i. p. 332. † Zacchias, tom. i. p. 239.

‡ "Flagrantior æquo
Non debet dolor esse viri, nec vulnere major."—*Juvenal, Sat.* 13.

Marc proposes to arrange them under the heads of *imitated* and *produced* diseases (*par imitation* et *par provocation*). The authors of the article on this subject in the Cyclopædia of Practical Medicine say, that they are referable to four groups: *feigned*, or altogether fictitious; *exaggerated; factitious*, being wholly produced by the patient, or with his concurrence; and, lastly, *aggravated*, or real, possibly, at first, but intentionally increased by artificial means.

It is not necessary to notice them under either of these divisions at the present time. I propose to mention the principal diseases that have been feigned somewhat in the usual nosological order, although it will hardly be possible to preserve this strictly; and shall then state under each the most approved mode of detection.*

Fever may be induced by the use of various stimulants, such as wine, brandy, cantharides, &c. It is often assumed when a disease is suddenly necessary to avoid military requisitions, or the performance of work in prisons. Foderé states that he has observed a feverish state of the system thus induced by violent exercise, and then, calling for the physician, has noticed the patient imitating the cold fit to admiration. Dr. Cheyne was sent for to a soldier, who was said to be in the chill of an intermittent. He found him shaking violently; but on throwing off the bed-clothes, he was seen, not in the *cold*, but in the *sweating* stage, produced by his exertions. Of all cases of feigned fever, it may be remarked that they are ephemeral. A day or two's examination generally developes the deceit, as a frequent repetition of the use of stimulants is too hazardous, and real disease might then be the consequence. In doubtful cases, the remarks of Dr. Hennen should be remembered: "Neither the quickness of the pulse, nor the heat of the skin, are infallibly indicative of the presence of fever; and therefore it is that the state of the tongue, stomach, and stools, and of the senses, should be most particularly attended to."† And even these require close examination. In a soldier under Dr. Cheyne, where

* The greatest difficulty in noticing this subject is, to select properly from the great mass of information that has of late years been afforded on it. The principal English authorities to which I have referred, in addition to systematic works, are:—

Hennen's Military Surgery.

Mr. Copland Hutchison, Surgeon to the Royal Naval Hospital at Deal, in the London Medical and Physical Journal, vol. li. p. 87; and in his Observations on Surgery, p. 141 to 193.

Medical Report on the Feigned Diseases of Soldiers, in a Letter to George Renny, M.D., Director-General of Military Hospitals in Ireland, by John Cheyne, M. D., Physician-General. Dublin Hospital Reports, vol. iv. p. 123 to 181.

Marshall's Hints to Young Medical Officers, &c.

The article, "Feigned Diseases," in the Cyclopædia of Practical Medicine, by Drs. Scott, Forbes, and Marshall.

And Sir George Ballingall's Military Surgery.

Professor Dunglison, in his Medical Dictionary, vol. i., article, "Feigned Diseases," has given a tabular view of them, with the mode of excitation and detection.

† Hennen, p. 198. "Scrubbing the skin with a hard brush, gives a flush difficult to distinguish from the colour caused by fever, and only to be detected by waiting patiently by the bedside until it subsides."—DUNLOP.

great complaint was made of pain in the chest, &c., the tongue was of a dry white appearance, made so by rubbing it with whiting from the wall. When washed with tepid water, it was clean and moist. Dr. Hutchison saw a French prisoner with an extremely small and rapid pulse; his tongue was covered with a brown coating, the eighth of an inch thick, and withal he was vomiting. The smell alone of the ejections proved that he had swallowed tobacco; and, on removing the matter from the tongue, it was found to be common brown soap. After this, he recovered in a few hours. Chalk, pipe-clay, brick-dust, flour, have all been used for this purpose. I may also add, that those feigning intermittents often pretend that the chill comes on during the night. This is a very uncommon circumstance in ordinary practice.*

Diseases of the Heart.—The *pulse* is sometimes found extremely weak, and occasionally none is perceived at the wrist. Should deceit be suspected, the physician may examine whether ligatures have not been applied to interrupt the pulsation, and he should also ascertain whether the arteries beat at the corresponding extremity. I am indebted to my late worthy preceptor, Dr. M'Cleland of Albany, for a case illustrating this point. During the period of his attendance at the Royal Infirmary in Edinburgh, a person applied for and obtained admission on the score of ill health, who had formerly been a patient there. The attending physician examined the pulse at the right wrist, but found none; he then tried the left, but with similar success. The trick was carried on for several days, at the end of which time it was discovered that the patient was in sound health, but that whenever the pulse was to be examined, he pressed his finger on the artery under the armpit.†

Ligatures have sometimes been applied, to produce the appearance of aneurism of the heart or great vessels. In two cases in France, they were found tightly bound round the neck; and one, indeed, was so fine, that it was almost hid by the folds of the skin. The countenance was terribly swollen and livid; but on removing the ligatures from the neck, and in one instance, also, from the top of each arm, this purple and swollen state of the face disappeared, and the irregular action of the heart ceased.‡

Internal remedies have also been used to produce palpitation and

* Marshall, p. 110.

† "I have seen a gentleman, who, by the exertion of the muscles of the arm and thorax, could stop the action of the pulse at the wrist; but, in so doing, he required to call into action all the muscles of the arm; so that should a *malingerer* attempt this, the cheat would easily be discovered by feeling the arm above the elbow. There was a preparation in the museum of Mr. Allan Burns, and which, I believe, is at present in the possession of my friend Mr. G. S. Pattison of Baltimore, U.S., where a slip of muscle passed across the humeral artery, and impeded its action. On inquiry being made, it was found that the subject had been a servant girl; and though strong and healthy in other respects, she could never, for any length of time, pump a well or switch a carpet.

"In the army hospitals, where I have been accustomed to skulkers of all kinds, whenever I suspected a man of deceiving me as to his pulse, I felt it at the temporal or carotid artery, under the pretext of saving him from the trouble of taking his arm from under the bed-clothes."—DUNLOP.

‡ Scott. Cyclop. Prac. Med. vol. ii. p. 138.

derangement of the functions of the heart. The powder of white hellebore was thus applied, at first, by a man who had lived with a veterinary surgeon. He not only produced the disorder in himself, but sold his secret and his drugs to others; so that many in the same corps (the marine artillery) were affected with it, and, in consequence, invalided before the deception was discovered.* Dr. Quarrier, who has given us this account, states that suspicion was at length excited, and the secret was discovered by the confession of the individual. When a sudden and decisive result was sought for, as much as a drachm was given, and it caused vomiting, purging, syncope, tremors, and great nervous irritability, which were followed by great and inordinate action of the heart and arteries; and this in its turn was succeeded by great debility, or a disposition to paralysis. In smaller doses, and repeated, it caused disorder of the stomach, and violent and continued palpitations, &c. It was fortunate, according to Dr. Quarrier, that this article was frequently adulterated, as the effects in several instances were nearly fatal.† Garlic, tobacco, and other irritating substances introduced into the rectum, have been known to cause violent palpitations and fever.

Consumption. — This is sometimes feigned by men desirous of obtaining a discharge. They complain of pain in the chest, and cough; produce emaciation by abstinence and drinking vinegar; and mix up the expectoration, it may be of catarrh, with pus obtained from others, and tinge it with blood from the gums.‡ It requires, however, only a proper acquaintance with the phenomena of the real disease, and a sufficiently prolonged examination of the case, to detect it.

Hepatitis was often pretended by those who had been long in the East or West Indies; and they were often able to enumerate most of the symptoms correctly. One recruit, however, was so unfortunate as to refer his pain in the liver to the left side, and was cured by the *mistura diabolica* regularly exhibited.§ The case, however, requires close examination as to the pulse, local enlargement, secretions, and excretions; and, above all, mercury (says Dr. Cheyne) should never be given in any the slightest doubtful case. The course of salivation is what is most desired by the malingerer.‖

Pain, under all its forms of *rheumatism*, *lumbago*, *sciatica*, or in

* "At the General Hospital at Chatham, this was lately practised to a great extent. The mode employed was, to take fifteen grains of hellebore, which produced great excitement, and which was maintained by taking four grains daily. The practice was introduced by a man who had been servant to a veterinary surgeon. One man took an over dose, and died in consequence."—DUNLOP.

† Hutchison, p. 151 to 161. Dr. Cheyne expresses his conviction that many soldiers have the power of quickening their pulse, when they expect a visit. Thus he has found the beats as frequent as 120 or 130 in a minute; and on returning unexpectedly in a quarter of an hour, they were reduced 30 or 40. Seamen sometimes produce this temporary quickness, by knocking their elbows against a beam.

‡ Marshall, p. 120.

§ Marshall, p. 114. This consists of Glauber's salts, infusion of tobacco, assafœtida, &c., given in small quantities, but so frequently repeated as to keep the taste in the mouth.

‖ Cheyne, p. 173.

the *hip and knee-joints*, &c. is one of the most frequently simulated diseases; and, in proportion to the facility of assuming it, must be the vigilance of those whose duty it is to detect the fraud. The inquiry should be made, in all suspicious cases, where the disease is seated — what is probably its cause — the nature of the pain — its duration — its symptoms and effects, and what remedies have been already used?

The seat of pain is either the external or the internal parts. Patients will not so readily feign the former, since the deceit is liable to be soon detected; and, in addition to this, it is generally of that kind which is deemed a slight disease. Pain in the external part is, moreover, often accompanied with heat, redness, change of colour, or tumour. Gout is sometimes pretended, and above all rheumatism, for which the soldier is always ready to assign sleeping on the ground as a cause. Both of these diseases have diagnostic symptoms — redness, &c. in the one; and tumefaction, or diminution of size, with retraction or loss of motion, in the other. But it is equally true, that there are species of severe pain in which the physician can find no external appearances to found an opinion; and of this description are scorbutic and venereal pains. Internal pain is accompanied with symptoms which it is impossible to assume, and their absence will of course lead to suspicion. Thus pain in the head is attended with loss of sleep, vertigo, fever, and sometimes with delirium; in the thorax, with cough and difficult respiration; so also in the bowels and kidneys. Each has its peculiar symptoms; which, if the disease be real, are not periodical or occasional in their attack, but incessant, and their severity is generally greater during the night. Inquiry ought also to be made concerning the cause of sickness, and a comparison drawn between it and the violence of the malady. With respect to the species of pain, we should examine whether it be sharp, heavy, or darting, and then compare this with the symptoms. It is, moreover, important to know the duration of the pain complained of; since it is very rare that it is prolonged for any length of time, without exhibiting manifest and unequivocal signs. If violent pain is stated to be present, and the patient notwithstanding enjoys a good appetite, and sleeps well, we have reason to doubt its severity. Much may also be learned from the remedies employed. Powerful ones are indicated if the disease be real, and the patient will not object to their application. It may also be proper to mix a little opium in the food of the patient; and if sleep be thus readily induced, we may form an opinion as to the magnitude of the disease.

Notwithstanding the above directions, instances have occurred of physicians mistaking real pain for feigned, and feigned for real. "I refused," says Foderé, "for fifteen years, a certificate of exemption to a young soldier, who complained of violent pain, sometimes in one limb, and sometimes in another, and occasionally in the thorax or pericranium, without any external sign to indicate its existence. He died at last in the hospital from the effects of the malady, which he always insisted was a species of rheumatism. I examined the body after death, viewed all the former seats of disease, but discovered nothing either in the membranes, muscles, nerves, or viscera; and

was hence led to believe that life was destroyed solely from the repetition and duration of these pains."* This case induced a determination in our author to be more lenient in future. Its success will be seen in the following instances. An artillerist from the garrison of Fort de Bouc, was brought to the hospital at Martigues, with a violent pain in the left leg, and which was attributed to sleeping on the damp ground. During the space of eight months, a variety of antimonial preparations, together with mercurials and tonics when indicated, were administered, along with local remedies, but without any relief. The leg, from the repeated use of epispastics and cauteries, became thin, and rather shorter than the other; while, from the low diet ordered, there was a general paleness and lankness of the system. Under these circumstances, Foderé could not refuse him a certificate as a real invalid. With the aid of a crutch he dragged himself to Marseilles, where he obtained the promise of a discharge. He was ordered to return to the fort to await its arrival; but, on his way thither, being too overjoyed, he was met by his commander walking without his crutch. On being put in prison, he avowed the fraud.

Another case was that of a deserter, a Piedmontese, condemned to hard labour. He was conducted from prison to the workshops, marching on two crutches, as being paralytic in the lower part of the body; and from thence to the hospital, where he remained thirteen months. He supported during that time, with the greatest fortitude, the application of epispastics, moxa, and cupping; asked earnestly for the trial of new remedies, and excited the commiseration of all who saw him. At the end of the above period he was dismissed. In a short time he abandoned the use of his crutches, and never employed them except when he expected to be observed.†

It is evident from these cases that the difficulty of detection is often great. "The imposition is perhaps more frequently discovered by the inconsistencies and contradictions which a patient makes in the history of his complaint, than by diagnostic symptoms."‡ There is also often a great aversion to the proper modes of cure.‖

Internal pain, the existence of which it is difficult positively to deny, may be discovered to be feigned by examination during sleep. Thus a soldier complained of severe pain in the abdomen, and screamed

* Foderé, vol. ii. p. 471. Dr. James Johnson relates of a man who complained of inability to move his shoulder-joint without much pain, and yet nothing could be seen externally for a month or six weeks, during which time he was excused from duty. At length the surgeon became suspicious, and finding that he still made the same complaint, reported him, and he was flogged as a skulker. Shortly, however, a deep-seated abscess was discovered in the shoulder-joint, from which large quantities of pus were evacuated. Anchylosis of the joint followed.—Medico-Chirurgical Review, vol. iv. p. 596. Probably the same case is given in the Cyclopædia of Practical Medicine, vol. ii. p. 250.

† Foderé, vol. ii. p. 437, 474. ‡ Marshall, p. 115.

‖ Dr. Coche relates the case of a French soldier who feigned lumbago. Six moxas were in succession applied during the ten months that he was in the hospital; and he only yielded when he saw the physician was about recommencing the use of that substance.—Annales D'Hygiène, vol. iv. p. 446. Great caution is, however, necessary in these cases, lest we mistake a real disease, psoas abscess for example, for a feigned one.

on the slightest touch to that part. He was bled, and afterwards an anodyne exhibited. About midnight he was visited by the medical officer, and found sound asleep. Pressure was made on the abdomen, and afterwards considerable kneading, before he awoke.*

Lumbago, where the body was bent nearly double, has been repeatedly removed in a moment, by Baron Percy, holding the individual in an interesting conversation, whilst an assistant approached insidiously and pierced him behind with a long needle.

Chronic rheumatism, according to Dr. Cheyne, is distinguished by some disorder of the digestive organs, impaired appetite, a degree of pyrexia in the evening, yielding during the night to perspiration. There is also some emaciation, wasting of the muscles of the affected limbs, and puffiness of the joint. The feigned, on the contrary, do not lose their healthy appearance — have no fever — do not become worse with damp weather, but are complaining at all times — and even allege that they have entirely lost the use of the part affected, which seldom happens in real rheumatism.†

An interesting case of feigned *tic douloureux*, or neuralgia, is mentioned by Dr. A. T. Thomson in his lectures. It occurred in the person of a young girl aged fifteen, who pretended to suffer great pain just back of the symphysis of the lower jaw. It produced her removal from school, the object she had in view. On a subsequent attack, Dr. Thomson resolved to try the effect of a strong mental impression; and understanding that she entertained a great antipathy against a dog, informed her that the only remedy remaining was to rub the affected part over the back of the dog. It produced an immediate removal of the disease, and it continued absent for eighteen months. This case, according to Dr. Thomson, has been published in the medical journals as an illustration of the effect of mental impressions on the nervous system. Yet, eight years afterwards, when this female had become a wife and mother, she wrote to him, stating that the whole course of the disease had been a deception.‡

It is easy to feign *hæmoptysis*, by pretending to cough, and then spitting out the blood which comes from pricking the gums; or it may be assumed by constantly holding some armenian bole or vermilion paint under the tongue, which tinges the saliva of a red colour. Periodical attacks of this disease are most commonly simulated; but it is difficult to counterfeit the accompanying marks of disease—such as the cough, flushed cheek, and even the *florid* and coagulated state of

* Marshall, p. 118.

† Cheyne, p. 170. A female presented herself, some years since, at Mr. Wardrop's Hospital of Surgery in London. She complained of most excruciating pain at the inner part of the right arm, in the situation of the biceps muscle; and this she said extended in every direction. The sensibility of the skin was such that she could not bear to have it touched. The biceps was kept in a state of continual contraction from the arm being constantly bent, and thus gave the appearance of a tumour. She spoke to Mr. Wardrop about amputation at the shoulder-joint, and professed her willingness to undergo any thing in order to be rid of this complaint, under which she had laboured for *five* years. It was ascertained that she had already been in four hospitals on a similar story. There was no fever, and her health and appearance were good.—Lancet, vol. xii. p. 603.

‡ London Medical and Surgical Journal, vol. vii. p. 101.

the blood. Orfila recommends that they should be made to spit without coughing, when the bloody saliva will be seen.

There are other persons who pretend to be afflicted with *hæmatemesis*, or vomiting of blood; and for this purpose, drink the blood of some animal, or use some coloured liquid, and then throw it up in the presence of spectators. Sauvages, in his Nosology, mentions of a young lady, who, being unwilling to remain in a convent, had some blood of an ox brought to her, which she drank, and then vomited in the presence of her physician. As no deceit was suspected, he stated that she was really ill, and she thus obtained her liberty.* A similar case is related of a female, who accused a person of having maltreated her. She went to bed, and brought up large quantities of blood without any effort. She could however sing, cry, and put herself in a passion, without the disease recurring; and it ceased when she found that the deceit would prove useless.†

Bloody urine has been frequently feigned, either by adding blood to the excretion, or by using substances that have the quality of reddening it, such as the prickly pear (Indian fig),‡ the beet root, madder, &c. The Spaniards, on their discovery of America, ate largely of the Indian fig, and were much alarmed at the consequence. It only requires cautious examination to detect deceit. The individual should be made to urinate in the presence of the physician, and the vessel used should be carefully examined both before and during the process. The blood in real cases, when subjected to heat, furnishes a brown coagulum. The attendant symptoms, also, can hardly be mistaken.§ High-coloured urine may be produced by various stimulants, such as wine, cantharides, &c. The experiment, however, is often hazardous, and foreign substances are hence more frequently used to give it the appearance of disease.‖

Hæmorrhoids have been imitated, like other hæmorrhagic complaints. So also has *menstruation*, by staining the clothes and body with borrowed blood. Baron Percy says that hæmorrhoidal tumours have been very artfully constructed, by means of small bladders inflated and tinged with blood, and attached to a substance introduced into the rectum.¶

* Mahon, vol. i. p. 361.

† Metzger, p. 462. Mr. Copland Hutchison mentions a case where a man had blood brought to him from the butcher's, and which he swallowed. (p. 178). The slaves in the West Indies have been known to swallow their own blood.—Scott, vol. ii. p. 143.

‡ Zachias, lib. iii. tit. 2, p. 290.

§ Dr. Watson on Hæmaturia, in the Medico-Chirurgical Review, vol. xxi. p. 491.

‖ A boy at Bilson (Staffordshire), A.D. 1617, accused a woman of having bewitched him, and succeeded so well in feigning convulsions, etc. that she was tried and condemned to die. Dr. Morton, the bishop of the diocese, suspected imposture, and caused him to be confined and watched. He grew apparently worse, and the urine which he openly voided was black. The good bishop almost despaired of saving the life of the female, in consequence of this dangerous situation of the boy. A vigilant spy, however, detected him in dipping a small piece of cotton in an ink-bottle placed at the side of his bed. This he put inside of the prepuce, in order to give the urine its colour when he excreted in public.—Memoirs of Literature, vol. iv. p. 357.

¶ Scott, vol. ii. p. 143.

Jaundice, when real, is known by the discoloration of the adnata, and of the urine. Clay-coloured stools are also another indication; yet it is stated that individuals in France have imitated these to perfection, by taking daily a small quantity of muriatic acid. There are several substances, as curcuma or rhubarb, which, on being taken internally, produce a yellowness of the skin; but in such cases it is proper to recollect that real jaundice is frequently accompanied with vomiting, pain, and sleeplessness. The most unequivocal symptom, and therefore the most to be relied on, is the colour of the adnata. If yellow, jaundice is present, originating either from disease or some artificial cause. A French conscript, however, always put snuff in his eyes before the surgeon's visit, to prevent their examination.*

Paleness of the skin, on the other hand, has been caused by burning sulphur, by the use of digitalis—the abuse of emetics and purgatives; but watchfulness, and preventing their use, check the effects. The general state of the system does not correspond with the appearance.†

Cachexia and *great weakness* are also often feigned, by using substances to make the face appear pale and livid. In these instances, inquire whether there is a loss of appetite, or of strength, or swelling of the legs. Examine also the pulse and the skin, whether the first be strong, and the latter hot.‡

Diarrhœa and *dysentery*. The former of these has been excited, in naval hospitals, by a mixture of vinegar and burnt cork; or a solution of sulphate of iron, obtained from the shoemakers, to whom it is furnished for blackening leather. Suppositories of soap or other irritating substances have been introduced into the rectum, to imitate the mucous discharges in dysentery; and, with such persons, of course, it is not difficult to procure the addition of blood. The stools have been broken down with their own urine. It requires watchfulness to detect these, and particularly they should be obliged to use a night-chair. Many

* Percy, quoted by Scott, &c. "In Jaundice, the urine colours linen dipped in it. This is observed in no other disease."—Quarterly Journal of Foreign Medicine and Surgery, vol. iv. p. 340.

† Orfila, Leçons, vol. i. p. 422.

‡ A very curious work was published at New-Haven in 1817, under the title of "*The Mysterious Stranger*, or *Memoirs of Henry Moor Smith*." It purports to be written by the Sheriff of King's County, New-Brunswick; and I have repeatedly understood that there is no doubt of the authenticity of all the material facts. The hero of the story was a most accomplished villain. While in the prison at Kingston (N. Brunswick), he began to spit blood, had a violent cough and fever, and gradually wasted away, so that those who visited him supposed that his death was rapidly approaching. This continued for a fortnight, and his weakness was so great that he had to be lifted up in order to take medicine or nutriment. A turnkey unfortunately, however, left the door of the prison open for a few moments, in order to warm a brick for his cold extremities: on his return, *Smith had disappeared*. After many adventures and hair-breadth escapes, he is now a prisoner in the Newgate of Connecticut. There also he has feigned cachexia, hæmoptysis, and epilepsy, but with no success. He confessed that he pretended to raise blood by pounding a brick into powder, putting it in a small rag, and chewing it in his mouth. He contrived to vary his pulse by striking his elbows; and said he had *taken the flesh off his body in ten days, by sucking a copper cent in his mouth all night, and swallowing the saliva*.

fine young men are said to have lost their lives in consequence of the use of the above substances.*

Involuntary stools. If these be solid, and the sphincter contracts on the finger, opium and solid food should be given, and a careful watch preserved. Such individuals are generally subjects for a court-martial. On one of these (who also pretended sciatica and loss of the use of his lower extremities), in the General Hospital at Lisbon, it was determined to apply the actual cautery. He was laid on the face, and held by three men. When the surgeon applied the red hot spatula to his hip, he *kicked* down one of the men who held him, and declared that he had been *shamming*.†

Vomiting. Some persons possess the power of expelling the contents of the stomach by pressure on the abdomen; others by swallowing air. It appears that nature or habit has given this to a few individuals. In many, however, frequent vomiting is a symptom of organic disease. Mr. Copland Hutchison had a case in the Baltic, where it occurred so frequently as to become alarming. It was soon observed, however, that the vomiting was periodical, occurring when the physician paid his morning or evening visit; and in the interval, the patient ate his usual allowance of food, without any injurious effect. He was watched, and it was found that he made pressure on the region of the stomach with his hands, applied under the bedclothes. Whenever these were secured, the vomiting ceased.‡

Dr. Cheyne remarks that the vomiting of *undigested* food is suspicious, and particularly advises that the case should be watched, to avoid mistakes. The stomach may be diseased. The absence of emaciation, and the continuance of a good appetite, are, however, circumstances indicating a healthy state of that organ.§ To vomiting, some, according to Orfila, have added the complaint of *difficult deglutition.*

Apoplexy will only be feigned by those who hope for immediate escape from some impending punishment. From the nature of the disease, it cannot be long dissembled. If it be necessary to ascertain the truth at the first moment of the attack, powerful remedies, such indeed as are indicated in the real disease, should be employed. Zacchias observes that feigned apoplectics cannot resist the action of sternutatories.

In *vertigo* and *headach*, the malingerers generally overact. The giddiness is too violent, and the state of the stomach is not noticed. The pulse and the eye should be particularly examined: the former is slow and irregular, and the latter inexpressive.‖

Paralysis, in many respects, requires the same treatment as rheu-

* Hutchison, p. 181. Cheyne, p. 171. † Cheyne, p. 147.

‡ Hutchison, p. 168.

§ Cheyne, p. 167. A remarkable case of voluntary vomiting occurred some years since in this country, in a distinguished public individual. I forbear relating any of the particulars, lest I might unwittingly trench on the sacred privacy of domestic affections and sorrows. "Non sibi, sed patriæ vixit."

‖ Cheyne, p. 150.

matism. It is frequently feigned to extend to the superior or inferior extremities: in other instances, a single limb only is stated to be affected by it. This last is a rare occurrence; and the existence of the disease is to be doubted, if the general health be otherwise good.

Œdema of an extremity, in these cases, is sometimes excited by the continued use of ligatures. Among the remedies most efficient, are electricity, and the actual cautery. Dr. Blatchford gave a pretended paralytic in the New York State Prison, and whose case resisted every description of medicine, a severe electric shock. He started up, ran into the hall, and asked for his dismission from the hospital. Where powerful means like these have failed, finesse or accident has succeeded in developing the fraud. Dr. Davies, at Chatham (England), knocked gently at the dusk of the evening, on the window of one who could not move, and had lain in bed for a month. On calling him gently by name, he was at the window in an instant.*

Mr. Copland Hutchison gave to one, who said he had a paralysis of the right arm, fifty drops of laudanum in his tea. When sound asleep, the doctor went into his apartment, and tickled his right ear with a feather, when instantly the lame hand was raised. A repetition of this caused more active exertion. In another instance, the right hand was said to be powerless. The patient was brought before a board of medical officers, for the purpose of being invalided if found diseased. It was winter, and the surgeon proposed that the hand, in its relaxed and useless state, might be placed over the edge of the table round which they were sitting, while assistants should keep the arm and shoulder firmly fixed. In this situation, a red hot poker was gradually brought under the hand. As it came nearer and nearer, the hand gradually rose to the full extent of the powers of the extensor muscles. A half-witted fellow brought out another, by saying that he had seen him use his arms as well as any one.†

A most obstinate case, however, according to Mr. Marshall, was that of a private, who, for two years, endured every thing that medical skill and suspicion could suggest. His complaint was paralysis of the lower extremities. He was finally sent home from the Mediterranean, to be invalided. While in the harbour an alarm of fire was given on board ship. All hurried to the boat alongside; and, on reaching the quay, the passengers were mustered. It was found that the invalid had saved not only himself, but his trunk and clothes.‡

In these, and similar cases, it is remarkable how parts of the body can be kept for so long a time (two or three years) in a state of inactivity, with hardly any diminution of muscular power. Dr. Cheyne relates some laughable instances of agility immediately consequent on

* Scott, vol. ii. p. 134. † Hutchison, p. 164.

‡ Marshall, p. 124. In another long protracted case, where the individual asserted that he had lost the power of using his lower extremities, and every attempt at detection had failed, the fraud was discovered by rubbing cowhage (*Dolichos pruriens*) on the soles of the feet at bed-time. He walked and groaned all night, and the next morning reported himself fit for duty.—Page 104.

successful deception. When the malingerers were sure of their discharge, they threw their crutches before them, and disappeared in a moment.*

In only one case (says Mr. Marshall) has he seen palsy of the upper eyelid attempted; and here the muscular resistance to every effort to raise it, shewed the deception.

It is remarkable that a disease so much dreaded by the real sufferer as *epilepsy*, should be so often feigned; yet this is really the case, and the cause probably is, the affright and pity that may be inspired; or else the short exhibition of disease that is necessary, leaving the patient to act as he pleases during the interval. In all suspicious cases, it is proper to notice whether the sick person is suddenly affected—whether the face is livid, the pupil fixed, the lips pale, the mouth distorted and frothy, and the pulse altered. The physician ought also to observe whether sleep follows the paroxysm, and also if the patient complains of dulness of sensation, vertigo, and great weakness. All, or most of these symptoms accompany real epilepsy. But the surest sign of this disease is a loss of feeling, so that sternutatories, and even the actual cautery, produce no effect during the paroxysm. This immediately gives us a mode of detecting artifice. An artillerist at Martigues had acquired, from frequent practice, such skill in feigning this disease as almost to deceive Foderé; and this, indeed, would have been the case, had he been able also to resist the application of fire. This always recovered him, though he lay apparently without sense, his eyes starting from their orbits, and his mouth foaming. He afterwards confessed, that he never counterfeited a paroxysm without feeling, for several days, a violent pain in the head.†

* I cannot forbear adding the following American case, extracted from a New Jersey newspaper. A dexterous deception was recently practised upon the court of sessions at Hackensack. A fellow who had been a long while in prison, awaiting trial on an indictment for perjury, a few days prior to the time appointed had a severe paralytic stroke, which rendered one side entirely powerless. In this helpless condition he was carried from the prison into court on a bed. The spectacle of an infirm fellow-being, trembling into the grave, on a trial for perjury, had a visible influence upon the sympathies of court and jury. The evidence, however, was so unequivocal, that the jury convicted him. During the progress of the trial he became so faint that a recess was granted, to enable him to be reconveyed to his apartment in the prison for revival, the prosecuting attorney kindly lending assistance. The court, in view of the prospect of his being speedily called to a higher tribunal, instead of sentencing him to the state prison, simply imposed a fine of five dollars, which his brother, who manifested the most fraternal solicitude, paid, and conveyed him away on a bed in a wagon. The next day, the prosecuting attorney encountered the fellow at the foot of Courtlandt Street, in New York, who told him, laughingly, that he had recovered; and then dropping his arm and contracting his leg, in true paralytic style, hopped off, leaving the learned counsel to his own reflections!

† Foderé, vol. ii. p. 464. "A case is related of a country boy, who feigned epilepsy to avoid work. A surgeon was called, who suspected the deceit, and observed to one of the bystanders, that if it was a true fit, as he thought it was, the patient would turn round on his face and bite the grass; this he did, and so betrayed himself. On occasions of this kind, it is proper to examine the mouth for soap, which is easily done by pressing the cheeks against the grinder-teeth. I once saw a pseudo-epileptic in Edinburgh, recovered by the simple expedient of calling a police-officer."—DUNLOP.

De Haen was consulted by a mother, whose daughter, after being cured of deafness, became epileptic. He directed her to be brought to the hospital at Vienna, where he attended. The fit, which at first did not occur more than once or twice a day, now recurred every hour. It resembled a real one, as the hands were violently clenched, and the eyes disordered; but he suspected deception, for the following reasons: She did not open her eyes during the paroxysm with a wink, but in the natural manner: her pulse was natural. When the curtains were drawn, the pupil of the eye was dilated; and when opened, it was contracted; and this last occurred very violently when a candle was presented. Convinced that the disorder was pretended, he ordered her to be taken out of bed, and directed the attendants to keep her in an erect posture. If she fell, they were to chastise her severely. A cure was thus effected; and she confessed that both the deafness and epilepsy were feigned, to avoid going to service. In another case, a female, aged twenty, was confined in prison for a murder, who had on her the marks of three successive burnings, which she resisted without confessing the deceit. De Haen, and many others, saw her imitate a paroxysm of epilepsy with such horrible accuracy, that the feigned was supposed to be real, until in the midst of it, being ordered to rise, she got up and walked away. In such an instance, our author recommends the remedy used at Paris. A beggar there often fell into fits in the street. A bed of straw, through compassion, was prepared, on which he might be laid, to prevent injury to himself. When next attacked, he was laid on it, and the four corners set on fire. He sprang up and fled.*

Various substances have been successfully applied to detect the imposition, as snuff blown into the nostrils, (and Mr. Hutchison remarks that he had tried this on the real without any effect;) flannel dipped into hot water, and applied to the side; a drop of alcohol poured into the eye, and pouring a small stream of water on the face. Aloes and salt insinuated into the mouth, has broken up a feigned paroxysm.†

It is denied that the peculiar appearance of the eye is always present in epileptics: It has been said to contract.‡ At all events, it is frequently difficult to ascertain its state correctly, and we must

* De Haen's Ratio Medendi, vol. ii. p. 56, &c. The following case should not be omitted: — "Maturam virginem procorum penuria torquet, angitque. Fortè casu audit a garrientibus inter sese matronis epilepsiam matrimonio nonnunquam curari. Ergo eam artificiosè fingere discit, quo cogat parentes se viro jungere."— (Ibid. p. 55.) The following is a case in point, with respect to the *aura epileptica*. Sauvages was called to visit a female, who imitated the fit to perfection. He was, however, suspicious concerning its reality, and therefore inquired whether, on the access of the disease, she felt pain extending from her arm to her shoulder, and from thence to the opposite thigh? She replied that she did, and thus led to her detection. (Belloc, p. 243.) There are also some instructive cases of feigned epilepsy in *Blatchford's Dissertation*, already referred to.

† In a late work of Mr. Marshall, which I have not been able to procure, it is stated, that a few drops of croton oil were introduced through an opening left by the loss of two teeth, and in a few minutes the pretended epileptic started on his feet, and ran to the water-closet.—Medico-Chirurgical Review, vol. xxi. p. 263.

‡ Medico-Chirurgical Review, vol. iv. p. 598.

attend to other circumstances. If the hands of the real epileptic be forced open, they remain expanded; but the feigned will immediately close them again.* The contractions also of various parts of the body always come on simultaneously in the real; nor is there any regular period in the return of the fits. Thus Vaidy, a French surgeon, detected a case by stating to the individual that the real disease always came on in the morning. He swallowed the bait, and the attack always occurred before noon.† It is also asserted, that in the real, warmth and perspiration are present during the fit; while in the feigned, they succeed it.‡

One fact should be kept in mind respecting this disease: The real epileptic is desirous of concealing his situation, and attaches to it a kind of false shame; while the feigned talks about the disease, and takes no precaution to avoid publicity.§

Convulsions, when feigned, do not present that stiffness of the muscles, or that resistance and rapidity of action, which appear in the real. The treatment must be similar to that of epilepsy. Twenty years ago, says Foderé, I proved, by the aid of fire and force applied to the antagonist muscles, that a woman, who had imposed on a good curate in the Alps, was an impostor. She was supposed to be possessed—fell down apparently without sense, and made frightful contortions. She could not, however, withstand the above tests, and rose up, to her great confusion, and the astonishment of the spectators.‖ In feigned cases, the muscles do not stiffen and contract as in real ones. Hence continued action of the antagonist ones will develope the fraud.

The following is a ludicrous feigned case of a minor form of convulsive action, confined to a particular part. A seaman pretended to have a convulsive motion of the muscles about the neck and upper part of the trunk, so as to produce an involuntary and incessant shrugging of the shoulders. The surgeon, under pretence of being very desirous to ascertain how often the alternate elevation and depression of the scapula occurred in the day, set some of his comrades to watch him; one of whom made a mark upon a board with a piece of chalk, for every shrug of the impostor. He held out nearly twenty-four hours, and then exclaiming, "You have done me!" offered to return to duty.¶

* Marc. Orfila's Leçons, vol. i. p. 414. † Marshall, p. 178.

‡ Dictionnaire des Sciences Médicales, Art. Epilepsie simulée, (by Marc.) In a real and most severe case of epilepsy occurring in a criminal at Paris, Vareliaud, the medical examiner, found the teeth worn at every point where the upper had come in contact with the lower jaw. The lower incisives, in particular, were worn extremely at their fronts; and yet the individual was only twenty-two years of age. The appearance of the teeth is hence worthy of examination in all doubtful cases. —Annales D'Hygiène, vol. iii. p. 429.

§ Dumas of Montpelier, in his work on the *Physiognomy peculiar to some chronic diseases*, mentions, that in constitutional epileptics, the facial angle is always under 80°, and recedes from that to 70°. He found this to be the case in many instances, at the hospital in Toulouse.—London Medical and Physical Journal, vol. xxvii. p. 38.

‖ Foderé, vol. ii. p. 468.

¶ Edinburgh Medical and Surgical Journal, vol. xxx. p. 179. A somewhat similar case occurred to Dr. Elliotson.—Lancet, N S. vol. vii. p. 273.

Chorea is sometimes attempted by our mendicants. It would tend to discover the reality of the disease if we applied the suggestion of Darwin — forcing them to make perpetual and repeated efforts to move the limb in the designed direction. They should be secretly watched.

Catalepsy would most probably seem to be a form of hysteria: at least, this will best explain most of the cases now occurring.* Its peculiar characteristics are, that the patient becomes suddenly motionless, while the joints remain flexible, and yet external objects make no impression. In so mysterious a disease, if there be any cause for suspicion, the remedies already indicated should be applied. Dr. Gooch quotes the following feigned case from Mr. Abernethy's Hunterian Oration:—

"A patient in the hospital feigned to be afflicted with catalepsy; in which disorder it is said a person loses all consciousness and volition, yet remains in the very attitude in which they were suddenly seized with this temporary suspension of the intellectual faculties. Mr. John Hunter began to comment before the surrounding students on the strangeness of the latter circumstance; and as the man stood with his hand a little elevated and extended, he said, 'You see, gentlemen, that the hand is supported merely in consequence of the muscles persevering in that action to which volition had excited them prior to the cataleptic seizure. I wonder,' continued he, 'what additional weight they would support;' and so saying, he slipped the noose of a cord round the wrist, and hung to the other end a small weight, which produced no alteration in the position of the hand. Then, after a short time, with a pair of scissors, he imperceptibly snipped the cord. The weight fell to the ground, and the hand was as suddenly raised in the air, by the increased effort which volition had excited for the support of the increased weight. Thus was it manifested that the man possessed consciousness and volition, and the imposture stood revealed."†

Feigned syncope, or *hysteria*, cannot resist the action of sternutatories. In the former, it is difficult to dissemble a small, feeble, and languishing pulse, an almost suppressed respiration, cold sweats, coldness of the extremities, and paleness of the countenance. Cases are, however, mentioned, where individuals have possessed the power of suspending, or at least moderating, the action of the heart; as, on the

* The following references to some cases may assist in forming an opinion:
Memoirs of Literature, vol. iii. p. 100, 194. Cases by Deidier.
Medical Commentaries, vol. x. p. 242.
American Medical and Philosophical Register, vol. i. p. 47. Case by Dr. Stearns.
Cyclopædia of Practical Medicine, Art. Catalepsy, by Dr. Joy.
Edinburgh Medical and Surgical Journal, vol. xxxix. p. 409.
Medico-Chirurgical Review, vol. viii. p. 201.
Lancet, N. S. vol. vi. p. 227. A case treated by Dr. Duncan, jun., in the Edinburgh Royal Infirmary.
Ibid. N.S. vol. xi. p. 532; vol. xvi. p. 129.
Dr. Copland's Dictionary of Medicine, Art. Catalepsy.

† Transactions of the London College of Physicians, vol. vi. p. 272.

contrary, some have been able to increase it at will. Dr. Cleghorn, of Glasgow, mentions, in his lectures, of a person whom he knew, who could feign death, and had so completely the power of moderating the action of the heart, that its pulsation could not be felt. This man, however, some years after, died suddenly.*

Somnolency. There are several cases on record of the long continuance of this state; some of which were feigned, and others, to say the least, doubtful in their nature. Dr. G. Smith makes mention of a soldier named Drake, who assumed an appearance of total insensibility, and resisted for months every sort of treatment—even the shower-bath and electricity; but, on a proposal being uttered in his hearing, to apply red hot iron, his pulse rose, and an amendment shortly took place.†

The case of Phineas Adams, which lately occurred in England, shews to what individuals will submit, in order to escape punishment. He was a soldier in the Somerset militia, aged eighteen years, and confined in gaol for desertion. From the 26th of April to the 8th of July, 1811, he lay in a state of insensibility, resisting every remedy, such as thrusting snuff up the nostrils, electric shocks, powerful medicines, &c. When any of his limbs were raised, they fell with the leaden weight of total inanimation. His eyes were closed, and his countenance extremely pale; but his respiration continued free, and his pulse was of a healthy tone. The sustenance he received was eggs diluted with wine, and occasionally tea, which he sucked in through his teeth, as all attempts to open his mouth were fruitless. Pins were thrust under his finger-nails to excite sensation, but in vain. It was conjectured that the present illness might be owing to a fall; and a proposal was consequently made by the surgeon to perform the operation of scalping, in order to ascertain whether there was not a depression of the brain. The operation was described by him to the parents at their bedside of their son, and it was performed; the incisions were made, the scalp drawn up, and the head examined. During all this time he manifested no audible sign of pain or sensibility, except when the instrument with which the head was scraped, was applied. He then, but only once, uttered a groan. As no beneficial result appeared, and as the case seemed hopeless, a discharge was obtained, and he was taken to the house of his father. The next day he was seen sitting at the door, talking to his parent; and the day after, was observed at two

* Paris's Medical Jurisprudence, vol. i. p. 360. See also Male, p. 267; Hennen, p. 466.

† Smith, p. 471. Edinburgh Annual Register, vol. ix. part ii. p. 49. Dr. James Johnson says, that he detected the imposture of Drake on the day he was landed at Portsmouth, by attempting to introduce a piece of aloes into his mouth. He felt the resistance of the muscles.—Medico-Chirurgical Review, vol. iv. p. 598.

"So well did this man acquit himself, that, after he was removed to the York Hospital, many of the medical men were then, and still are of opinion, that the disease was real. I attended him at Hillsea, along with Dr. Hennen and Dr. Knox, now of Edinburgh, who had the immediate charge of him; and from every thing I saw, and many experiments I made, I have not the slightest doubt that he was an impostor."—Dunlop.

miles from home, cutting spars, carrying reeds up a ladder, and assisting his father in thatching a rick.*

Mr. Dease states a case where a female servant, on receiving a slight injury from her master, ran to the door—said she had been almost murdered, and to corroborate it, fell into a fit. She was carried to a hospital, and lay for ten or twelve days without shewing the least sign of sense or recollection. Mr. Dease, on being called into consultation, soon detected the imposture, and the woman almost immediately disappeared: but popular indignation had nearly ruined the individual in property, and consigned him for a time to a gaol.

Even *hydrophobia* has been attempted to be feigned both in England and France, but with little success.† And I have seen it stated in an extract from the United Service Journal, that a beggar once attempted *tetanus* at St. Bartholomew's Hospital. Mr. Abernethy, however, suspected the imposition; and, turning to one of the surgeons, as if in consultation, remarked what a remarkable symptom, in the last stage of this disease, incessant winking of the eyes was. The patient immediately began to wink with both his eyes.

Nostalgia, or *maladie du pays*, is a disease common in military hospitals. This mental affection, if carried to excess, soon produces a physical one; and a mixed state is produced, in which all the marks of melancholy and hypochondriasis are visible. Young men are more subject to it than persons advanced in life; villagers more than citizens; and, among nations, it is found to prevail most in the Swiss, the Savoyards, the inhabitants of the Pyrenees, the Flemings, &c. Besides the above considerations, and that alteration of countenance which it is impossible to feign, it may be added, that "pretenders generally express a great desire to revisit their native country, whilst those who are really diseased are taciturn, express themselves obscurely on the subject of their malady, dare not make an avowal, and are little affected by the consolations which hope or promises offer to them."‡ The healthy colour, the strength and regularity of the pulse, and the aversion to low diet and setons, also serve to distinguish the one from the other.§

It has been attempted to imitate *scrofula*, by exciting ulcers in the neck and lips with euphorbium or other acrid substances. Cicatrices from these have been exhibited. The scrofulous ulcer cannot, however, be imitated. *Scurvy*, also, was feigned by the French conscripts; but they could not advance further than a bleeding state of the gums, induced by potash, &c.‖ Various *cutaneous affections*, as *tinea capitis*,

* Edinburgh Annual Register, vol. iv. part 2, p. 159. A remarkable case, about which there appears to be some doubt, is related by Dr. Hennen, p. 458. The *approach* (*not the touch*) of a hot iron caused abundant marks of sensibility.

† Orfila, Leçons, vol. i. p. 425. Medico-Chirurgical Review, vol. ix. p. 261.

‡ Foderé, vol. ii. p. 463.

§ Orfila, Leçons, vol. i. p. 412.

"The only two cases of nostalgia I ever happened to meet with, do not bear out the general remark, that an inhabitant of a hill-country, or a village, exclusively, is liable to this disease. The first was a recruit, a country lad, from the fens of Lincolnshire, who died under my charge, on his passage to Canada in 1813; and the other, a London pickpocket, whom I saw this year (1824) in the hulks at Sheerness." —Dunlop.

‖ Orfila, Leçons, vol. i. p. 426.

pompholyx, &c. have been produced by the application of nitric acid or blisters.

Incontinence of urine. Two deserters were brought to the hospital at Martigues, on account of this disease. Foderé was the attending physician, and applied epispastics to the perinæum—a remedy which he in previous cases had found useful—but without success. They were discharged; but it was shortly discovered that they had feigned the disease. The consequence was an epidemic incontinence of urine among their companions that remained. This awakened the suspicion of our author: and, above all, surprised that his remedy produced no effect in any case, he ordered that the penis of every patient should be tied, and on the knot a seal placed, which none but the gendarme who guarded them should have power to break, at such times as they wished to urinate. He charged the guard to visit them from time to time, to observe whether the penis was inflated, and also whether the urine was not discharged *guttatim*. He did this from having observed that, in real incontinence of urine, the penis becomes enlarged, so as to render it necessary to remove the ligature in a very short time. The expedient succeeded; it was removed only at the ordinary period, and in twenty-four hours the epidemic vanished.*

Dr. Hennen observes that this disease is almost always detected by giving a full dose of opium at night, without the knowledge of the individual, and introducing the catheter during sleep; or by taking him by surprise during the day, and introducing the same instrument, when it will be found that the urine has not drained off *guttatim* as it was secreted, but that the bladder possesses the power of retention.† Dr. Comyns cured its epidemic appearance in an Irish regiment, by prescribing a cold bath every morning and evening in Lough Neagh.‡ In ordinary practice, it is a very rare disease. The prepuce and glans penis are found to be pale from its continuance, and the clothes exhale an ammoniacal odour.

Gonorrhœa has been imitated by soldiers, with caustics applied to the prepuce.§ *Stricture*, also, would seem to be a complaint with naval officers who wish to leave their ship. Dr. Hutchison detected several, by engaging them in conversation, while he succeeded in introducing the bougie.

Chemistry supplies us with the means of ascertaining deceit when the *excretion of calculi* is feigned. It teaches the characters which designate their animal origin.‖ A physician was consulted by the friends

* Foderé, vol. ii. p. 481.

† Hennen's Principles of Military Surgery, p. 455. In a very interesting inaugural dissertation on feigned diseases, published by Dr. Blatchford in 1817, it is stated that *suppression of urine* was a frequent disease among the female convicts at the New York state-prison. The author, who was the resident physician there for some time, relates two cases, in which the frequent use of the catheter obviated all the evil effects that a *voluntary* suppression might have produced, and also indicated when the complaints of pain and distress were groundless.—Pages 71 and 74. By a reference to old registers, he found that this was a common complaint immediately after the initiation of every "resident physician."

‡ Cheyne, p. 150.

§ Dr. De Brus. American Journal of Medical Sciences, vol. i. p. 378.

‖ "Dr. Thomson of Edinburgh, while a young man, as a chemical experiment,

of a young lady of high respectability, concerning a very painful disease to which she was subjected. She was said to be frequently ill, and during the attack to void, with agonising pain, concretions in her urine. A certain number of these being discharged, she felt relief. A parcel of these urinary concretions was handed to a physician, who instituted experiments on them, and found, what indeed was obvious on inspection, that they were nothing but common sand and pebble-stones. Of these, it was asserted, she had excreted not less than several pint measures in the course of two or three years. No motives were assigned for this lady's extraordinary conduct.*

Mr. James Wilson mentions a case where pieces of slate had been introduced into the urethra of a boy, and a request was then made to perform the operation of lithotomy. The object, he imagines, was to excite commiseration, and thus obtain money, or possibly to extort it from the surgeon, had he seriously attempted any operation.†

Dr. Elliotson speaks of a woman, who shewed sundry concretions which she stated had been passed with the urine, and gave her great pain. They were found to be solely carbonate of lime (a rare constituent of urinary calculi); and on being shewn to Dr. Wollaston, he ascertained, by a lens, that they were the backbones of sprats.‡ Soldiers have frequently taken scrapings from the wall, or a stone, and mixed it with their urine.

"It is curious to observe," says Foderé, "how many young men have, during the last twenty years, worn convex glasses, in order to acquire *myopia* or *near-sightedness;* which, however, is not the certain consequence, but more commonly this practice leaves a weakened and defective sight, differing from it, and also from that which is the effect of old age. It is not from an inspection of the eye, nor from the account of the individual, that we can judge concerning the reality of the complaint; but it may be ascertained by presenting an open book, and applying the leaf close to the nose, or by putting on glasses proper for near-sighted persons. If the individual cannot read the book distinctly when placed thus, or when the above glasses are used, we may

examined some of the sand which a woman alleged she had passed from her bladder, and found micaceous particles in it, which put an end to the imposture. A poor woman in the Glasgow Infirmary, who was less of a geologist than her compeer, used pounded coals for a similar purpose."—DUNLOP.

* Edinburgh Medical and Surgical Journal, vol. vii. p. 488.

† Wilson's Lectures on the Urinary and Genital Organs, p. 183. There are many similar cases: one by Dr. Livingstone of Aberdeen, where stones were found sticking in the vagina.—Medical Commentaries, vol. iv. p. 452. By Dr. Thomas Thomson, where he detected micaceous particles in the alleged gravel.—Annals of Philosophy, vol. iv. p. 76. By Sir Astley Cooper, of Mr. Cline, who was about operating on a female, but discovered that the body had not the hardness of stone, and finally drew from the vagina several pieces of coal.—Lectures, vol. ii. p. 129. By Dr. Elliotson.—Lancet, N. S. vol. x. p. 135. Pebbles have for a time been passed off as gallstones.—Medico-Chirurgical Review, vol. xxii. p. 231.

‡ London Medical Gazette, vol. vii. p. 239. Siliceous matter, in very minute quantity, appears to have been found in gravel by Dr. Venables.—Journal of the Royal Institution, vol. ii. p. 256. The most remarkable case, however, is that given in a recent number of the Edinburgh Medical and Surgical Journal (vol. xli. p. 127), by Dr. Hill of Greenock. Several minute calculi were passed, which Dr. William Gregory ascertained by chemical experiment to consist of silica solely.

feel confident that his disease is feigned."* This mode of examination should be strictly adhered to; since, as far as my observation has extended, no complaint is more frequently urged by those who wish to avoid military duty, than near-sightedness.

Ophthalmia has often been artificially excited by the application of various stimulant remedies. It is, however, detected by the rapidity of its progress. *It arrives at its acme within a few hours after the application of the acrid substance.* Some information may also be derived from noticing which eye is affected. A few years since, when an extensive system of deception prevailed in the British 28th regiment of foot, Dr. Vetch observed that the counterfeit inflammation was almost solely confined to the right eye.† A left-handed man would probably inflict the injury on the left eye.‡

No disease has been more extensively feigned than this, both in the English and French armies. Twelve per cent of the inefficient conscripts belonging to the department of the Seine, were rejected from this cause;§ and several hundred men, in various British regiments, have been affected at one time.‖ The articles principally used have been salt, sulphate of copper, corrosive sublimate, cantharides, alum, tobacco-juice, lime, and nitric acid.¶ Sometimes the progress of the epidemic was stopped by removing numbers, in a state of nudity, to a new ward. They could not carry these articles with them. But the most efficient remedy appears to have been the alteration of the pension regulations. They ordained that no soldier should be discharged for the loss of one eye only. Dr. Hutchison found it necessary, in some instances, to put on the strait waistcoat, and thus prevent the hands from doing injury.

That species of *blindness* which originates from amaurosis, is strongly characterised by the dilated and fixed pupil. There are, however, cases in which the pupil retains some contractile power, although we know the sight to be lost. In such an instance, epispastics and setons are proper; and, if suspicion exists, the patient should be watched, to see whether he does not avoid obstacles put in his way. If this be carefully pursued, the deceit is often detected. The following case, however, occurred to Mahon:—A young conscript was sent to the corps blockading Luxemburg. Having passed the night at the advanced posts, he, on the next morning, declared himself blind, and was sent to the hospital. The surgeons used the most powerful remedies, and were convinced that the disease was feigned, as the pupil contracted perfectly. He assured them, however, that he could not see; thanked them for their care of him, and asked for the application of new remedies. He was sent to the superior medical officers at

* Foderé, vol ii. p. 480. "There was a young French surgeon in Edinburgh, in the year 1819, who was naturally short-sighted, but not sufficiently so to excuse him from military duty. He avoided the conscription, however, by habituating himself to read with a book close to his eyes."—DUNLOP.

† Edinburgh Medical and Surgical Journal, vol. iv. p. 158.

‡ Hennen, p 465. § Scott, p. 148.

‖ Edinburgh Medical and Surgical Journal, vol. xxxviii. p. 139. Scott, Cheyne, etc. ¶ Cheyne, p. 130.

Thionville. They, also, were convinced that it was a fraud; but, having learnt the course that had been pursued, they determined on a last trial. He was put on the bank of a river, and ordered to walk forward. He did so, and fell into the water; from which, however, he was immediately taken by two boatmen, stationed for that purpose. Convinced of his blindness, but unable to explain the dilatation and contraction of the pupil, the surgeon gave him a discharge, but warned him, at the same time, that if his disease was feigned, it would prove of no avail, as it would sooner or later be ascertained that he was not blind. They offered him another, if he would confess the fraud. He hesitated at first; but, being at length assured that they would keep their word, he took up a book and read.* "The proof in this case," says Foderé, "would have been complete, if, instead of a river, he had been put on the edge of a precipice, where he might see that nothing could prevent his destruction—*but what if he had been really blind?*"

A dilated pupil and inactive iris, the common characteristics of amaurosis, have been produced by the application of the extract of belladonna or hyoscyamus to the skin around the eye; and above two hundred conscripts in France succeeded, by this means, in being declared amaurotic. Dr. Marshall has also seen these effects temporarily produced by infusing the leaf of the *Datura metel* into a man's food. The eye is, however, more or less red from local applications, and we should also remember that their effects are temporary.†

Nyctalopia (night-blindness) was much feigned by the soldiers in the expedition to Egypt under Sir Ralph Abercrombie. It was difficult to detect it, as the disease in that country is epidemic. All inconvenience was, however, obviated by joining a blind man with a seeing one in the works; and when the sentries were doubled, a similar arrangement was made — hearing being often more important on an outpost than seeing.‡

Pretended deafness may be detected by making a noise at a moment least expected. This excites a sensation which it is difficult to conceal. Acute persons will also always find some mode of ascertaining the truth. A deserter, condemned to labour in the canal at Arles, said he was deaf, and passed for such with his comrades and guards. Being brought before the inspector to be examined, he appeared such as he stated, until Foderé spoke to him in a low tone of voice, saying, "You cannot persuade me that you are deaf; but if you will confess the truth, you shall have your discharge." To the astonishment of all, he answered, "Very well; I am not deaf."§ Again, a conscript stated that he was deaf. The general who visited for the purpose of examination, let fall a piece of silver behind him. The deaf person turned his head round towards the place from which the noise proceeded, and by this means was detected.‖

"Who would believe," says Baron Percy, "that, by exercise,

* Mahon, vol. i. p. 360.

† Marshall, p. 112. The effects of henbane do not last, according to Orfila, beyond twenty-four hours; and those of belladonna beyond six.

‡ Cheyne, p. 146. § Foderé, vol ii. p. 475. § Belloc, p. 252.

some young men have so successfully affected deafness, that a fire of musquetry exploding suddenly at their side could not draw from them the least mark of fear or surprise? I knew one, however," he adds, "who betrayed himself at last before his judges, at the sound of a small piece of money designedly dropped on his foot, while it was whispered in his hearing, that he was surely going to be discharged."*

Deafness cannot long be present without producing a peculiar cast of countenance. It also, in real cases, comes on vastly slower than with the simulated.†

Some of the French conscripts excited diseases of the ear, and particularly fœtid discharges, by introducing blistering plasters, peas, and other substances into it.

Those who pretend to be *deaf and dumb* have a still more arduous part to play, and need an art and perseverance of which few are capable. Such who are really in that unhappy situation acquire a physiognomy and certain gestures which it is difficult to assume, and which it is impossible to prepare for every examination that may be made. In reviewing the histories of those pretending deafness and dumbness, it has been found, says Foderé, that women have been the most successful; and the sex fondest of talking are the most capable of feigning dumbness.

The Abbé De L'Epée was deceived by a pretended deaf and dumb person, who feigned to be the son of Count De Solar. Sicard, however, his successor, was more fortunate in detecting the villany of another, whose ingenuity resisted, for four years, an infinite number of investigations made on him in France, Germany, Switzerland, Spain, and Italy. This young man was named *Victor Foy*, and was from Luzarche, six leagues from Paris; but called himself *Victor Travanait*—travelling, as he said, in search of his father, but in reality to avoid military duty.

He was imprisoned in various countries, watched closely, and examined most rigidly, without being detected. So perfectly, indeed, had he accustomed himself to his part, that, when he avowed the fraud, to use his own expression, he had unlearnt how to hear. In Switzerland, he was tempted by a young and beautiful woman, who offered him her hand, but without effect. In the prison at Rochelle, the turnkey was ordered to sleep with him, to watch, and never to quit him. He was repeatedly awakened in a violent manner, but his fright was expressed by a plaintive noise, and in his dreams guttural sounds alone were heard; and the hundred prisoners, who were all ordered to detect him if possible, could discover nothing from which they could imagine deceit. At last the officer charged with the police of the prison of Rochelle became satisfied, after many examinations, that he was really deaf and dumb, and declared this in the public journals, so as to obtain his liberty. Victor unhappily, at this period, went beyond

* New York Medical Repository, vol. xvii. p. 359.

† "In the York Hospital, we had a soldier who feigned deafness so well, that firing a pistol at his ear produced no effect. We tried the experiment after he had been put to sleep by opium, and he started out of bed."—Dunlop.

his capacity. He stated himself in writing to be an *élève* of the Abbé Sicard. This ingenious and worthy individual denied the fact without seeing him, and proved it from the writing. "I cannot tell," said he in a letter to the counsellor of state, Real, "whether this person, confined at Rochelle, be really Victor Travanait, or not; but I can say positively that he was not born deaf and dumb." The reason which he assigned for this opinion was, that he wrote from sound, while the deaf and dumb write only as they see. In his letters he appeared so ignorant as to divide some words, and annex prepositions to others as if they were constituent parts. The following extract will serve as a specimen:—"*Je jur de vandieux; ma mer et né en Nautriche; quhonduit* (pour *conduit*); *essepoise* (pour *espoir*); *torre* (pour *tort*); *ru S. Honoret; jai tas present* (pour *j'étais présent*); *jean porte en core les marque* (pour *j'en porte encore les marques*)." It will be observed that, in this letter, Victor uses *q* instead of *c;* and from this Sicard inferred that he had heard and knew that the sound of these gutturals was similar. He concluded by stating his conviction that Victor was not born deaf, and of course was not dumb.

The criminal was now brought to the institution for the deaf and dumb at Paris, and placed before the black board. He was ordered to write answers to questions put to him by Sicard, which he did in so able a manner, and eluded the most embarrassing questions so ingeniously, that nothing but his orthography could yet be adduced against him. Sicard had taught his pupils to articulate sounds, and he had done this by shewing them the words, as it were, by the apparent effects of touches on a musical instrument, and then pressing their arms more or less strongly. During this operation he obtains at pleasure the hard or soft consonant, which serves as a sign for the required articulation. Victor, when put to this proof, instead of the syllable *pa*, pronounced only the vowel *a*, and never uttered the labial consonant, which all the deaf and dumb easily articulate. He was then put to the last test. When asked how he had been instructed, he answered by signs, and promised to explain by them such words as they might write on the black board, but could not do so. He was then placed among those who were really deaf and dumb, but understood nothing from them, nor could they comprehend him. Frightened at this detection, and still more so at the threat he had heard, that he would be confronted with the pastry-cook to whom he had been an apprentice, he at last took up a book and read.*

It is an observation of the author from whom I have taken this case, that it was Victor's folly alone which detected him. Had he not asserted that he was a pupil of Sicard, he might have escaped. But he was ignorant that all were educated alike, and, of course, should express their ideas in a similar manner.†

* Foderé, vol. ii. p. 478–9. When Mr. Clerc, the distinguished teacher of the deaf and dumb at Hartford, visited Albany, he informed me that he was one of the pupils who assisted in detecting Victor.

† A case of pretended deafness and dumbness in this country, by a person named *James Stilwell*, was detected by Mr. Clerc in 1822. The imposture, in this instance, was, however, more clumsy than in the one in the text.—See the National Gazette,

If the tongue retains its muscular power, the person pretending to be dumb is doubtless an impostor. Orfila recommends that they should be made to sneeze, and the sonorousness of the sound noticed.

Stuttering and *stammering*, if the organs of speech were sound, were treated by the French surgeons on the starvation plan, until the subjects of it called for their food without any hesitation in articulating.*

The number and variety of feigned diseases connected with *tumours* and *enlargements* are really remarkable. The following can hardly be characterised, but it shews how much we ought to distrust that affectation of modesty which will not permit a complete investigation. A young female at Strasburg, from the enlargement of her abdomen, had led the public to doubt the purity of her character. The distension continued so long as to dissipate the suspicion; and for thirty-nine years she continued to increase in bulk, and excited the commiseration and charity of all who saw her, in such a manner as to lead a highly comfortable life. Her case excited the attention of the physicians and surgeons; and they waited with some impatience until her death should develope the nature of this extraordinary disease. No tumour was found; but in her wardrobe was a sack or cushion weighing nineteen pounds, and so made as to fit the shape of the abdomen. This female would never allow a medical man to examine the seat of her pretended disease.†

Sauvages, in his Nosology, makes mention of a mendicant who gave to his child all the appearances of *hydrocephalus*, by opening the integuments of the head near the vertex, and then introducing air between them and the muscles. This infamous fraud was discovered by removing the patch which covered the hole, and prevented the air from passing out. A mountebank at Brest produced similar inflations, together with the appearance of the most hideous deformity in a child, by means of the introduction of air, and the application of ligatures on various parts of the body;‡ and, not long since, a female in France, by the same mode, caused an *emphysema* of the abdominal parietes, so as to resemble dropsy.‖ Tumours of this nature are readily produced, since the cellular texture is spread over the whole surface of the body, and air may be introduced through the smallest possible aperture. We must, however, recollect that dropsy, hydrocephalus, and emphysema, are marked by stronger and more conclusive symptoms than the mere existence of tumour. A French conscript is said

September 14, 1822. Other cases of pretended deafness and dumbness are related by Marshall, p. 156; and Cheyne, p. 143.

"Foderé says, that a good way to detect pretended deafness and dumbness is to say something deeply interesting to the patient in his presence, and mark the effect it produces on his countenance. Whether the *Great Unknown* has studied Foderé or not it is impossible to determine, but he illustrates this admirably in Peveril of the Peak, where Fenella betrays herself on hearing that Julian is assassinated."—DUNLOP.

* Marshall, p. 130.

† Mahon, vol. i. p. 362, from the Acta Naturæ Curiosorum.

‡ Foderé, vol. ii. p. 485, quoted from the bulletin of the Society of Emulation.

‖ Foderé, ibid.

by Beaupré to have excited *ascites*, by injecting water into the cavity of the abdomen.* *Anasarca* of the lower extremities has been pretended by means of ligatures.

In 1811, thirty or forty soldiers were admitted into the hospital at Dublin, for, as was stated, *dropsy* and *intermittent fever*. The abdomen was greatly distended and tympanitic, and they complained of great thirst; but the tongue was clean, pulse regular, and urine natural. They were soon cured by the *mistura diabolica*.† A French conscript had the power of producing *tympanites* of the stomach, and enormous distension of the abdomen, by swallowing air.

Physconia was also at one time very prevalent as a feigned disease in India, and supposed to have been caused by swallowing toddy, with large quantities of rice-water. Smart purgatives would often remove the disease in the afternoon, but in the morning it frequently returned. Some would appear to have the power of simulating it, by elevating the spine at the loins, when placed on the back for examination.‡

A *prolapsed rectum* and *uterus* have each been imitated by means of a portion of animal intestine, in which a sponge filled with a mixture of blood and milk was placed. It was fixed into the vagina or rectum, in such a manner that one of its extremities was left hanging out.‖ *Polypus of the nose* was simulated, according to Percy, by introducing the testes of cocks and hares' kidneys into the nostrils;§ *hydatids of the uterus*, by means of vesicles prepared from the intestines of a pig, and constructed so as to resemble a string of beads;¶ a *malignant tumour* of the same organ, by introducing a sponge.**

Even the *Barbadoes leg* has been imitated by the long-continued use of ligatures. In a man sent home from India for a discharge, the thigh measured in circumference 22¾ inches, the calf of the leg 17½, and the ancle 15 inches. In six days after the removal of the ligature, the thigh had decreased to 20 inches, and the other parts in proportion.††

Hydrocele. This disease is imitated by introducing air through a small incision, or it has been actually excited by injecting fluids. Some surgeons in the French army were convicted of doing this, and severely punished. The appearance of *hernia* has been produced in the same way, or its sac imitated with the bladder of an ox. A receipt for producing hernia by inflation seems to have been current in the British army.‡‡

Some men have, however, the power of retaining the testes in the groin, by the voluntary action of the cremaster muscles; and the swellings thus resulting have been mistaken for hernia. An individual of this description was detected by Mr. Hutchison. He, to use his

* Marshall, p. 153. † Cheyne, p. 169. ‡ Marshall, p. 151, 152.
‖ Mahon, vol. i. p. 357. § Scott, p. 151.
¶ Ibid. p. 142. Detected by Professor John Thomson in Edinburgh.
** Medico-Chirurgical Review, vol. xxi. p. 153. Detected by Mr. Lawrence in London.
†† Scott, p. 154. ‡‡ Sir A. Cooper's Lectures, vol. i. p. 75. Cheyne, p. 129.

own language, soon proved an *alibi* of the testicles from their proper domicile in the scrotum, and caught them peeping through the pope's eyes: the scrotum was an empty bag. The man, on being detected, acted like a philosopher; and, "seeing no longer any chance of eluding the king's service, displayed several remarkable feats of the power he possessed over these organs. He pulled both testes from the bottom of the scrotum up to the external abdominal rings, with considerable force, and again dropped them into their proper places with incredible facility. He then pulled up one testis, and after some pause the other followed, as the word of command was given; he then let them both drop into the scrotum simultaneously. He also pulled one gradually up, whilst the other was as gently descending; and he repeated this latter experiment as rapidly as the eye could well follow the elevation and descent of the organs, so that my assistant and myself were not only surprised, but so exceedingly amused, that we could hardly believe the evidence of our senses."*

Every writer on feigned diseases notices *contractions* and *deformity*, and their consequence, *lameness*. The subjects will maintain particular joints for so long a time in one position, that they assume the appearance, on a superficial examination, of being anchylosed. In consequence of inaction, also, and the use of ligatures, these parts often become thin. Patient and long-continued watching, combined with the use of appropriate remedies, and at the same time disguising the appearance of suspicion, will often succeed in detecting the real nature of the case. An emetic has been given, and during the sickness produced by it the contracted limb has been found to yield to a very slight force. Electricity has been effectual with some; a pulley with others. The French surgeons attached a weight to a riband placed around contracted fingers, and in a few minutes, not exceeding ten, the disease was removed. They also made those who complained of contraction of the lower extremities support themselves for some time on the healthy leg alone: the trembling and elongation of the other soon manifested the deceit.† "A tourniquet may be placed on the limb above the joint, by which the muscles are prevented from acting, and the joint becomes in consequence movable."‡

Again, feigned cases have been detected by an examination of the part during sleep, or by engaging the person in interesting conversation, or by making continued flexion of the healthy extremity. The diseased one has thus been forgotten, and it insensibly returns to its natural state. Yet, with all the keenness that long experience may be expected to produce, there are many who succeed in deceiving the

* Hutchison, p. 187. In Vidocq's *Memoirs* (which I presume are to be taken with a grain of allowance), frequent allusions are made to the talents of French rogues and villains in counterfeiting diseases. Tobacco-juice was swallowed by them to produce fever; and at the Bicêtre they taught one another how to produce wounds and sores. Vidocq himself made his head to swell like a bushel; and he says, "it gave no pain, and all traces of it could be removed by the day following." A murderer, who had suffered a long confinement, in order to obtain a moment's sunshine, counterfeited death so well and so often, "that, when he actually breathed his last sigh, two days passed before they took off his iron collar."

† Orfila, Leçons, vol. i. p. 468. ‡ Scott, vol. ii. p. 139.

examiner. "A convict who was confined on board the Retribution hulk at Woolwich, during the period of his sentence, which was seven years, kept his right knee bent so as not to touch the ground with his foot all that time; and he was, on that account, not sent to hard labour with the other convicts. He was commonly employed in executing light jobs, which he could do in a sitting posture. When he moved from place to place, he used to hop upon the left foot with the assistance of a stick. At the end of the seven years he was discharged; and upon going away, he very coolly observed, 'I will try to put down my leg—it may be of use to me now.' He did so; and walked off with a firm step, without his stick, which he had previously thrown away."*

Some of the best formed men in the British army feigned various distortions—as of the spine, the chest, or the limbs. It is hardly necessary to say, that nothing but careful and repeated examination will detect the fraud. *Wry neck* was also not uncommon in France. In real cases of this disease, according to Orfila, the sterno-cleido-mastoideus of the opposite side is not tense; but in feigned ones it is. The impostor, also, cannot readily turn his eyes to the side opposite to the contraction.†

Ulcers are frequently induced by the use of epispastics, acetate of copper, quicklime, the juice of euphorbium, or other acrid plants; and real ones are often prevented from healing by similar means. Some, again, cause them by rubbing the part, and they have been known to keep up irritation by thrusting pins through the bandages. Besides noticing the nature of the discharge, whether it be pus or sanies, and also attending to the habit of the patient, it is sufficient to mention, that ulcers caused intentionally are readily distinguished from real ones, since their borders are less callous, their surfaces more superficial, and generally less painful; and by the use of lukewarm water, and covering them with lint, they are readily healed; and the reason for this is, that they do not originate from or accompany a disease of the system. Frauds of this description are frequently attempted in hospitals, or to avoid the performance of labour of every kind. In 1810, a fellow enlisted in the marines at Portsmouth (England), and received his full bounty. In a few days it was discovered that he had a very bad leg. On investigation, it was proved by his wife and others, that to avoid

* Scott, vol. ii. p. 138. A writer in the Boston Medical and Surgical Journal, vol. viii. p. 284, suggests the idea, that the sudden recovery of lost powers is not a positive proof of malingering. To a certain extent this may be true; but these cases it will not be so difficult to decide as those of an opposite description. A man is struck with a stick or hammer about the hip-joint; he recovers from the external bruises, but continues lame. Nothing that indicates injury can be discovered on examination; but remedies produce little or no effect, and the individual walks with a crutch. A case of this kind became the subject of a lawsuit in Glasgow some years since. The injured thigh had sensibly diminished in size, but this was attributed, by the witnesses on one side, to the prosecutor not giving the limb its due share of motion. It is, however, well put, that if this was a case of feigned disease, the inactivity, being only for the public eye, would have been so trifling as not to cause this extenuation. The *probability* was therefore in favour of its reality.—Lancet, N. S. vol. viii. p. 740, from the Glasgow Medical Journal.

† Orfila, Leçons, vol. i. p. 409.

going on duty, he had made an incision in the flesh just upon the shin-bone, and put a copper halfpenny on the wound, which almost immediately caused a violent inflammation. He ultimately, however, paid most dearly for his speculation, as a mortification followed, and it was found necessary to amputate the limb.*

Mr. C. Hutchison amputated the leg of a man at Deal Hospital for a caries of the tibia, extending from the ankle-joint to the knee. The patient persisted in denying that he had ever "played any tricks" with his leg; yet, on dissection, a piece of copper coin was discovered, imbedded between the gastrocnemius and soleus muscles, nearly three inches from the margin of the ulcer. He then confessed that he had thrust it into the ulcer about nine months before, with a view of obtaining his discharge by invaliding.† To prevent all injury, Mr. Hutchison was obliged, in many instances, to secure the leg in wooden boxes, made like a boot, and closed with a lock.

Nor is deception confined to common ulcers. Even that dreadful disease, *cancer*, has been feigned. "I have seen," says Pierre Pigray, "a woman present herself to the late King of France, to be touched by him (as the former kings of France were said to perform miracles in this way), who appeared to have a very large and ill-looking cancer of the breast. It seemed so extremely natural, that it might have deceived the spectators; but when I observed that she was young, of a good habit, well formed, and without any symptom of cachexia, I was led to suspect deceit. On touching the ulcer, I ascertained, though with some difficulty, that a part of a spleen had been glued on its smooth side to the nipple, which left on the outside a serous and reddish kind of matter, similar to that of cancer. When this was removed, the nipple remained white, healthy, and well formed."‡

A false eruption of *petechiæ*, or *pustules*, may be detected by examining the patient perfectly naked.

Ozæna has been imitated by introducing cantharides or blistering

* Edinburgh Annual Register, 1810, part ii. p. 105.

† Hutchison, p. 143.

"During the war, ulcers were feigned to a prodigious extent in the army, for the sake of procuring discharge, and getting a fresh bounty for enlisting. A scoundrel of the name of Noble, in the neighbourhood of Glasgow, who used to carry my bag a partridge-shooting, often boasted to me, that he had been discharged from six different regiments by the very means mentioned in the text. In the York Hospital, in the years 1812–13, we had many cases of this kind from the Peninsula, and were obliged to lock up the leg in a wooden box prepared for the purpose, in order to secure ourselves against the patient tampering with the sore.

"On a late visit to Sheerness, my friend Mr. Robertson, surgeon to the convict hulks, told me that the number of patients with ulcers on the legs was, some months prior to this, so alarming, that he was afraid the secretary for the home department would take it up. But, suspecting some fraud, he employed spies, when he found that all this disease was occasioned by a process termed, in the flash language, *fox-hunting*; that is, rubbing the sand used for scouring the deck with the thumb to the thigh-bone. He cured half a dozen of them convicted of this practice, had them flogged, and never had an ulcer in his hospital since."—DUNLOP.

‡ Quoted from his Surgery. Mahon, vol. i. p. 358. Foderé, vol. ii. p. 486.

plaster into the part. *Fistula in ano*, in the same manner. It is only necessary to cleanse the parts, and examine their condition, in order to ascertain the real nature of the disease.

Wounds, with reference to this subject, are very properly divided by Drs. Scott, Marshall, and Forbes, into *fictitious* and *factitious*. Of the first, or those which have no existence, or are very slight, it would seem that they are most commonly feigned during action, to avoid danger. Contusions may be intentionally given; but their appearance seldom equals the impinging of musket or cannon balls. One case is mentioned, where the part was stained to imitate the purplish yellow hue of ecchymosis when on the decrease. It was alleged that the contusion had been received some time previous.*

Fractures of the thigh have been feigned; but it is found, on examination, that the muscles of the injured leg are hard and in full action, while those of the other are inactive and soft. A piece of metal has also been inserted into the head, to indicate previous fracture of some part of the skull. Mr. Marshall mentions a case where a soldier thus succeeded in procuring a discharge. He was, however, afterwards detected.†

Under *slight wounds*, I may as well notice the insertion of needles into various parts of the body—as the arms, hands, breasts, &c. Two cases are related of females doing this. One happened at the Richmond Hospital, Dublin; and the irritation and inflammation ran so high as to render amputation near the shoulder-joint necessary. The other was at Copenhagen. As the needles were extracted, others were inserted in different places, so that no less than four hundred were removed, from various abscesses, in about three years. In the first instance, the individual made a confession; in the second, she was seen introducing them under the skin.‡

Factitious wounds, or mutilations produced voluntarily, present some points of greater difficulty. It will always be a question whether they were not caused accidentally. The practice itself is of ancient date. Among the conscripts of Ancient Rome, a common species of mutilation was cutting off the thumb, and from this (*pollicem truncando*) it would appear that our modern word *poltroon* is derived.§ It was common during the last war both in England and in France; and the injuries were inflicted either by fire-arms or cutting instruments, and generally on the upper or lower extremities. In one regiment, at the Cape of Good Hope, nine disabled themselves in six weeks, for the purpose of being discharged.‖

Each case demands a separate investigation. A dragoon said that his horse had bitten off his finger; but he forgot to wipe his bloody sword, which lay in the manger. Another came running with two amputated fingers, produced, as he said, by the collision of water-casks. The cuts were clean, and the amputation complete. Another lost his thumb by falling on broken glass; but there was not the mark

* Scott, vol. ii. p. 156. † Marshall, p. 173.
‡ Scott, vol. ii. p. 148. § Scott, vol. ii. p. 156. ‖ Marshall, p. 177.

even of abrasion, beyond this single severe excision.* The French soldiers sometimes caused their teeth to be filed off or extracted, so as to be unable to bite off the end of the cartridge.

After the bloody battles fought by Napoleon at Lutzen, Bautzen, and Wurchen, it was insinuated to him that some of his soldiers had voluntarily mutilated themselves, particularly in the hands and fingers. On investigation, nearly three thousand were found thus injured. They were collected together, and a medical jury was appointed, over which Larrey presided. On examination, it was found that nearly all the wounds had been inflicted by contusing bodies, propelled by fire-arms, and but a few by polished weapons. Again, a majority of them presented other wounds on various parts of their bodies.

The verdict was favourable to the gallant soldiers. Larrey ascribes the great predominance of this kind of injury to the fact, that they fired in three ranks, and those in the second and third involuntarily rested the barrels of their guns on the hands of those in the first rank; and again, the enemy occupied the summits of several hills, and of course fired down upon the French, who, in return, would have their hands constantly raised to their guns.†

A case in civil life was investigated by Dr. Marc. The individual, under the idea, as it would seem, of rendering himself of importance to a relative, or to secure his gratitude, pretended to have had a murderous conflict with some assassins, although no dead bodies could be found. His head was wounded longitudinally to the extent of about an inch, and in direction from left to right. The integuments only were divided. The hat, of soft felt, was cut for nearly three inches, and in a direction from right to left. A cotton bonnet and a silk handkerchief, which he wore under his hat, were also divided. Dr. Marc observes, that a blow so powerful as to divide all these should have inflicted a less superficial lesion.

As collateral evidence, the appearance of the knife used in killing the assassin, was adduced. It had a thick covering of blood. Now this was hardly consistent with the idea of stabbing, since, on drawing it out, the flesh and the clothes would both rub off a portion, and what remained would be in longitudinal striæ. Dr. Marc was of opinion that it had been daubed on. He deemed the whole case pretended, *the effect not corresponding with the force of the ascribed cause.*‡

Similar cases have been recently detected at Paris, principally from the *slightness* of the wounds: they were not such as a robber or murderer would inflict. The celebrated Dupuytren was called as an

* Marshall, p. 179. It is now provided, that in all cases of maiming, whether the injury occurred on or off duty, whether accidentally or intentionally, the soldier shall be tried by a district court-martial as soon after the event as possible.—Ballingall's Military Surgery, p. 587. No pensions are granted except the injuries occur in the performance of military duty.

† Larrey's Surgical Memoirs, translated by Dr. Mercer, p. 107. Chaussier, p. 487.

‡ Annales D'Hygiène, vol. i. p. 257. There is another doubtful case of assassination in vol. ix. p. 417, although the physician, Dr. Breschet, inclines in favour of the wounded person. All the wounds were extremely superficial, yet evidently made with a cutting instrument.

examiner in one of them, and he related before the detected individual the following circumstance :—

As Napoleon was one evening in the park of St. Cloud, a young man rushed towards him, with the cry of "*assassins! save the First Consul!*" He fell near the group which surrounded Buonaparte, and, on examination, two wounds were discovered, from which blood flowed. He represented that he had been studying in the park, when he overheard concealed conspirators waiting the favourable moment for an attack, and, on being discovered, was thus wounded by them. The gates were instantly closed, but no conspirators could be found. During many examinations he persisted in this story, and it was only at the end of fifteen years that he confessed that he had inflicted the wounds with his own hands.*

From the enumeration now made, it is evident that, without due vigilance, the military strength of a country may be seriously impaired by deceptions among its soldiers and sailors; and the duty of the medical officer thus becomes a highly responsible one. He is to guard against fraud on the one hand, and severity on the other. Nothing can compensate for the reflection that he has unjustly condemned, or caused to be punished, a man who, it is subsequently proved, laboured under disease. I have already mentioned instances where mistakes have been made. Many others are enumerated by writers, and particularly of that class where deep-seated pain is the principal symptom. Dr. Cheyne speaks of one who was treated as a malingerer and sent to drill, until a lumbar abscess appeared, of which he died.† In reflecting on these circumstances, and the many obstacles to a full detection, I am very ready to withdraw a somewhat rash assertion which I made in a previous edition, that it is disgraceful

* Annales D'Hygiène, vol. xi. p. 188.

† Cheyne, p. 137. "I received (says a writer in the Glasgow Medical Journal, August 1831) an impressive lesson of caution in these matters, by my acquaintance with a case which occurred in the Infirmary of Edinburgh nearly thirty years ago. A street-porter, after a fall, began to complain of pain stretching along the whole outside of the thigh. The pain was much aggravated by motion, so that he could not walk across the ward without a crutch. The case being supposed to be sciatica, he was under the care of the late Dr. Duncan, assisted by my lamented friend Dr. Bateman, who acted as clinical clerk. The most attentive examination, scrupulously and laboriously made, could discover nothing deviating from the ordinary structure and appearance; nor was there any general affection of the system. Our patient, too, was the object of suspicion. It was a severe winter; employment for porters was said to be scarce; the lodging and food of the infirmary were comfortable; and the aliment from a benefit-society was accumulating in his favour. He readily submitted to the most violent counter-irritants, but without acknowledging any relief. Perkins's metallic tractors, then in high vogue, were applied with due solemnity; and this was the only application which relieved the pain. This admission on the part of the patient, however, only served to confirm our suspicions. He was dismissed from the hospital, with *simulation* affixed to his name in the records; and, as we understood, he was struck off from the roll of the Friendly Society. But about two weeks after his dismissal, he died of an apoplectic attack. The thigh complained of was inspected. The cartilage covering the head of the femur was partially destroyed; and purulent matter, to the amount of two ounces, was found in the cavity of the joint."—Lancet, N.S. vol. viii. p. 737.

for a surgeon to be deceived by an individual who feigns his maladies. I am convinced that the remark was altogether too strong and too broad.

Much may be done to detect, by conversing with the individual alone—by a patient investigation of the nature of the disease—by concealing all doubts concerning its reality, and by neglecting the individual, if we are satisfied of his fraud, rather than consigning him to punishment. No harsh means, beyond those proper for the real disease, should ever be used by the surgeon.* It may be well, also, to remember, that a general disposition to feign disease often has its origin in the severity of the service, or the inhumanity of some who are clothed with authority.

Pretended pregnancy and delivery, and *feigned insanity*, will be noticed in subsequent chapters. And I shall conclude the consideration of the present topic by remarking, that physicians are not unfrequently called upon to examine *impostors*, or those who feign diseases *which can have no existence*. The full consideration of these, however, belongs strictly to medical police; since they are seldom subjects of *legal* investigation.

It has generally been the case, that the hope of exciting public curiosity, and, of course, commiseration and charity, has been the moving principle of impostors; and they have justly imagined that the feigning of ailments contrary to the course of nature and the experience of mankind, would most readily answer the purpose.

Abstinence for a great length of time is the most frequent, as well as the most successful, of these deceptions; and the reason is obvious. It is practicable to a certain extent, and the most constant and minute attention is requisite to detect the falsehood. The most noted, because it is the most modern case, is that of Ann Moore, the fasting woman of Tutbury (England). According to her account, she commenced in March 1807, and continued fasting for six years. At the end of that period the imposture was discovered in consequence of a watch placed over her; and it was ascertained that her daughter secretly gave her food and drink. The *cui bono* is readily explained from the statement of Dr. Henderson, who observes, that she made so much by the exhibition of her person as to place 400*l.* in the stocks. She had, however, the power of abstaining from food for a considerable length of time. During the last watch she received none for nine days and nine nights.†

I will add only one case to the preceding. Cicely De Rydgeway, in the 31st year of Edward III. was indicted, and condemned for the murder of her husband. It is stated that she fasted in prison forty days. A record, lodged in the Tower of London, contains an account of this remarkable abstinence; attributes it to miraculous power, and

* Cheyne, p. 179.

† Observations on this case may be found in the 5th and 9th volumes of the Edinburgh Medical and Surgical Journal; and also in the London Medical and Physical Journal, vols. xxi. xxiv. xxix. and xxx.

adds, "Nos ea de causa pietate moti ad laudem Dei, et gloriosæ Virginis Mariæ, matris suæ, unde dictum miraculum processit, ut creditur." It concludes with a full pardon of the criminal.*

* London Medical and Physical Journal, vol. xxxi. p. 50. I add the following references for the use of those who may be desirous of examining the subject of abstinence.

A female in Germany, who imposed on the public for two years.—London Medical and Physical Journal, vol. vii. p. 190.

Mary Thomas.—London Medical and Physical Journal, vols. xxi. and xxx.

Hildanus, Ramazzini, Block, Doebel, Fontenelle, and Dr. Willan, are quoted by Mr. Granger and Dr. Henderson, in their papers on Ann Moore's case in the Edinburgh Medical and Surgical Journal, vols. v. and ix.

Cases are also recorded in *Stalpart Van Der Wiel*, vol. ii. observ. 15—*Haller's* Physiology, vol. v. p. 168—*Schurigius's* Chylologia, chap. iv.—*Edinburgh Medical Essays and Observations*, vol. v. part 2, p. 1 and 6.

State Trials, Emlyn's edition, vol. v. p. 482. Trial of Richard Hatheway, for a cheat and impostor, at Surrey assizes, March 24, 1702. Among other things, he said that he had been bewitched by one Sarah Murdock; and, in consequence of this, he could not eat, but fasted ten weeks.

Harleian Miscellany, vol. iv. p. 41. A discourse upon abstinence, occasioned by the twelve months' fasting of Martha Taylor, the famed Derbyshire damsel; by John Reynolds, surgeon.

Memoirs of Literature, vol. iii. p. 112. Account of a Swedish damsel who has lived six years without food; attested by the Bishop of Skara (West Gothland).

Republic of Letters, vol. ii. p. 439. History of a singular and extraordinary distemper in a woman, by Dr. Michelletti.

Philosophical Transactions, vol. xiv. p. 577; vol. xxviii, p. 265; vol. xxxi. p. 28; vol. xlii. p. 240; vol. lxvii. p. 1.

Medical Commentaries, vol. xiv. p. 360.

Quarterly Journal of Foreign Medicine and Surgery, vol. v. p. 190.

References in *Elliotson's* Blumenbach, p. 301–3.

Two recent cases of females, one in Holland and the other in Italy.—Medico-Chirurgical Review, vol. xxiii. p. 204.

NOTE.

Dr. Beck has noticed mental alienation as a feigned disease in the ninth chapter. In this view, however, it is intimately connected with the first section; and the following cases, taken from Mr. Marshall's Hints to Medical Officers, will well illustrate the difficulty of detecting imposture, and the necessity of extreme caution in coming to a decision.

"Some time ago a man enlisted in a regiment at present (December 1827) quartered in this garrison (Dublin), who, after being at drill an unusually long period, could not be taught his duty. Every exertion was made by the adjutant and drill-sergeant to make him comprehend the manual and platoon exercise, but apparently without success. In consequence of this corps having been joined by another regiment, the presumed idiot was discovered to be a deserter, and a very clever fellow."

The following, however, is a more melancholy instance of imposition being suspected where it was not practised, and will shew with what anxious caution a decision should be made that may render an individual liable to punishment. It is copied from the same work.

"Private Charles Louis, aged 31, —— regiment of foot, complained, during the month of December 1825, of pain in the loins, occasioned, as he said, by a sprain received the preceding July, while drawing water from a well, but which he did not mention when the accident happened. As the ailment was considered very slight, he was not admitted into the hospital. He continued, however, to complain of pain

in the loins and about the site of the cæcum. On the 26th of January, 1826, he went on furlough, and returned to the regiment on the 26th of February. From this period he obstinately refused to do any duty, assigning as a reason that he was unable. He was then admitted into hospital, where he was kindly treated, but carefully observed. His appetite and other functions of the body were natural, and no trace of disease could be detected. He sometimes complained of uneasiness in the region of the liver, but never represented the pain as urgent; and, indeed, seldom said any thing respecting his ailments, unless in reply to direct queries. He was in general remarkably taciturn; and his manner appeared to be more indicative of moroseness than of mere lowness of spirits. Eventually he was discharged from hospital, but still persisted in refusing to do his duty. He was tried by a regimental court-martial for disobedience of orders, which sentenced him to undergo corporal punishment; and on the 15th of March he received 175 lashes, in the usual manner, without making the slightest complaint. He still, however, declined doing duty, and was a second time tried by a court-martial, and sentenced to be confined for one month in a solitary cell. When released from confinement, he was ordered to pull up the grass between the stones in the barrack-yard—an employment which annoyed him more than any other punishment. His case was now brought to the notice of Lieutenant-General Sir George Murray, commander of the forces in Ireland, with a recommendation that he should be transferred to the General Military Hospital, Dublin. This suggestion being adopted, Louis was admitted into the General Hospital on the 30th of May, where he remained under the care of Dr. Cheyne, until the 12th of July, when he rejoined his regiment. During the time he was in Dublin he preserved his usual gloomy, discontented manner. The greatest care was taken to investigate his case, but no trace of disease, either physical or mental, could be satisfactorily observed; and a certificate to that purpose, signed by Dr. Peile, deputy-inspector of hospitals, Dr. Brown, surgeon to the forces, Dr. Crampton, surgeon-general, and staff-surgeon Stringer, was transmitted to the regiment upon his being discharged. Shortly after Louis had joined the regiment, he evinced decided symptoms of aberration of mind, which were for a considerable time supposed to be feigned; but after close observation for several months, the surgeon of the regiment deemed his intellect te be unsound. In July 1827, he was again admitted into the General Hospital, Dublin, in consequence of mental alienation; and it is the opinion of Dr. Cheyne and the other officers of that establishment, that there can be no doubt of the reality of the mental affection. He is still (December 1828) in hospital; his manner is much less gloomy than formerly; and he shews no reluctance to discuss topics connected with his present hallucination; he, however, artfully eludes every attempt to extract any information from him respecting his family or early life. Among many other incoherent notions which have entered his mind, he conceives that he is colonel of the 15th regiment, and that he is abounding in wealth, but that he is deprived of the use of it by undue means. His bodily health continues good."

The work above quoted may be consulted with great advantage on the subject of feigned diseases. It is entitled, "Hints to Young Medical Officers of the Army," &c. By Henry Marshall, Surgeon to the Forces.—DARWALL.

CHAPTER II.

DISQUALIFYING DISEASES.

Disqualifications in civil cases—in criminal cases. Disqualifications for military service. Classes exempted by the law of the United States. Law of the State of New York on exemption from military duty. Regulations for exemption in France—in Prussia. Rules for the inspection of recruits in England. Diseases that exempt or disqualify—statistical results. Law decisions on pleas for exemption. Certificates of exemption and discharge. Laws respecting these.

This chapter and the one preceding it are intended principally for the use of the military physician and surgeon. But, although the subject of *disqualifying diseases* falls peculiarly under their notice, yet there may be numerous instances in civil life, where the opinion of the medical man is required concerning them. He may be directed, for example, to ascertain whether an individual is fit to serve on a jury, whether he is able to attend as a witness, or whether he is competent to take on him certain offices or duties. Again, a physician may be ordered to investigate the condition of a criminal, and to report whether he is capable of undergoing hard labour, or of suffering other severe punishments that are inflicted by the justice of his country.

I shall accordingly consider this subject as follows:—

1. As to the disqualifications in civil and criminal cases.
2. As to the disqualifications for military service.

I. *Of disqualifying diseases in civil and criminal cases.*

In civil cases, the presence of acute diseases should undoubtedly exempt from the performance of most of the offices or duties to which an individual can be called. The imminent danger which may follow from muscular exertion, together with the weakened state of the mental faculties which generally accompanies these ailments, renders a demand for such performance cruel and oppressive: and, accordingly, in all countries where the law governs, the proof of this is deemed a sufficient exemption. But there may be diseases on which a doubt exists, whether the required exertion would prove injurious; as, for example, rheumatism, asthma, and particularly epilepsy. Concerning such, it would be idle to give any specific rules, further than to observe, that it behoves the examining physician to inquire into the nature of the particular case, and from his knowledge of it to be guided in his testimony. Should there be a patient liable to convulsive affections, and who is only preserved from frequent attacks by being kept calm and sequestered, he certainly would not be a proper person to serve on a jury, or

to be kept for a length of time as a witness before a crowded court. The same remark applies to those who are labouring under infirm health, or a predisposition to consumption, who have symptoms of aneurism, of stone in the bladder, &c., or who suffer from periodical or continued attacks of pain in one or the other organs. The humane, and therefore the just, rule in all these cases, is to exempt the subjects of such maladies from all duties that are not indispensable.

The distinction, however, should be kept in view, that many who are unable to travel without great danger may still be examined at their own houses, and that thus the ends of justice can, in a great degree, be answered.

In elucidation of these remarks, and as shewing that they are practically observed, I will quote only two cases.

In Andrews *v.* Palmer (1812), depositions taken, *de bene esse*, were presented, upon the incapacity of a witness from bodily injury to attend a trial. Lord Eldon remarked,—"This affidavit is too loose—that the witness will not be able to travel for a considerable time. The surgeon ought to have made an affidavit, with reference to the time when the trial is to come on, pledging his professional judgment to the probability that the witness will not be able to attend. If the affidavit was more precise in that respect, I think I ought to make such an order as I have mentioned," viz. for the officer to attend with the original deposition.

An affidavit was afterwards produced, more precisely worded, and the order was made accordingly.*

On the trial of Mary Elder, or Smith, for poisoning with arsenic (and which will be hereafter noticed), a juryman was taken suddenly ill. Drs. Christison and Mackintosh, who were in attendance as witnesses, immediately visited him in an adjoining room, and, on their return, being sworn, stated that he had been seized with a fit of epilepsy; that the convulsions had ceased, but that his memory was as yet only partially restored. Both agreed that he might be able to return to his duty that night, but it was not likely. A relapse might be the consequence.

"Lord Gillies had no doubt. They could not, with propriety, with any regard to decency and humanity, insist upon his resuming his place in the jury-box." The other judges concurred, and subsequently a new jury was chosen.†

As to criminal cases, it is equally unnecessary for me to enlarge, since the well-known humanity of our country renders it superfluous. I may, however, remark, that while acute diseases deserve commiseration and attention, as much as in the preceding instances, there are also some affections which should prevent or delay the execution of the higher punishments.‡ We can readily imagine a state of body in the criminal that would make the application of irons to his limbs, or the

* 1 Vesey and Beames' Chancery Reports, p. 21.

† Syme's Justiciary Reports, p. 72.

‡ Two of these are so important to be ascertained with certainty, that I shall treat of them under their respective titles, viz. pregnancy and insanity.

condemnation to hard labour, a sentence more dreadful than death itself.

In all cases, whether of a civil or criminal nature, every thing must depend on the skill of the physician, and the correctness of his testimony concerning the diseased person. As it is impossible to suggest specific rules, applicable to every instance that may occur, so it will be his duty to study the peculiar symptoms and indications with great attention, and, while he leans to the side of mercy, avoid being deceived by feigned representations of imaginary maladies.*

II. *Of disqualifications for military service.*

In every state, however despotic, there are certain classes of individuals exempted from military duty. This is, in fact, deemed indispensable, even with those who consider the male population merely as the material for armies. There must remain some to renew the waste of war — some to support the females and children of the nation, and others to protect them from injury.

The Jewish lawgiver, in his statutes, mentions several classes who were exempted from this duty, and, in particular, all married persons during the first year of their marriage.† And similar provisions are to be traced in the laws or customs of all countries.

In the United States, by a law of congress, all persons under eighteen years of age and above forty-five are exempted. The importance of this regulation in time of war is incalculable, since it prevents the destruction of such whose strength is not yet matured, as well as those who are already feeling the advances of age.‡ It is also understood that there are many diseases which disqualify and exempt from military duty. In this state, the law formerly directed that the age and ability of a person enrolled to bear arms should be determined by the commandant of the company, with the right of appeal to the commanding officer of the regiment, and, it added, "*that the certificate of a surgeon, or surgeon's mate, shall not be conclusive evidence of the inability of any person to bear arms.*"‖ In the Revised Statutes, the phraseology on this subject is somewhat altered. The enactment stands thus, "Persons claiming to be exempted from enrolment, by reason of inability to bear arms, may produce the certificate of a surgeon, or surgeon's mate, as evidence of such inability, but such

* See on this subject Foderé, vol. ii. p. 431, &c.

† Deuteronomy, c. xx. v. 5, 6, 7; c. xxiv. v. 5.—See Michaelis, vol. iii. p. 34, for an enumeration of the classes that were exempted.

‡ "After the battle of Leipsic, Napoleon made great exertions to recruit his army, and called upon the legislative senate to give him their assistance, to which they shewed some reluctance. 'Shame on you!' cried the emperor, 'I demand a levy of 300,000 men. *But I must have grown men; boys serve only to encumber the hospitals and road-sides.*'"—Edin. Med. and Surg. Journal, vol. xxxvi. p. 137.

In an English regiment, employed in the Burmese territories in 1824, the ratio of mortality among the young men was 38 per cent, or 1 in every 2⅝; while among those who were considerably older the mortality was 17 per cent, or 1 in 6.—Dr. Burke, Inspector-General of Hospitals, quoted in Medico-Chirurgical Review, vol. xxi. p. 261.

‖ See the "Act to organise the Militia," passed April 23, 1823.

certificate shall not be conclusive, nor shall it be lawful for the person giving the same to take any fee or reward therefor."*

If there be any difference between these, of which I am not very positive, it must be that, by the former law, the commanding officer of the regiment had the power of rejecting the surgeon's certificate, while, in the latter, this would rather seem to be referred to a court-martial. However this may be, both equally shew the necessity of the surgeon's being acquainted with disqualifying diseases.

The military system of FRANCE being more perfect than that of any other nation, it might be expected that rules on this subject would there be formed; and, accordingly, we find that such were promulgated at an early period after the revolution. A number of the inspector-generals (viz. *Coste*, *Biron*, *Heurteloup*, *Villars*, *Parmentier*, *Bruloy*, *Imbert*, and *Kanens*), were constituted a council of health of the armies; and they prepared certain tables of diseases, which partially or totally exempted from military duty. This was done during the reign of the directory (year seven of the republic); but they were incorporated into the *Code de la Conscription* by Buonaparte.

Among the preliminaries necessary to obtain an exemption are the following: — Every conscript who pleads bad health or bodily inability must appeal in the first instance to his municipal administration; and he is not entitled to present himself for this purpose, unless he bring a certificate from a health-officer that he is really affected with a disease which appears to him to authorise an application. He is then to be examined by a health-officer in presence of the administration, if he be capable of attending; or in presence of a delegate from it, if he be totally unable to attend in person. Before any dispensation be granted the commissioner of the executive directory must be heard; and he may, if any doubts be entertained, require a counter-examination. When the municipal administration consider any appeal to be without foundation, the conscript is obliged to join the army without delay. When they consider themselves incompetent to decide upon the appeal, the conscript is allowed to present himself immediately before the central administration for their decision. And the municipal administration can only grant *definitive* dispensations in cases of palpable and notorious infirmities. They may allow *provisional* ones, not exceeding three months, when acute diseases or accidents prevent the conscript from presenting himself.

All the decisions of the municipal must be sent to the central administration for their approbation or rejection; and, if they refuse to ratify them, the conscript must again be examined. Lastly, when they confirm a dispensation, it is sent to the minister of war, who forwards an exemption to the conscript, or annuls the dispensation.

A distinction is also made as to the diseases to be judged of by the respective administrations. The municipal can only take cognisance of palpable and notorious infirmities; while every application for a dispensation, definitive or provisional, for diseases not obvious, or which do not prevent the applicant from attending at the capital

* Revised Statutes of the State of New York, part 1. chap. x. title 3.

of the department in person, must be judged by the central administration.*

The officers of health, in giving their opinion, are directed to regulate themselves by the following tables: —

TABLE I. *Evident infirmities, implying absolute incapability of military service, and which are left to the decision of the municipal administrations of the canton.*

1. Total privation of sight. 2. The total loss of the nose. 3. Dumbness; permanent loss of voice; complete deafness. If there be any doubt of the existence of these infirmities, or if they do not exist in a great degree, the decision is to be reserved for the central administration. 4. Voluminous and incurable goitres habitually impeding respiration. 5. Scrofulous ulcers. 6. Confirmed phthisis pulmonalis, *i. e.* in the second or third degrees. Care should be taken to report the symptoms characterising this state; and, as they are but too evident, they ought to procure an absolute dispensation. But for commencing phthisis, asthma, and hæmoptysis, the municipal administration ought to grant only a provisional dispensation, if the person be incapable of presenting himself before the central administration; the decision in these different cases being reserved to the latter. 7. The loss of the penis, or of both testicles. 8. The total loss of an arm, leg, foot, or hand; the incurable loss of motion of these parts. 9. An aneurism of the principal arteries. 10. The curvature of the long bones; rickets, and nodosities sufficient evidently to impede the motion of the limbs. Other diseases of the bones, although great and palpable, are sometimes liable to doubt, and therefore are reserved for the judgment of the central administration. 11. Lameness (claudication) well marked, whatever be the cause; this must be precisely stated. The same is the case with considerable and permanent retraction of the flexor or extensor muscles of a limb, or paralysis of these, or a state of relaxation impeding the free exercise of the muscular movements. 12. Atrophy of a limb, or decided marasmus, characterised by marks of hectic and wasting, which should be stated in the report.

TABLE II. *Infirmities or diseases which occasion absolute or relative incapacity for military service, and which are reserved for the examination and opinion of the central administrations of the department.*

1. Great injuries of the skull, arising from considerable wounds, or depression, exfoliation or extraction of the bones. These sometimes occasion all, but commonly several of the following symptoms: affection of the intellectual faculties, giddiness, swimming in the head, drowsiness, nervous or spasmodic symptoms, frequent pains of the head. 2. The loss of the right eye, or of its use. This defect disqualifies a man from serving in the line, but does not prevent him

* Edin. Med. and Surg. Journal, vol. vi. p. 138, 139.

from being useful to the army in other services, or in the marine. 3. Fistula lacrymalis; chronic ophthalmia, or frequent rheums in the eyes, as well as habitual diseases of the eyelids or lachrymal passages, of such a nature as obviously to injure the powers of sight. 4. Weakness of sight; permanent defects of vision, which prevent objects from being distinguished at the distance necessary for the service of the army; short-sightedness; night-blindness; confusion of vision. In a note, it is observed, that these affections of the sight are often difficult of decision; and it is recommended to the surgeon to ascertain the effect of glasses on the persons complaining of near-sightedness.* Nyctalopia, it adds, is rare in youth, and often only temporary; while amblyopia, or confusion of vision, may be known with some certainty, when we perceive that the pupils have changed their diameter, or when they have lost somewhat of their mobility or regularity. This, however, is not always present; and, in doubtful cases, it is directed that the testimony of ten individuals, not relatives of the appellants, should be brought, affirming the existence of these defects. 5. Deformity of the nose, capable of impeding respiration to a considerable degree; ozœna, and every obstinate ulcer of the nasal passages or palate; caries of the bones, and incurable polypi. 6. Stinking breath from an incurable cause, as well as fœtid discharges from the ears; and habitual transpiration of the same character, when incurable. Soldiers who emit these fœtid exhalations are rejected by the corps, and repulsed by their comrades. 7. Loss of the incisive or canine teeth of the upper or under jaw; fistulas of the maxillary sinuses; incurable deformity of either jaw by loss of substance, necrosis, or other cause, hindering the biting of the cartridge, or impeding mastication, and injuring the speech. A person without canine or incisive teeth, cannot be a soldier of the line, but may be employed in other services. 8. Salivary fistulas, and the involuntary flux of saliva, when incurable. 9. Difficulty of deglutition, arising from paralysis, or some other permanent injury or incurable lesion of the organs employed in that function. 10. Permanent and well-established diseases of the organs of hearing, voice, or speech, considerable in degree, and capable of impeding their use considerably. As these diseases are very doubtful, and may frequently be simulated, it is advised that testimony proving their existence should be obtained, and the examination also should be repeated for several months at stated periods. An absolute or definite exemption need not be given, as they yield to time and skill. 11. Ulcers and tumours of a decidedly scrofulous nature. The symptoms, if any be present, of a scrofulous cachexy, should be stated. 12. Deformity of the chest, or crookedness of the spine, sufficient to impede respiration, and to prevent the carrying of arms and military accoutrements. 13. Phthisis in the first degree; confirmed asthma; and habitual, frequent, and periodical spitting of blood. The state of patients attacked with these diseases is often evidently bad, and accompanied by circumstances which leave no doubt; they then admit of an absolute dispensation. Sometimes they are less decided,

* See chapter i. p. 29.

when only a provisional judgment is to be given. 14. Irreducible hernias, and those which cannot be reduced without danger. 15. Stone in the bladder, gravel, habitual incontinence or frequent rétention of urine, as well as severe diseases or lesions of the urinary passages; fistulas of these parts, whether incurable, or requiring constant medical assistance. In a note it is remarked, that retention of urine produces well-known symptoms, which will guide to a knowledge of the true state of the case. Incontinence may be simulated with less danger of detection; and, apparently in order to avoid the advantage that might be taken of this, it is directed, that if the young man has, in other respects, a healthy and vigorous look, *he may be sent to the army without any inconvenience.* 16. The permanent retraction of a testicle; its strangulation in the ring; sarcocele; hydrocele; varicocele; all severe affections of the scrotum, testicles, or spermatic cords, known to be incurable. 17. Ulcerated hæmorrhoids; incurable fistula in ano; periodical and incurable hæmorrhoidal flux; habitual and chronic flux of blood from the intestines; habitual incontinence of fæces; habitual prolapsus ani. These ought to be stated by able health-officers, who have, for a length of time, treated and observed the patient; and a provisional dispensation is only to be given, until their incurability is established. 18. The total loss of a thumb or great toe, or the forefinger of the right hand, or two other fingers of one hand, or two toes of one foot; the mutilation of the last joints of one or several toes or fingers; the irremediable loss of motion of these parts. These, although they interfere in different degrees with several parts of the infantry service, do not unfit for other duties, such as miners, sappers, pioneers, or even for cavalry duty, if the mutilation of the toes or right hand be not considerable. If, therefore, the petitioner, on account of any other mutilation than the loss of the thumb, is in other respects strong and of a robust constitution, he ought to be sent to the army. 19. Incurable deformities of the feet, hands, limbs, or other parts, which impede marching, or handling of the arms, or carrying the accoutrements, or the free motion of any weapon. These may produce only a relative invalidity, and hence the physical effects arising from them should be stated. 20. Large and numerous varices. 21. Cancers and ulcers, which are inveterate, of a bad character, incurable, or whose cure it would be imprudent to attempt. The state of body accompanying them should be mentioned. 22. Large and old cicatrices badly consolidated, especially if they have adhesions, and are accompanied by the loss of substance, covered with crusts, or attended with varices. 23. Severe diseases of the bones, such as diastasis or separation, anchylosis, caries or necrosis, spina ventosa; osseous tumours, and those of the periosteum, when considerable, or situated so as to impede motion, and which have been treated without success. 24. Diseases of the skin, when they are capable of communication; when they are old, hereditary, or obstinate, as tinea; acute, moist, and extensive herpes; obstinate and complicated itch; elephantiasis; lepra. In all these cases a definitive dispensation cannot be granted, until after methodical treatment by very intelligent officers of health has

been continued in vain, or unless the constitution of the patient be obviously injured. 25. Decided cachexy, of a scorbutic, glandular, or other nature, known to be incurable, and characterised by evident symptoms of long standing; dropsies known to be incurable. 26. Debility and extreme extenuation, joined to a diminutive stature, or to a very tall one, out of the ordinary proportions. This case requires great judgment in deciding on it; and it is advised to adjourn the decision from quarter to quarter. "When a conscript has grown very rapidly; when he is tall, lean, and slender made; when he has a long neck, arms, and legs; and when his breathing is difficult from the least exercise: such an individual is out of the question, until nature has added in strength what it has hitherto confined to stature." 27. Gout; sciatica; inveterate arthritic and rheumatic pains, impeding the motions of the limbs and trunk. If these are present in an acute form, the conscript has a right to a provisional dispensation; but if they be chronic, particular attention should be paid to the condition of the parts. Gout seldom arrives to a high degree of obstinacy, without leaving nodosities and sensible contractions; while protracted rheumatism alters the form of the muscles and colour of the skin, and causes a wasting of the part affected. The surgeon is warned, in cases where no sensible appearances prove the existence of rheumatism, not to mistake a feigned for a real disease; and the following acute remark is added: "As it is but just that in some other equivocal cases, such as those respecting the diseases of the breast, humanity should incline to the conscript's side; so with respect to pains and rheumatism which are not proven, it is equally proper to prefer severity to indulgence; *as military exercise, far from aggravating the predisposition, if it exist, will only contribute to remove it.*" 28. Epilepsy; convulsions; general or partial convulsive motions; habitual trembling of the whole body, or of a limb; general or partial palsy; madness, and imbecility. The surgeon, in this class of cases, is to be particularly careful not to be deceived by simulated disease.*

Such were the rules devised for the conduct of the inspecting military surgeon in the days of Napoleon. They have been followed, though with greatly diminished severity, under the succeeding governments of France.

Dr. Marshall informs us, on the authority of Kirckhoff, that these regulations are very closely imitated in the army of the King of the Netherlands. In Prussia, the army is also recruited by involuntary levies, and every man, upon his reaching the age of twenty, becomes available for the services of the state, as a soldier. He is, however, exempted (among other causes), if he is furnished with a medical certificate, stating that he labours under an infirmity, either permanent or temporary, disabling him from military service. A list of diseases that disqualify was transmitted in 1817 to the various military surgeons by

* These regulations are published in Belloc, p. 344 to 362; and a translation of them, which I have used, is contained in the Edinburgh Medical and Surgical Journal, vol. vi. p. 138, &c.

Goercke, Physician-General, and chief of the military medical department of the Prussian army. I have compared this with the French tables, and find them very similar. A distinction is, however, taken between the infantry and cavalry service, and it is stated that in the latter the following do not disqualify for service — being considerably in-kneed, cicatrices of ulcers on the legs, loss of a great toe, moderately deformed feet, and flatness of the soles of the feet. In garrison service, also, hydrocele, if not very large; varices of the legs, if not very severe; a slight degree of contraction of the elbow-joint; shortness of one of the lower extremities, provided the defect can be remedied by means of a high-heeled shoe; inguinal or femoral hernia, if the intestine can be retained in its place by a truss; loss of any finger except the thumb, and slight traces of scrofula, do not disqualify.*

In France and Prussia, armies are raised by conscription; in England, by recruiting. It is, therefore, well remarked by Dr. Marshall, that in the former countries the regulations are calculated to obviate the *simulation* of defects, while in the latter they are intended to prevent fraud, through the *dissimulation* of infirmities.

Orders on this subject have at various times been issued by the medical department of the British army.† The latest that I have seen, and which are, probably, still in force, are dated July 30, 1830, and signed by Sir James M'Grigor, M.D., Director-General of the Army Medical Department. The following are enumerated as the more common causes for which a recruit should be rejected: — Feeble constitution; unsound health, from whatever cause; indications of former disease; nodes, glandular swellings, or other symptoms of scrofula; weak or disordered intellect; chronic cutaneous affections, especially of the scalp; severe injuries of the bones of the head; impaired vision, from whatever cause; inflammatory affections of the eye-lids; immobility or irregularity of the iris; fistula lacrymalis; deafness; copious discharge from the ears; loss of many teeth, or the teeth generally unsound; impediment of speech; want of due capacity of the chest, and any other indication of a liability to pulmonic disease; impaired or inadequate efficiency of one or both of the superior extremities, on account of palsy, old fractures, especially of the clavicle, contraction of a joint, mutilation, extenuation, deformity, ganglions, &c.; an unnatural excurvature or incurvature of the spine; hernia, or a tendency to it from preternatural enlargement of the abdominal ring; a varicose state of the veins of the scrotum or spermatic cord — sarcocele, hydrocele, hæmorrhoids; fistula in perineo; impaired or inadequate efficiency of one or both of the inferior extremities, on account of varicose veins, old fractures, malformation (flat feet, &c.), palsy or lameness, contraction, extenuation, unequal length, bunions, overlying or supernumerary toes, ganglions; ulcers,

* Marshall's Hints on the Examination of Recruits, &c. p. 49.

† Copies of several of these will be found in Marshall, pages 5 and 12. See also Hennen's Military Surgery, American edition, p. 354.

or unsound cicatrices of ulcers, likely to break out afresh; diseases, whether acute or chronic, for which medical treatment is required; and, lastly, traces of corporal punishment, which is declared to be an unqualified cause of rejection.*

The medical officer is also directed to attend to all the circumstances that indicate vigorous health, a capacity for exertion and general efficiency, such as a proper proportion between the trunk and limbs; a firm and elastic skin; a healthy countenance; a lively eye; chest capacious and well formed; belly lank; limbs muscular; feet arched, and of a moderate length; hands rather large than small; teeth in good condition; voice strong.

The recruit is to be undressed before inspection, and is to perform before the medical officer a certain routine of actions, such as walking, extending the arms, coughing while in that position, standing upon one foot, kneeling, &c. &c. A proper manual examination is, of course, made during these exercises. It is also to be ascertained, whether he has had the small pox, or has been vaccinated.

"The certificate of surgeons or assistant-surgeons, when they approve of recruits for the corps to which they themselves belong, will be considered final;"† but in other cases they are to be re-examined by a district staff-surgeon, or the medical officer of the regiment to which they are sent.‡

* "Instructions for the guidance of staff and regimental officers belonging to the medical department, in the duty of examining recruits who may be brought before them for inspection," in Edinburgh Medical and Surgical Journal, v. xxxvi. p. 370.

† "Final approval" refers to the time when the recruit joins his corps. He may be enlisted in some distant part of the country and approved; but on reaching the place where he is to be formed into a soldier, he must be examined anew by the commanding officer and surgeon.

"In our army, the commandant never interferes except when, from general debility, or obvious bodily infirmity, a recruit is not equal to the duties of a military life. The recruit is first examined by the surgeon of the district where he is enlisted, then by the regimental surgeon on joining; and should any difference of opinion take place, the case is referred, if near London, to the medical board; or, if at a distance, to a board specially called together for that purpose."—DUNLOP.

‡ "These causes of incapacity are, and always have been, understood. During the heat of the war, when levies of recruits to the amount of 100 or 150 often joined a regimental depôt at a time, a half-witted fellow might sometimes be slipped through, particularly when the officers wished to shew a strong paper-muster, in order to escape disagreeable duty at home, and be sent on a dashing service abroad, where there were some hopes of promotion from that great desideratum of an officer, 'a bloody war or a sickly season;' but these gentry were got quit of as speedily as possible, whenever they had served the purpose for which they were enlisted. At present we are a great deal too nice as to our recruits, in my opinion, as symmetry of form is now an indispensable requisite for a soldier. Large, broad, or splay feet, for instance, are at present inadmissible,—a regulation which amounts almost to a virtual exclusion of the inhabitants of the highlands of Scotland from his Majesty's service; a service of which, according to themselves, and Colonel David Steward of Garth, they are so exclusively the ornaments."—DUNLOP.

Those who are curious on the subject of *splay* or *flat foot*, and the disability caused by it for military life, will see extracts from Marshall's last work (including observations by Goercke, the head of the Prussian military medical department) in Edinburgh Med. and Sur. Journal, vol. xxxviii. p. 178.

Dr. Marshall * mentions some curious facts illustrative of the necessity of great caution and acuteness in these inspections. Thus, recruits, in order to obtain the required height, have been known to glue pieces of buff to the naked soles of the feet, or to rub cobbler's wax among the hair. On the contrary, in France, where the object of the conscript is a discharge, he has endeavoured to diminish his height by cutting off all his hair, and paring off the thick cuticle under the soles of his feet.

It is recommended by our author, as the most certain mode of ascertaining the exact height of individuals, to measure them extended on their backs. In fifty-two cases thus examined, the perpendicular was found less than the horizontal height by an average of $\frac{3}{16}$ of an inch.†

Of 57,894 recruits examined in the centre recruiting district, Dublin, from September 26th, 1804, to December 24th, 1827, 44,166 were approved and 13,728 rejected, being a proportion of 23·7 per cent.

Of 11,735 men drawn for military duty in the department of the Seine from 1816 to 1823 inclusive, 5,905 were rejected for the following causes:—

Low stature	1,483
Deformity	1,021
Infirmities or diseases	3,401
	5,905

If we take the per centage of the two last, we shall find it to be at the rate of 43.1, being considerably larger than the other.

I will only add a few of the diseases which produced rejection at Dublin during the years 1825, 1826, and 1827. (Total rejected in those years, 2,747.)

Varicose veins of one or both legs	340
Ulcers, cicatrices of ulcers, wounds	252
Hernia of various kinds, or laxity or enlargement of one or both rings	249
Unsound health, emaciation, &c., sottish intemperance, worn out	277 ‡

Of our own country, I may remark that the French and Prussian rules are most applicable to our militia, and the English to our regular army. I am not aware that the general government has adopted any rules respecting the latter, but I am certain that militia surgeons have no directions on the subject. The only American publication with which

* Besides Dr. Marshall's "Hints," he has published another work, entitled "On the Enlisting, the Discharging, and the Pensioning of Soldiers, with the Official Documents on these branches of Military Duty." This I have not been able to procure; but there is a review of it in the Edinburgh Medical and Surgical Journal, vol. xxxviii. p. 136.

† Hints, p. 62.

‡ Ibid. p. 187 to 195. Additional tables will be found in Edinburgh Medical and Surgical Journal, vol. xlii. p. 46. London Medical and Physical Journal, vols. l. and lii.

I am acquainted is a report made by the late Dr. Sam. L. Mitchill, then surgeon-general of the militia of this state, to his excellency, governor Clinton, and communicated to the legislature at their session in 1819.* The bodily disabilities for military service are arranged by Dr. Mitchill into classes, with reference to various parts of the body. The diseases enumerated by him are, however, all included in the tables that have been quoted, and it is therefore not necessary to repeat them.

I have met with some adjudications under the militia law of Massachusetts, which it may be proper to mention. They were made in consequence of appeals from the justices of the peace to the supreme court. In one, the individual was fined because he had not a surgeon's certificate, countersigned by the commanding officer,—although he offered to prove then by the surgeon of the regiment, that he was infirm and not capable of doing military duty. The court held that he should have been allowed to prove his disabili'y, although he had no certificate. The law has reference to an exemption for a term of time and not for one day.†

In another, the surgeon gave a certificate in 1807, that the soldier, by a wound in the left hand, had his thumb and fingers rendered useless, and is unable to perform military service. The captain on this discharged him for life. He was now (1808), nearly two years subsequent, fined for not appearing. The court determined that this was not necessarily an excuse for life, but that the justice before whom he is sued may inquire whether the disability continues.‡

I cannot conclude this section without recommending that tables founded on those which I have given, should be prepared for the use of surgeons, and that they should be enjoined to grant certificates according to their specifications, and be obliged to report to a superior authority all cases not coming within them.

As to certifiates, I have already stated, that in this state " no fee or reward is to be taken for them."

By the French law, " all officers of health and others convicted of having given a false certificate of infirmities or disabilities, or of having received presents or gratifications, shall be punished by not less than one, or more than two years' imprisonment; or by a fine of not less than 300, nor more than 1000 francs."§

In cases of discharges for various disabilities, and where the possession of these entitles the holder to pensions or gratuities, it is evident that much care must be taken to prevent imposition. Here, however, the directions given in the remarks on feigned diseases are more particularly applicable.‖

* Assembly Journal for 1819, p. 25.

† Howe *v.* Gregory, 1, Massachusetts Reports, 81.

‡ Commonwealth *v.* Bliss, 9, Massachusetts Reports, 322. See also the same vol. p. 11, 456, 540.

§ Edin. Med. and Surg. Journal, vol. vi. p. 139.

‖ The reader will find in every page of Marshall the great caution that it is requisite to pursue in the English service previous to granting these. In the Austrian service, several medical boards sit in succession in judgment on each other before the soldier is discharged, and they are held responsible for errors, and may be called upon to refund the amount of any expenses that have thereby been incurred.—Marshall, quoted in Medico-Chirurgical Review, vol. xxi. p. 260.

CHAPTER III.

IMPOTENCE AND STERILITY.

Laws of various countries concerning impotence as a cause of divorce — Roman law — Canon law — Ancient French law — Napoleon code — English law. Causes of impotence in the male — absolute — curable — accidental or temporary. English, French, and Scotch law on accidental causes as effecting paternity. Banbury peerage case. Diseases that may produce temporary impotence. Causes of impotence in the female — incurable and curable. Causes of sterility — incurable and curable. Notice of English law cases, where impotence was presented as a cause of divorce. Law of the state of New York on this subject — cases.

A KNOWLEDGE of this subject may become necessary in various ways before judicial tribunals. An individual accused of committing rape has been known to plead that he was physically incapacitated; while the legitimacy of children has been contested on a similar plea. These examples are sufficient to shew the necessity of a brief notice of the physical signs of impotence, even were they not connected with the subject of divorce.

The laws of Moses, and afterwards the Roman law, permitted divorce at the pleasure of either party. The Christian law, however, declares marriage to be indissoluble; and Justinian, legislating on this principle, was the first monarch who prescribed the mode of obtaining divorce by law, and at the same time promulgated statutes as to impotence.* He ordained, that if the imbecility continued for two years after marriage (which period was afterwards enlarged to three years), the female should be entitled to a divorce.†

We are informed, that it was not until the twelfth century that this jurisprudence came into general use. The canon law, under which these cases were judged, always desired (at least in practice) that the defect should be shewn to have existed before marriage; and that after its celebration, a certain period of time should have elapsed before a complaint was entertained, in order to ascertain whether the impotence was absolute, or only accidental. These dispositions of the canon law were adopted into the civil law of ancient France; and many arrets of parliament have admitted the plea of impotence, and dissolved marriages of eight, twelve, and even fourteen years' standing. Accidental impotence, however, in the sense I shall hereafter define it, was never deemed a just cause of divorce by any of these tribunals. In 1759, the parliament of France refused the application of a female, whose husband

* Gibbon's Rome, vol. viii. chap. 44, p. 64.
† Code Justinian, lib. v. tit. 17.

had been declared impotent during his first marriage, on the principle, that at his second nuptials, several years after, the physicians declared that he appeared to be cured of his disease.*

The Napoleon code does not expressly declare that absolute and incurable impotence is a dissolving cause of marriage; but the course of legal proceedings under it leads to this conclusion. The court of appeals at Treves in 1808, in the case of a female, directed that she should be visited by medical men, who were to report to that tribunal, whether the supposed injury occurred before or after marriage, and whether it was remediable.†

The law of England, as laid down by Blackstone and his editor, is as follows:—"A total divorce is given whenever it is proved that corporeal imbecility existed before the marriage. In this case, the connexion is declared to have been null and void *ab initio*. Imbecility may, however, arise after marriage; but it will not vacate it, because there was no fraud in the original contract, and one of the ends of marriage, the procreation of children, may have been answered."‡

There is, however, one case on record, which was decided on very different principles. I refer to that of the Earl of Essex, in the reign of James the First. His countess transferred her affections to the royal favourite, Viscount Rochester (afterwards Earl of Somerset); and, being desirous of a divorce, complained that her husband was impotent. She deposed, that for the space of three years, they had lain together, and during that time he had repeatedly attempted to have connexion with her, without success. She also stated that she was still a virgin; and several peeresses and matrons, who were directed to examine her, corroborated this statement, although it is mentioned that she substituted a young female of her own age and stature in her place during the examination. She was also pronounced to be well fitted for having children. The earl, in his answer, admitted his inability to know her; while he denies his impotence as to other females, and insinuates his belief of her incompetency for copulation. After the examination of numerous witnesses, objections were raised by Abbot, the archbishop of Canterbury, and one of the king's delegates on this trial, on the propriety of dissolving the marriage on such grounds; to which the king vouchsafed an angry reply. It was finally decided, by the vote of seven delegates (five being absent, and not consenting), that the marriage should be dissolved, and the parties allowed to contract new marriage ties.§

* Foderé, vol. i. p. 361. It will astonish those who have not attended to this subject, to learn that there was a period in French jurisprudence when actual congress was a judicial proof in cases of impotence. At first it was conducted in a private manner, but afterwards became shamelessly public. This prevailed from the thirteenth century until the year 1677, when it was solemnly abolished, in consequence, as it would seem, of the case of the Marquis De Langley. His wife declared him impotent; the congress was ordered, but without success; and his marriage was annulled in 1659. He married again, and had seven children.—Dictionnaire des Sciences Médicales, Art. *Congres*, by Marc. Mahon, vol. i. p. 70.

† Foderé, vol. i. p. 362, 363.

‡ Blackstone's Commentaries, with Notes by Christian, vol. i. p. 440.

§ Hargrave's State Trials, vol. i. p. 315. See also No. 1 in the Appendix to

The causes of impotence have been variously divided by different writers; but I conceive that I shall be best enabled to give a comprehensive view of them, by adopting the arrangement of Foderé, into *absolute, curable,* and *accidental or temporary.*

We shall first notice those in the male.

The absolute causes of impotence, or those for which there is no known relief, principally originate in some mal-conformation or defect in the genital organs; and these may be either natural or artificial. To this class we refer the following — an absolute want of the penis. Cases are frequently met with in medical works, where it is stated that the ureters were found terminating in the perinæum, or above the os pubis. Foderé observes that he cured a young soldier of incontinence of urine, in whom there was a fleshy excrescence, like a button, in the place of the penis, and at which the ureters terminated: the testicles were well formed. Many cases are also on record of the penis being impervious.*

vol. viii. being a narrative of the proceedings on the trial, drawn up by the Archbishop of Canterbury. In the speech which he intended to have delivered on giving his opinion, he relates the case of one Bury, tried in 1561. His wife cited him before the Ecclesiastical Court on the ground of impotence; and the physicians deposed that he had but one testicle, and that no larger than a bean. The want of access was also proved. A sentence of divorce accordingly passed. After some time, Bury married again, and had a son by his second wife. A question arose, after the lapse of some years, whether the offspring was legitimate; and it was decided that *the second marriage was utterly void*, because the ecclesiastical court had been deceived in the opinion they had given on the impotency of Bury.—Page 23 of the Appendix.

* A most valuable and learned essay on this subject may be found in the Edin. Med. and Surg. Journal, vol. i. pp. 43 and 132, entitled, "An attempt towards a systematic account of the appearances connected with that mal-conformation of the urinary organs, in which the ureters, instead of terminating in a perfect bladder, open externally on the surface of the abdomen, by Andrew Duncan, jun., M. D." See particularly Matthew Ussem's case, and page 54, on the genital organs of the male.

Dr. Duncan enumerates 49 cases, of which 41 are of the male and 8 of the female. The following may be added to his catalogue. 1, 2. Two cases by Dr. Maitland, of Blackburn (Lancashire). In one, the ureters terminate in a fungoid tumour, at the lower part of the abdomen — testicles in each groin, penis an inch long and imperforate—in the other the ureters end in a tumour in the pubic region—penis imperforate — testicles natural.— Edin. Med. and Surg. Journal, vol. xxv. p. 31. 3. By Dr. Vernon, in a child — the usual tumour.—Ibid. vol. xxvii. p. 81)

There are two American cases which have been described and figured. One was seen at New York, where the individual died in the state prison in 1826, aged fifty-two years. There was a fleshy mass in the pubic region, and the ureters terminated in this. The penis was imperforate, and about an inch long; the testicles large and well-formed. The individual repeatedly stated that his venereal desires were violent. Plates of this case, with descriptions, are given by Drs. Ducachet and Charles Drake.— Medical Recorder, 3, 515, and New York Med. and Phys. Journal, vol. v. 443. Another has been very recently described and figured by Dr. Hayward, of Boston. This individual came into the Massachusetts General Hospital, in June, 1832. He was a native of the state of Maine, aged twenty-one, and in good health. There was an oval fungous tumour, six inches in circumference at the base, and projecting one inch and a quarter from the abdomen, directly over the ordinary place of the symphysis pubis. The ureters terminated in this, and the urine passed out in drops. The penis was short, only two inches long,—measuring five inches in circumference at its root, partly divided and united at the under surface only. The testes were perfect. He has sexual desire, and, when under the influence of it, the penis becomes erect, and sometimes a discharge of seminal fluid

In addition to this, have been enumerated, an amputation of the virile organ — a schirrous or paralytic state, induced by injury to the nerves or muscles of the parts — and an unnatural perforation of the penis, or in other words, the extremity of the canal of the urethra terminating at some place other than its natural situation. When this happens on the upper part it is styled *Epispadias*, when below, *Hypospadias*. We shall, however, see that it would be unsafe to consider all or most of these as absolute causes of impotence. Thus, Piazzoni relates a case where both the corpora cavernosa were destroyed, but as the canal of the urethra was preserved, the act could be performed.* So also with the varieties in the termination of the urethra. Belloc says that he knew a person at Agen, in whom the orifice was at the bottom of the frænum, and who had four children resembling their parent, and what is still more remarkable, two of them had the same mal-conformation. The possibility of impregnation may therefore depend on the distance to which the orifice is thrown back.†

The inability to propel the semen out of its vessels, is frequently to be considered as an absolute cause; but generally it is a curable one.‡

takes place from the ureters. Dr. Hayward states that one other case of this kind has come under his observation, but he had not an opportunity of examining him minutely.—Boston Med. Magazine, vol. i. p. 91.

* Paris' Med. Jurisprudence. vol. i. 205. A case is related by Mr. Hurd, in the London Med. and Surg. Journal, vol. iv. 323, in which the patient, after suffering severe disease, such as phagedenic inflammation, with the formation of excrescences, was relieved by complete amputation. There was only a very small protrusion of the organ on pressure, yet he had subsequent to this two children.

† Belloc, p. 50. I will mention in this place the cases that I have noticed, and whether they were impotent or not.

Hypospadias,— a case is mentioned by Zacchias, fruitful.

Dr. Hosack—the same.—New York Med. and Phys. Journal, vol. ii. p. 12.

Dr. Dewees—the same.— Coxe's Medical Museum, vol. i. p. 165.

Mr. Syme—the same.— Edinburgh Medical and Surgical Journal, 33, 243.

Frank has seen a case transmitted through three generations. Kopp saw a peasant, near Hanau, with five children, in whom the opening was 11½ lines from the extremity of the glans. — Dict. des Sciences Med. vol. xxiii. Art. *Hypospadias*, where other cases are cited; also vol. xxiv. Art. *Impuissance*.

The case of Dr. Schweikard, in the same work, Art. *Hermaphrodisme*, doubtless belongs here. "At the root of the glans was an oval opening; this was the urethral orifice through which the urine passed. This man had several children."— Ibid. vol. xxi. p. 96.

Dr. Gunther — two cases — fruitful. — London Medical Repository, vol. xxv. p. 185.

"I know an individual, the father of a very fine child, marked strongly with the paternal resemblance, and in this person, the urethra opens in the corpus spongiosum, between one or two inches from the glans."—Dr. Blundell in Lancet, N. S., vol. ii. p. 771.

For other cases, in persons below the age of puberty, see Edin. Med. and Surg. Journal, vol. xxxii. 246; Littel's Monthly J. Foreign Med. i. 189.

London Med. Gazette, vol. xiii. p. 878, a case of hypospadias, cured by Dupuytren.

On the same page is the notice of a case of epispadias, related by Dr. Cramer in Hecker's Journal.

‡ Morgagni declared a case, where the patient was thirty years old, and all the parts were properly formed, to be incurable. This opinion was founded on the idea that some of the internal organs were diseased—Opuscula Miscellanea, p. 34. *Responsum Medico-Legale super seminis emittendi Impotentiâ.*

I mention it, however, in this place, for the purpose of stating, that in several instances of this nature, there have been found, after death, a diseased state of the prostate gland, or extensive strictures of the urethra.

The natural want of both testes, provided that ever occurs, or their artificial loss, is another cause. The removal of them by excision, and the frequency of this practice in some countries, is well understood. I may add, that there have been instances in which these organs have suddenly diminished and disappeared, as a consequence of disease or external injury.* The point, however, which excited most discussion in former times, was, whether individuals born without any appearance of testes, but who, in other respects, have the activity and strength that belong to the male sex, are to be considered impotent. It is generally believed not; since it has been well ascertained, that in many instances these organs have not descended from the abdomen, and yet the individual has exhibited every proof of virility.† Considerable attention should be directed to the external appearance of the person — his muscular system — the strength of his voice — the presence of the beard, &c. The medical examiner should also examine whether any cicatrix is to be found in the scrotum, indicating castration; or whether, in the room of the testes, there do not exist some hard knots or lumps, proving the existence of former disease. If these are wanting, and the general appearance is virile, we are not justified in considering the individual as impotent.

A different opinion, however, prevailed in former times. Pope Sixtus the Fifth declared, in 1587, in a letter to his nuncio in Spain, that all those who were destitute of them should be unmarried; and Philip II. accordingly executed this order, which affected many in that kingdom. The parliament of Paris, also, in 1665, decreed that they should be apparent, in order to permit a person to contract marriage.‡ These, however, are the relics of barbarous ages. Unquestionable facts and anatomical examinations have proved that the conformation in question may be present without injury to the generative power. Rolfinck relates the case of an individual distinguished for libertinism,

* Foderé vol. i. p. 369. He observes, that he has witnessed several cases of this kind in deserters condemned to labour on the canal at Arles. Larrey also states, that many soldiers of the army of Egypt were attacked with a similar complaint. The testes lost their sensibility, became soft, and diminished in size until they were no larger than a white French bean. No venereal disease had preceded these attacks. When both testes were affected with this atrophy, the patient became impotent — the beard grew thin, and the intellect weak. He attributes it to the use of the brandy of dates.—Larrey, vol. i. p. 260.

Severe blows, fractures, &c., on the back of the head, would also seem to cause impotence. See case in Hennen's Military Surgery, 2nd. edition, p. 303; also one from Hildanus, quoted in Medico-Chirurgical Review, iv. 969, and Larrey's Clinique Chirurgicale analysed in the same, vol. xix. p. 16.

† "During the examination of 10,800 recruits, I have found five in whom the right, and six in whom the left testicle was not apparent. In two of those cases, there was inguinal hernia at the side where the testicle had not descended. I have met with but one instance where both testicles had not descended."—Dr. Marshall's Hints, &c., pages 83, 207.

‡ Mahon, vol. i. pp. 55, 57.

who was executed for some crime. He was, after death, consigned to the dissecting knife; and, on examination, the testes were found in the abdomen.* The parents of a young man in a similar situation consulted the physician as to the propriety of allowing him to marry. He recommended it, and a numerous offspring demonstrated the propriety of his advice.†

I may also add, in this place, a cause of impotence, concerning which there has existed a considerable diversity of opinion; and that is, the loss of one of the testicles only. If this deprivation be compensated by the healthy size and condition of the other, we have no reason to dread the effects. This actually occurs in some cases of cynanche parotidea, where there has been a translation of the complaint from the neck to the testes. Dr. Robert Hamilton, in one of the best histories that we have of that disease, mentions, that when it was epidemic at Norfolk in England, a patient was seized with swelling of both the testicles. One of them wasted away, until nothing but its coats was left. This occurred in 1762, and in 1769 he had a child, and in 1772 another; both of whom were healthy.‡ Mahon also mentions that he was acquainted with a young man, in whom one of these organs gradually diminished and withered away, whilst the other increased proportionably in size; and after this had taken place he became the father of five children.‖ Sir Astley Cooper removed a testis

* Mœbius, quoted by Mahon ut antea. It is stated by Bichat, on the authority of Roux, that very commonly, among the inhabitants of Hungary, the testes do not descend till some months, or even years after birth.—Brewster's Edinburgh Encyclopædia, Art. Anatomy, vol. i. p. 825.

† Mahon, vol. i. p. 54. Additional cases of fruitful marriages under these circumstances are mentioned by Dr. Geddings.—Chapman's Journal, N. S. vol. iv. p. 34.

It is, however, proper to subjoin the remarks of Mr. James Wilson on this subject. "When both testicles have remained in the cavity of the abdomen, it has been supposed by John Hunter that they are exceedingly imperfect, and incapable of performing their natural functions." He had met with two cases, one of which seemed to confirm this remark, while the other makes against it, although it does not altogether refute it. "The first is a young gentleman of very large fortune, now twenty-five years of age. He has some beard, and not an unmanly appearance; but although an imprudent, and in some respects a dissipated person, he has never shewn the least desire for women, or disposition for sexual intercourse. The second is between thirty and forty years of age, who has one testicle forming a tumour within the ring; and the other, which descended at puberty, lying immediately on the outside of it. He is a married man, and has children. Before his marriage, he describes himself as having great desire, and not being deficient in power. He formerly had a venereal gonorrhœa;" and it was from a swelling of the testicles, consequent on this, that Mr. Wilson came to witness his case. One testicle is of full natural size, and the other also appears to be so, as far as can be judged by feeling it through the tendon of the external oblique muscle.—Wilson's Lectures on the Urinary and Genital Organs, p. 408.

Mr. Lawrence has also seen two cases, in which the testes remained, and the individuals were impotent. On dissection, the body of the glans was not more than half its natural size; and the epididymis, which was very imperfect, did not join the body of the testes. In a third instance, however, it exactly resembled the last case of Mr. Wilson. It appears, then, says Mr. Samuel Cooper, that more depends on the size and structure of these organs being natural, than upon their natural situation.—Note to Good's Study of Medicine, vol. v. p. 7.

‡ Transactions of the Royal Society of Edinburgh, vol. ii. Art. 9.

‖ Mahon, vol. i. p. 52.

for an enlargement and great hardness, in January 1821. The wife, by whom he had already had one child, nursed the patient, and in March she proved pregnant.* If, however, the remaining testicle be small and extenuated, or have become scirrhous or carcinomatous, or even if the epididymis be tumefied and hard, we have just reason to dread the presence of impotence.

There also occasionally occur cases, in which the smallness of the testicles throws doubts on their powers. Dr. Baillie knew a person of middle age, in whom their size did not exceed that of the extremity of the finger. This was congenital, and accompanied with a total want of sexual desire. Mr. Wilson, however, relates the following: "I was some years ago consulted by a gentleman, on the point of marriage, respecting the propriety of his entering into that state, as his penis and testicles very little exceeded in size those of a youth of eight years of age. He was twenty-six, but had never felt desire until he became acquainted with his present wife. Since that he had experienced repeated erections, with nocturnal emissions. He married, became the father of a family; and those parts which at twenty-six were so small, at twenty-eight had increased to the usual size of those of an adult man.†

A question, connected with the subject under consideration, was agitated some years since in Germany. It was, whether a person castrated after he arrives at the age of puberty, is capable of impregnating for some days after the operation. Marc, a high authority in all such cases, supposed that he must be deemed impotent, as the time needed for curing the wound is sufficient to carry the semen into the blood; and even if capable of two or three emissions, yet he would afterwards be impotent. Orfila states it as his opinion, that there may be temporary power in such cases, where the extirpated testicles are healthy, but not if tuberculous or schirrous.‡ Sir Astley Cooper, in his recent work on the structure and diseases of the testis, gives a very apposite case:—

He performed the second operation of castration in 1801, on a person for chronic abscess in the testis. On visiting him four days after, he informed Sir A. C. that he had, during the last night, an emission. He was a married man previous to the first operation. For nearly the first twelve months after the complete castration, he stated that he had emissions *in coitu*, or that he had the sensations of emission. After that he had erections and coitus, at distant intervals, but without the sensation of emission. After two years he had erections very rarely and very imperfectly; and ten years after the operation he said he had, during the past year, been once connected. In 1829 Sir A. C. saw him as a patient. The erections were very seldom and very imperfect, and the penis was shrivelled and wasted.‖

* Medico-Chirurgical Review, vol. xviii. p. 389.

† Lectures, p. 424. ‡ Orfila's Leçons, vol. i. p. 127.

‖ Medico-Chirurgical Review, vol. xviii. p. 390. Sedillot mentions that he has heard Boyer relate the case of a man from whom both testicles had been successively removed, on account of sarcocele. After the second operation his wife became pregnant. He consulted Boyer, who told him that the child was no doubt his own, but that it would be his last.—P. 17.

To the above, Foderé adds the following, which may possibly in some cases produce the consequence in question, viz. congenital tumours of a large size; such, for example, as scrotal hernia. This, he supposes, may produce a hardness of the parts, and prevent a secretion of the seminal fluid, by its continued pressure on the spermatic vessels.* The medical college of Western Prussia declared a voluminous and irreducible hernia a sufficient cause of divorce.†

Among the curable causes of impotence may be enumerated the following:—An atony of the parts, arising sometimes from local disease or external injury, and at others from masturbation; a retraction of the penis, originating from stone in the bladder, or some other urinary diseases; a natural phymosis, which sometimes confines the glans in such a manner as to prevent the emission of semen;‡ obliteration of the canal of the urethra, from stricture or other causes;‖ and, lastly, the malconformation, of which we have spoken, as to the place of the aperture of the urethral canal. All these have been successfully obviated by modern surgery.§

The third class of causes, the accidental or temporary ones, is the most important, since they are frequently the subject of legal investi-

* Foderé, vol. i. p. 372. "In Italy, double hernia, by pressing on the spermatic chords, sometimes causes as complete emasculation as if the testicles were actually removed; so that many of the fine singers of that country are so by the visitation of God."—Dunlop.

We should not forget that extreme youth is an absolute cause. It has been decided, as far back as the reign of Henry the Sixth in England, that the issue was a bastard, when the husband was within the age of fourteen. See the King *v.* Luffe, 8th, East's Reports, p. 205.

† Metzger, p. 494. The following is also an incurable cause, but not discoverable until after death. "A malformation of the epididymis—instead of passing on to the vas deferens, that tube has terminated in a cul-de-sac. I have preserved one of this kind in the collection of Windmill-street."—Wilson's Lectures, p. 423.

‡ Observations on Natural Phymosis and its Effects, by Dr. Houston, in Edin. Med. and Surg. Journal, vol. xxxviii. p. 266.

In Sir George Lee's Ecclesiastical Reports is a case (Welde *v.* Welde, 1731), where the husband pleaded capacity in answer to a charge of impotency, and one Williams, a surgeon, swore that Mr. Welde had an external impediment, arising from the shortness of his frænum, which prevented an erection, but that it was now removed, he having cut the same, and that he believed he was now capable.—Reports, Appendix, vol. ii. p. 580.

‖ Cases of this description will be found in Edin. Med. and Surg. Journal, vol. xxi. p. 315, by Mr. Maclure of Glasgow; Medico-Chirurgical Transactions, vol. xii. by Mr. Arnott.

§ Bushe's Medico-Chirurgical Bulletin, vol. ii. p. 1. The Editor gives several cases of hypospadias successfully treated. I subjoin the following uncommon case, as an illustration of the trophies of modern surgery. In 1830, a patient aged 26 was admitted into the Edinburgh infirmary, under the care of Mr. Liston. The whole extent of the urethra anterior to the pubes was exposed superiorly, there being a wide fissure through the corpora cavernosa and glans. The penis was retracted considerably, so that the posterior part of the fissure lay behind the symphysis pubis. When he urinated, the urine after emerging from beneath the symphysis, divided into numerous streams, some of which spread over the sides of the penis, whilst others passed along the exposed urethra. This malconformation was congenital, and he was impotent. It was remedied by paring off the callous edges of the margin of the fissure, introducing a catheter and uniting the edges by sutures. The penis obtained its natural appearance.—London Med. Gazette, vol. vi. p. 252.

gation. They are those which affect an individual during his marriage, and of course, have to be considered in cases of contested paternity.* The law presumes, that the husband is the father of every child conceived during the term of wedlock, yet it allows an investigation as to the chastity of the female. That such is law in our own and other countries, the following extract will prove: "In the case of Lomax *v.* Holmden, tried before the court of King's Bench in England, the question at the trial was, whether the plaintiff was the son and heir of Caleb Lomax, Esq. deceased, and this depended on the question of his mother's marriage. And that being fully proved, and evidence given of the husband's being frequently at London, where the mother lived, access was of course presumed. The defendants were then admitted to give evidence of his inability from a bad habit of body. But their evidence, *not going to an impossibility, but an improbability only*, this was not thought sufficient, and there was a verdict for the plaintiff."†

The proofs of bastardy may be thus, 1. impotence, and 2. proof of non-access, so conclusive, that it is *impossible* that the husband could have been the father of the child. This subject, in all its bearings, has of late years been minutely canvassed, in consequence of what is usually styled the Banbury peerage case. Lord Banbury died in 1632, aged 85. In 1627, Lady B. had a son, and in 1630, another. They both lived at the house of Lord Vaux, with whom it was said, she was in habits of adultery. In an inquisition held after his death, it was held that he died without heirs male of his body. The son claimed the title in 1646, and his descendants also, from time to time, but the House of Lords either passed resolutions denying the claim, or had no proceedings. In 1806, the lineal descendant of the son succeeded in bringing it to a solemn adjudication. Lord Erskine advocated his cause, and quoted the case of Sir Stephen Fox, who was married at 77, and had four children, the last when he was 81. Lord Banbury was proved to have been hale and hearty at the time of his death. The House, however, decided in 1813, that the claim had not been made out. The author, from whom I draw this narrative, observes, that the *concealment* (which was the fact in this case) under circumstances which could leave no doubt that the adultery was the *cause* of it, appears to have formed the point on which the decision was grounded.‡

* I may mention in this place, a rare case given by Mr. Callaway, of an individual, who, returning home intoxicated, had several connexions with his wife during the night. The penis continued in a state of permanent erection after this for sixteen days, resisting all medical and surgical means. An incision with a lancet at the end of this time, produced a copious discharge of dark, grumous blood, and a solution of the erection. The individual is impotent, most probably occasioned, says Mr. C. "by a deposition of coagulable lymph in the cells of the corpora cavernosa, preventing the admission of blood, and consequent distention of the organ."—London Med. Repository, vol. xxi. 286.

† Strange's Reports, vol. ii. p. 940. I am indebted to Dr. Male for the reference to this case.

‡ Edinburgh Review, vol. xlix. p. 190, an elaborate article on the law of legitimacy. See also London Law Magazine, vol. iv. p. 32; also Head *v.* Head. (1 Simons and Stuart, 150) in Peter's Condensed Chancery Reports, vol. i. where

The French, or Napoleon code, although it does not permit a husband to disavow his child, by alleging his *natural impotence*, yet contains a regulation, which, in its effects, operate similarly to the principles contained in the English case above quoted. The 312th article says, that the infant conceived during marriage, has the husband for its father, but he may, notwithstanding disavow it, if he can prove, that from the 300th to the 180th day before its birth, there was, either on account of absence, or *from the effect of some accident*, a physical impossibility of cohabiting with his wife.*

In discussing this subject, it will readily occur that there is a class of diseases, during the progress of which virility may be preserved; while there is another in which it is destroyed. It is not possible, nor indeed would it be proper, to state these, except in a general way; since it is difficult to foresee what may hereafter be adduced in contested cases, as a cause of impotence. We shall therefore be understood to mention the diseases, as causing a probability on one or the other side, and not as positive proof.

The diseases that are considered compatible with connexion are those which do not affect the head and sensitive system primarily, and are not accompanied with great debility. Inflammatory and catarrhal fever are of this class. So, also, in asthma and the early stages of phthisis pulmonalis the power is preserved.† Some diseases appear to stimulate the generative organs; and others, although accompanied with pain, are said to excite desire. Of the first may be named a calculus in the kidneys or bladder; and to the last belong gout and rheumatism.‡

A man named Aurelius Lingius, aged sixty years, had been affected, during the last two years of his life, with occasional attacks of fever, accompanied with gouty pains, which at intervals made him

the answers of the judges in the Banbury cause are given. The same case, before Lord Eldon, in 1 Turner and Russell's Reports, 138. On the subject of non-access, the following American cases may be quoted, Commonwealth *v.* Stricker, 1 Browne's Pennsylvania Reports, app. p. 47; Commonwealth *v.* Shepherd, 6 Binney's Pennsylvania Reports, 283; 2 Paige's Chancery Reports, 130, Cross *v.* Cross.

* Foderé, vol. i. p. 375. "In Scotland it is only necessary that a man should be in a situation, where a possibility exists of his cohabiting with his wife, in order to constitute him the father of her children, or as the law correctly and beautifully expresses it, within the four seas of the realm. There is a case at issue in the Court of Session at this moment, where a Miss M'Neil, an heiress, is claimed by two husbands. The one asserts that he married many years ago, and cohabited with her one night only; the other married her since and has by her a family; but it seems to be the general opinion that if the first husband proves her to be his wife, the children must be his as a matter of course."—DUNLOP.

† Orfila's Leçons, vol. i. p. 136. Louis, a late writer on consumption, denies the truth of this opinion, so far as to limit it only to the earliest periods. In more advanced stages, he is convinced that it decreases with declining strength. The editor of the London Medical Repository (vol. xxv. p. 106) remarks on this: "We have no doubt, that in some examples of phthisis, both the power and the propensity to gratify it, have existed up to the very day of the patient's death."

‡ "A friend of mine, who studied in the hospital of New York, informed me that, after recovering from the yellow fever, the patients displayed most furious sexual passion, to the great inconvenience of the nurses and other female attendants."—DUNLOP.

extremely ill. For the space of two months, however, he appeared on the recovery; when, being seized with a fever and ague, he died. His wife declared herself pregnant, and six months after his death, was delivered of a healthy child. Its legitimacy was contested, on the ground that the husband, before his last illness, had been incapable; and this opinion was corroborated by his own confession to the physician attending him. His wife allowed the truth of this statement, but asserted that his powers had returned some time before his decease. In this state of the case, Zacchias was consulted; and he decided in favour of the chastity of the wife, for the following reasons: Aurelius had been twice married, and by each wife had had several children. The disease under which he laboured was a heating one, and his powers were probably perfect during the period of convalescence. His age does not prevent the possibility of his producing pregnancy in the female. Symptoms of this were present during his lifetime; and although he was known to be extremely jealous, yet his affection remained undiminished towards her. And finally, the intervals of ease that accompany articular pains, together with the fact that she always reposed in the same bed with him, were, in the mind of Zacchias, conclusive arguments. The judges decided in favour of the female.*

In connexion with the facts already stated, it may be proper to add a circumstance suggested by the author just quoted. He deems it possible that certain diseases may so change the state of the system, as to produce an alteration in the generative power. He quotes the testimony of Avenzoar, who had no children during the whole period of youth, but became a father shortly after recovering from a violent fever. And also the case, which came under his own observation, of an artificer, who lived twenty-four years with his wife without issue: shortly after his convalescence from illness, he became a father, and afterwards had many children.†

The diseases which we may rationally suppose will prevent cohabitation are the following:—A mutilation, or severe wounds of the sexual organs—carcinoma of the testicles or penis—gangrene of the lower extremities—immoderate evacuations of blood or bile, or of the fæces—scorbutic cachexia—marasmus—peripneumony and hydrothorax—anasarca in its perfect state, particularly if accompanied with an infiltration into the sexual organs—nervous and malignant fevers, particularly if they affect the brain, and are accompanied with great debility and loss of memory—all affections of the head and spinal marrow, whether from a fall, blow, wound, or poison;‡ or from internal causes, as apoplexy, palsy, or other comatose diseases. If the infant is conceived whilst the husband has been known to have laboured under either of these maladies, the presumption is certainly against its legitimacy. So also, if he be affected with leprosy, venereal ozæna, severe cutaneous diseases, or insanity, we may reasonably doubt the fact of

* Zacchias, Quest. Med. Leg. Consilium, 23. † Zacchias, vol. i. p. 271.

‡ Foderé mentions the case of a person, aged forty, who laboured under temporary impotence during the space of six months, from exposure to charcoal vapours. This state of the system was left after the recovery from the immediate danger.—Vol. i. p. 382.

cohabitation, from the fear that we may suppose the female has experienced, lest she should be contaminated, or from the dread that she has entertained of having communication with the individual.

We come now to the consideration of impotence in the female. And here it is to be observed, that even if the causes of it be removed, yet sterility, or an inability to conceive, may still exist. It will, therefore, be proper to notice the causes of impotence and sterility in succession. They may each be divided into incurable and curable.

The incurable causes of impotence are, 1. An obliteration or thickening of the sexual organs, so as to prevent any introduction.

The vagina and womb have thus been found closed with a dense fleshy substance. Morgagni mentions cases in which there was a continuity of parts, without any aperture. A recent case related by Dr. Mott, as occurring in this country, deserves to be mentioned in detail. The individual was aged 23, and had been married upwards of two years. Her health was extremely good, but she had not seen the least indication of the menses. About every twenty-eight days, she feels some slight uneasiness about the pelvis, which is followed for a day or two with an active diarrhœa. This occurrence she has noticed since about the age of seventeen or eighteen.

As no connexion could be effected by her husband, she at length consented to an examination. The external parts were fully formed, but no vagina could be discovered. On a plane with the meatus urinarius, or about the situation of the hymen, there is a complete septum or partition. It has a firm appearance, though it yields somewhat to the finger. There is not the least opening into it in any part. Imagining that it might possibly be an imperforated hymen, Dr. Mott made an incision into it about an inch in depth—but without success. After this closed, he made a second attempt, until he proceeded between two and three inches. No marks of a vagina could however be dicovered. Dr. Mott is of opinion that both vagina and uterus are wanting. She has never experienced the least sexual desire.*

Foderé also relates the following case from the *Causes Celèbres.*

* New York Med. and Phys. Journal, vol. ii. p. 19. A case, probably of the same nature, is mentioned in the Lond. Med. Repository, vol. viii. p. 347.

Other cases are referred to in Davis's Obstetric Medicine, p. 112. "Richerand mentions a similar case, in which nature was periodically relieved by a discharge of bloody urine."—DUNLOP.

Dr. Lee (Cyclop. Pract. Med., Art. *Diseases of the Ovaria*) states the following as communicated to him by Prof. Elliotson. A young married female had never menstruated, yet had violent pains every month. Connexion went on, yet with severe pain. On examination, which was finally consented to, no vagina could be discovered, "the part, on opening the labia being as flat as the palm of my hand." Mr. Cline attempted twice to remove the difficulty by an operation, within the labia, but without success. It is justly supposed that the uterus was here wanting, but, from the appearance of the breasts and other circumstances, that the ovaria had been fully developed.

Such was actually found to be the case in an instance of *imperforate* vagina, (as it is called, but where that organ was found closed by a thick, muscular looking substance), operated on by Dr. Macfarlane of Glasgow. The patient died, and, on dissection, no uterus was found, but the ovaries were large and well formed. In this female, the breasts were fully developed.—Medico-Chirurgical Review, vol. xxii. p. 450.

In 1722, a young woman aged twenty-five, in good health, was married at Paris. Six years elapsed without consummating the nuptials; at the end of which, she consented to be visited by a midwife. This person declared that she could find none of the sexual organs, and that their place was occupied by a solid body. The female stated at this time, that though in good health, she had never been subject to the menses. A surgeon named Dejours was afterwards called in; and, on examination, he supposed that an incision into this solid mass might remedy the inconvenience; and he accordingly performed it in 1734, but without success; as, after cutting down two inches, he still found the mass in equal quantity, and the hope of its being a superficial obstruction was destroyed. He contented himself with keeping the wound open, and an aperture was thus preserved. In the year 1742, the husband applied to the court to annul the marriage. Levret and Saumet, on being consulted, stated that they had found an aperture of two or three inches in length; that the cicatrix of the former operation still remained; and that either through fear, or the prudence of the surgeon, it had not been sufficiently extensive to remove the obstacles. Ferrin, Petit, and Morand, on the other hand, deposed, that the operation had been properly performed, and that it was not probable that the parts necessary for generation had ever been present, either before or after marriage. The court, however, refused to annul the connexion, from an idea that a cure was practicable. The female died at Lyons about ten years after; and on dissection, the vagina and uterus were found to constitute one solid mass, without any cavity in either.*

In other cases the vagina is entirely wanting, and yet, on dissection or by operations during life, the uterus is found present. Thus, in one by M. Villaume, the hymen was present, but there was merely a mass of cellular tissue in the place of the vagina, and by an operation, an opening was made to the uterus.† In another, by Dr. Moulon of Trieste, there was no exterior trace of the external organs, but, on dissection, the uterus with its appendages were seen of their natural size and well formed.‡ Professor Warren of Boston recently operated in a case where the vagina was wanting, although the aperture of the urethra was well formed, and the clitoris and nymphæ appeared as

* Foderé, vol. i. p. 385. Still more remarkable cases are on record. In the article *Cas rares*, in the Dictionnaire des Sciences Médicales, vol. iv. p. 166, it is asserted, on the authority of Hufeland, that the body of a child three years old was lately opened at Berlin, in which there was not the slightest trace, either externally or internally, of any part of the genital organs peculiar to either sex.—Medico-Chirurgical Review, vol. iv. p. 300. Another resembling the above, and occurring in a girl fourteen years old, is quoted from the Journal de Médicine, in the American Journal of the Medical Sciences, vol. ii. p. 412. This individual enjoys good health.

† Littel's Monthly Jour. of For. Medicine, vol. i. p. 376, from Archives Générales.

‡ American Journal of Medical Sciences, vol. ii. p. 193, from Journal de Progres. Sometimes the vagina is found ending in a *cul de sac*, as in the case of Agatha Mélassene, who died, aged 27, at the Hotel Dieu in 1823. The external organs were well formed, and the breasts full; yet on dissection, no uterus could be found, but the broad ligaments were present, containing in their folds the fallopian tubes and well developed ovaries.—Littel's Journal of Foreign Medicine, vol. i. p. 134. A small orifice leading to the bladder, unaccompanied with a vagina, occurred at Mr. Syme's Edinburgh Surgical Hospital.—Edin. Med. and Surg. Jour., vol. xxxvii. p. 337.

usual. The female was 23 years old. The breasts were natural. No uterus could be discovered on examination. The operation ended favourably, a sanguineous discharge resembling the catamenia occurred, and Dr. Hayward supposed that he could distinguish something like a uterus.*

2. Another cause (as assigned by systematic writers), both of impotence and sterility, is a natural or fistulous communication of the vagina with the bladder or rectum. Foderé mentions cases of this nature, where the female menstruated by the rectum, and every possible remedy failed of success. There are, however, exceptions to this; since we have accounts of impregnation in one or two instances, and where delivery was effected by the malformed passages. Louis's famous case was of this description. The thesis that he wrote on this subject, "In uxore sic disposita, uti fas sit, vel non? judicent theologi morales," was made the subject of a prosecution by the parliament of Paris, and the doctors of the Sorbonne interdicted him from addressing the casuists. The Pope, however, allowed him to publish it in 1754.†

3. A prolapsus or retroversion of the uterus, or a prolapsus of the vagina. These are of course curable during their first stages; but instances have occurred where they are of long standing, and cannot be reduced, since the introduction of the fingers causes the most vivid pain.‡

4. A cancer of the vagina or uterus, from the pain that accompanies it, may be considered as an absolute cause.§

5. Extreme brevity of the vagina (congenital) would seem to be occasionally an incurable cause, so far as relates to the pain caused by connexion, although possibly it may not be accompanied with sterility. Dr. Gooch says, that he once met with a case of this kind, and relates, that Dr. Hunter was consulted by a lady in a mask, labouring under this. He told her that she was the most unfortunate partner a man could have, as there was no cure.‖ Dr. Dewees appears to have met with two cases,—in one, the whole distance to which the finger could be passed did not exceed one inch or an inch and a half; in the other, it was apparently connected with an absence of the uterus, as the vagina terminated in a *cul de sac*. This female had never menstruated; yet she had all the marks of womanhood, and enjoyed sexual intercourse.¶

* American Journal of Medical Science, vol. xiii. p. 79. A similar case is related by Mr. Edwards, in the Edinburgh Medical and Surgical Journal, vol. xli. p. 403. The editor, in commenting on this, remarks that cases of congenital deficiency of the vagina are very rare, and quotes three, from Meyer, Oberteufer, and Howship.

† Medico-Chirurgical Review, vol. v. p. 299. A late case of the same nature occurred to Prof. Rossi in Piedmont.—Dictionnaire des Sciences Médicales, vol. xxiv. Art. *Impuissance*. Two other cases are related by Davis, on the authority of Puzos and Portal.—Obstetric Medicine, p. 121.

‡ Pregnancy is however possible, even with an external prolapsus of the uterus. See cases quoted in the Cyclopædia of Practical Medicine, vol. iii. p. 493.

§ In the New England Journal, vol. ix. p. 161, is a case by M. Lasserre, which evidently proves the position in the text. Dr. Beatty of Dublin had, however, a pregnant female labouring under this disease.

‖ Gooch's Midwifery, p. 45. ¶ Dewees on the Diseases of Females.

The curable causes are — 1. A dense substance covering the orifice of the vagina. Paré, Ruysch, Fabricius, and many others, relate cases of this kind; in some of which the membrane, which is generally the hymen, was so strong that the menstrual blood was accumulated behind it in large quantities. Foderé quotes a case from Fabricius, where the husband demanded a dissolution of the marriage, from the impossibility of having perfect connexion. The female, however, declared herself pregnant; and by an incision into the membrane the obstacle was removed, and the pregnancy completed at the time indicated.* Dr. Physick is also stated to have operated with success in a case where the vagina was entirely closed up to a considerable distance within the os externum.†

2. An extreme narrowness of the vagina. Should pregnancy intervene, no apprehension need be entertained of the result in this case, as it has been repeatedly observed that a dilatation gradually takes place before the period of delivery. It may be remarked, however, that this occurs more readily in young females than in those of advanced years.‡

3. Independent of the natural narrowness just mentioned, there is a similar affection that occasionally originates from accidental causes, such as tumours and callosities, cicatrices remaining after the cure of ulcers, or from lacerations after difficult labour.§ A

* Foderé, vol. i. p. 389. I shall notice this more in detail in the chapter on Rape.

† Dorsey's Surgery, vol. ii. p. 368. A remarkable case of a married woman, in whom the fossa magna was closed up to the orifice of the uterus, is quoted from Fletcher's Medico-Chirurgical Notes and Illustrations. She was relieved by an operation. A passage had, however, previously been effected into the bladder by the urethra, which was greatly enlarged—Lancet, N.S. vol. viii. p. 613.

‡ Dr. Davis mentions a case in which the narrowness returned after the first delivery, and was only completely relieved after the second birth.—Obstetric Medicine, p. 102. See also the subsequent pages of his work for other cases.

§ These are so numerous and various, that I will only refer to some of the more remarkable:—

Davis's Obstetric Medicine, pp. 116—120.

On obliteration of the vagina, by Cæsar Hawkins.—London Medical Gazette.

Cyclopædia of Practical Medicine, vol. ii. p. 601, Art. *Impotence*, by Dr. Beatty.

Dr. Williams, in the American Journal of Medical Sciences, vol. xi. p. 408. He refers to several cases. Dr. Hoillemin in the same, vol. xv. p. 407.

A case by Dr. Barret of Kentucky, where death followed from rupture of the uterus in a second delivery, having been maltreated in the first. On examination, there was found a complete adhesion of the vagina, leaving only a septum of one or two lines at the lowest part. Through this, impregnation must have been effected.—Drake's Western Medical and Physical Journal, vol. iii. p. 206.

A case, also, by Professor M'Naughton, in the New York Medical and Physical Journal, vol. vi. p. 252.

A case by Dr. Stedman, in the Edinburgh Medical and Surgical Journal, vol. xxxvii. p. 26. By Dr. Turnbull in ibid. vol. xxxix. p. 128.

In the Medico-Chirurgical Transactions, vol. xi. p. 445, a case is related of a negress in Jamaica, in whom there was a complete adhesion of the labia; and she asserted that it was owing to an operation performed in Africa, for the purpose of preserving the chastity of the female. This appears, indeed, to have been an ancient custom, as it is mentioned by Strabo. That it is the practice, is proved by the observations of Burkhardt, who says that the daughters of the Arabs, Ababde and Djaafeere, who are of Arabian origin, and who inhabit the western banks of the

dilatation of these may be made according to the rules of modern surgery.*

4. Imperforate os uteri.†

5. We may add, long-continued hæmorrhage, recent prolapsus of the uterus or vagina, and even protracted fluor albus, to the above. They prevent connexion from the pain that occurs, or the diseased state that is present.

The causes of sterility of an incurable nature, and sensible to the sight or touch during life, may be stated thus: A schirrous or cartilaginous uterus; stricture in the cavity of that organ;‡ a polypus in the interior of the uterus; enlarged and schirrous ovaria. The want of the uterus, should that occur, is seldom positively known till after death.‖

Nile, from Thebes as high as the cataracts, and generally those of all the people to the south of Kenne and Esne as far as Sennaar, undergo excision of the clitoris at the age of from three to six years. The healing of the wound is contrived to close the parts except at one place, for the passage of the urine and menses; and the adhesions are not broken through until the day before marriage, and in the presence of the intended bridegroom. Some have the parts sewn up, and, like eunuchs, become more valuable on account of their unfitness for sexual connexion.—Elliotson's Blumenbach, p. 456. See also Browne and Leigh's Travels.

* Dupuytren, in his Essay on Laceration of the Perinæum during Labour, mentions two cases, which I extract, for the purpose of caution to the medical jurist. He delivered a young woman secretly. The perinæum was ruptured; but by the use of the suture, it again united. Several years afterwards, a man and woman visited him: the husband was unable to consummate his marriage. On examination, the aperture of the vagina was found very narrow, and a cicatrix was on the perinæum. It was his old patient. He advised patience; and in a short time the female became pregnant, and was safely delivered. In a parallel case, the husband deemed it a most unequivocal proof of previous purity.—London Medical Gazette, vol. xi. p. 128.

† Medico-Chirurgical Review, vol. xvii. p. 553. A case by Prof. Delpech.

‡ Baillie's Morbid Anatomy, p. 371. "Slight inflammation (he observes) may induce this, and the obliteration particularly occurs in that part where the cavity is narrowest."

‖ Memoirs of the Medical Society of London, vol. iv. p. 94. See also Burns' Midwifery, chap. iv. note 47, for references — Morgagni, letter 46; and Cooke's edition of the same, vol. ii. p. 450. A case by Dr. Stein of Berlin illustrates the variety of external conformation that occurs. She was married, aged twenty-four, well-formed, slender, and delicate, with full breasts. The vagina was imperforate, and, on operating, nothing but a mass of cellular tissue could be found. She had never menstruated. Dr. Stein supposes, with probability, that the uterus is wanting, and infers that it is the *ovaria*, and not the *uterus*, which, by their influence, give to the female her characteristics. Annals of Philosophy, vol. xvi. p. 114. This last opinion is corroborated by known facts, such as the case of Mr. Pears, in the Philos. Trans. for 1805. The woman died at the age of twenty-nine. Her stature was about four feet six inches, having ceased to grow at ten years of age. She never menstruated; her breasts and nipples never enlarged more than in the male subject; there was no appearance of hair on the pubes, and she never shewed any passion for the male sex. On dissection, the os tincæ and uterus were found of the usual form, but they had never increased beyond their size in the infant state; the passage into the uterus through the cervix, was oblique; the cavity of the uterus of the common shape, and the fallopian tubes were pervious to the fimbriæ; the coats of the uterus were membranous; *and the ovaria were so indistinct, as rather to shew the rudiments which ought to have formed them, than any part of their natural structure.*—Edin. Med. and Surg. Journal, vol. iii. p. 105. Mr. Pott removed the ovaria in a case of inguinal hernia, by a surgical operation.—Works, vol. ii. p. 210. Before this period, the female (aged twenty-three) was stout, large-breasted, and menstruated

The causes which may be curable are obliquity in the position of the uterus; too great irritability of that organ; excessive menstruation; leucorrhea; retention of the menses.* This last, however, is not by any means a certain cause of sterility, as women have become pregnant without the menses ever occurring.†

In concluding this subject it is proper to add, that there are many cases of constitutional sterility, which we cannot explain. Ashwell, in his Treatise on Parturition, ascribes it to four principal causes: too early marriage, general ill health, too frequent sexual intercourse, and dysmenorrhœa.‡ It is obvious, however, that these are far from being invariable; yet the frequency of barrenness among prostitutes has led to some examinations, and afforded us several interesting facts. Some have referred it to a state of exhaustion of the uterine system produced by excessive excitement; and, in illustration, it is asserted that some of the most abandoned, on going to Botany Bay and marrying there, become the mothers of large families. An anatomical change would, however, seem to cause it in certain instances. Thus, Mr. Langstaff, in several dissections, found the fimbriated extremities of the fallopian tubes on one or both sides adherent to some of the neighbouring parts; and it is evident that the constant state of inflammatory turgescence in the generative organs must lead to this.§

regularly; afterwards, although she enjoyed good health, she became thinner, her breasts were gone, and she never menstruated.

Additional cases of the absence or imperfect state of the uterus or ovaria may be found in the London Med. Repository, vol. xxvi. p. 78, by Dr. Renauldin; Lancet, N. S. vol. x. p. 624, by Dr. Macfarlane; Davis's Obstetric Medicine, p. 513; Andral's Pathological Anatomy, vol. ii. p. 414; Gooch's Midwifery, p. 8.

* Foderé and Mahon mention dropsy (hydatids) and tympany of the womb as causes. Denman, however, observes that, according to his experience, they have not prevented conception.—Denman, pp. 148, 149.

† I have already referred to Dr. Duncan's Essay, and will only add, that it contains a notice of mal-conformations in the genital organs of both sexes, as connected with a deficiency of the urinary bladder. Copious references are given to all preceding cases on record.—See Edinburgh Medical and Surgical Journal, vol. i. p. 132. Additional cases of female mal-conformations are also contained in Edinburgh Medical and Surgical Journal, vol. i. p. 39, by Mr. Coates; vol. i. p. 128, by Astley Cooper, Esq.; and, vol. vii. p. 23, by Mr. Conquest: in London Medical Gazette, vol. x. p. 8, by Mr. Earle. This last writer observes, that there are but seven or eight recorded cases of such mal-conformations in the female, while there are at least sixty related of its occurrence in the male. It is not incompatible with impregnation. See the case of the Cornish woman, by Dr. Huxham, Philosophical Transactions, vol. xxxii. p. 408; also, vol. xx. p. 56; and Mr. Earle's Clinical Lecture on this subject, as above. A very curious American case, where the Cæsarian operation was successfully performed, and the parts generally resembled the cases above enumerated, is related by Dr. Hamilton, of Enfield, Connecticut, in Boston Medical and Surgical Journal, vol. xi. p. 93.

‡ Review of his work in American Jour. Med. Sciences, vol. iv. p. 149. Sterility is considered, by the laws of various countries, a legal ground of separation. It is so among the Hindoos. By the laws of China, barrenness and talkativeness are two among the seven causes of divorce. The Koran also permits it. By the English and Scotch law, sterility is a ground for divorce *a mensa et thoro*.—Edinburgh Encyclopædia, Art. *Barrenness*.

§ Medico-Chirurgical Review, vol. iv. p. 405; Paris's Medical Jurisprudence, vol. i. p. 215. See also Dr. Elliotson's Clinical Lectures, in Lancet, N.S., vol. viii. p. 55; Eberle's Medical Review, vol. ii. p. 394; Medico-Chirurgical Transactions, vol. viii. p. 505, vol. xiii.

From a review of the causes of impotence in both the sexes, it is evident that the absolute ones are few in number, that they are mostly palpable to the senses, and that the number formerly assigned to this class has been greatly reduced by the improvements in surgery. The medical witness must of course regulate his testimony by these facts.

I have already stated the English law on this subject, and will here add a few of the decisions made under its general provisions.

In the case of Briggs *v.* Morgan, the suit was brought sixteen months after marriage. The female had been a widow, and had lived eighteen years with a former husband: she was now fifty years old. Sir William Scott (Lord Stowell) denied the application: it was brought too late; the female, also, is beyond the ordinary time of child-bearing; and she further swore, that she had constant connexion with her first husband until near his death.*

In the case of Greenstreet *v.* Cumyns, the husband admitted the charge, and two physicians and two surgeons, duly appointed, testified that though the disease and imperfection of the parts were not such as to imply impotence, yet having heard his own history, they put faith in his account, and, as he was in good health, they could hold out no hope of his weakness being remedied. The marriage was annulled on these grounds — the husband (Sir Wm. Scott observed) being in utter ignorance of his constitutional defects at the time of marriage.†

In Norton *v.* Seton, the husband instituted a suit for divorce after having been seven years married, on the ground of his own impotency and defect in his generative organs. It was with great justice denied by Sir John Nichol. "Here," says he, "has been seven years' cohabitation. Cur tamdiu tacuit?"‡

The doctrine that the impediment must have existed at the time of marriage, and must be incurable, and that even if the last be proved, it must not have been a merely supervening effect, is decisively affirmed by Sir John Nichol in the case of Brown *v.* Brown.§

In Pollard *v.* Wybourn, it was proved, by medical certificates, that the female, twelve years after marriage, was *virgo intacta* and *apta viro.* The husband had made several confessions of his incapacity, and refused, being in France, to answer to the complaint. The marriage was dissolved.‖

I find that I was mistaken in stating, as I did in the previous edition, that the English law was in force in this state. This point was solemnly adjudicated by Chancellor Sanford, in 1825, in the case of Burtis *v.* Burtis. Here the wife filed a bill against her husband, and

* 3. Phillimore's Ecclesiastical Reports, p. 425.

† 2. Ibid. p. 10. ‡ 3 Ibid. p. 147.

§ 1. Haggard's Ecclesiastical Reports, p. 523.

‖ 1. Ibid. p. 725. It would seem that the canon law in England required three years' cohabitation before the party could be declared incapable. Such at least is asserted by Sir George Lee (Ecclesiastical Reports, edited by Dr. Phillimore, vol. ii. p. 580), in the case of Welde *v.* Welde. Here the surgeon, as I have already stated, deposed to the removal of a natural phymosis, and he now believed the defendant capable. The wife was declared pure on the examination of midwives. Sir George Lee, however, refused to dissolve the marriage.

stated that he was impotent, and had been so from his birth. She therefore asked for a dissolution of the marriage. The defendant demurred, on the ground that the complainant was not entitled to any relief, and that he ought not to be compelled to make any discovery. His counsel further urged, that impotence was a mere *canonical* cause of divorce, and that the English Chancery never claimed nor exercised any jurisdiction on that subject; while, in our own state, jurisdiction was given by statute. On the other hand, the counsel insisted that the jurisdiction of the ecclesiastical courts of England, in granting divorces and annulling marriages, had devolved upon, and appertained to, the Court of Chancery in this state.

The chancellor, in his opinion, mentioned that New York, when a colony, was ruled for some years by governors, who, either alone or with the council, assumed executive and judicial powers. During that period, one of the governors, Lovelace, granted four divorces, one in 1670, and three in 1672.* These were the only cases that occurred during and through the long period of more than one hundred years, down to the Revolution. Subsequent to that period, no provision on this subject had been made by the legislature.

* For one of these I am indebted to the kindness of John V. N. Yates, Esq., late secretary of state; and, as it has never been published, I prefer giving the proceedings at full length, as copied from the records.

"Nicholas W——, of Oysterbay, on behalf of Rebekah his daughter, wife of Eleazer L——, of Huntingdon, made complaint unto me of the uncomfortable condition wherein his said daughter hath, for divers years past, lived with her said husband; and there having been formerly several complaints made, both on the part of the relations of the husband, as well as those of the wife, suggesting some notorious fault or impediment on the one side or the other, which hitherto hath not been fully or clearly made appear, so that mutual discords and differences do still continue. To the end a fair composure of the same may be affected, or some other lawful course taken therein, I have, by and with the advice and consent of my council, thought fit to ordain and appoint, and by these presents do ordain and appoint, that Eleazer L——, and Rebekah his wife, do appear now in this city, upon Wednesday the fourth of May next, before a special court appointed to examine into and determine the matter in difference between them; and all persons concerned, or that can give in evidence on either part, are hereby required to make their appearance before the said court, for the better clearing of the truth, so that the controversy may be decided according to law and good conscience. Given under my hand at Fort James in New York, this 1st day of April, 1670.

"FRANCIS LOVELACE, Governor."

Volume marked "Court of Assize, 1665 to 1672"—vol. ii. p. 139.

A Commission, &c.

"Whereas complaint hath been made unto me by Nicholas W——, on the behalf of Rebekah his daughter, against Eleazer L——, her husband, and also by the said Rebekah against him the said Eleazer, that having been joined in matrimony for the space of seven years and a half, or thereabouts, he, the said husband, hath not performed conjugal rights unto his wife, but, on the contrary, hath caused her to lead a very uncomfortable life with him; and the said father and daughter, upon supposition of impotency and insufficiency in the said Eleazer L——, having sued for a divorce, the hearing and examination into which matter I do not judge meet should come on before a public court, I have therefore thought fit to nominate and appoint, and by these presents do hereby nominate and appoint, Thomas Lovelace, Esq. Mr. Samuel Maverick, Mr. Matthias Nicolls, Captain John Manning, and Mr. Humphrey Davenport, to be commissioners, to meet at some convenient place this afternoon, then and there to hear and examine into this matter in difference between the said Eleazer L—— and Rebekah his wife. To which end, you are to call both parties before you, or whosoever also can give evidence or testimony in the matter; to

"The law of England concerning divorces is chiefly the ecclesiastical law, and not the common law of that country, and it has never been adopted in this state. Our statutes concerning divorces are original regulations, and they do not adopt or introduce the English law of divorces. We have no judicature authorised to adjudge, by a substantive and effectual sentence, that a marriage is illegal, and to separate the parties. This court cannot, therefore, dissolve a marriage, or decree a divorce for the cause of corporeal impotence."*

In our Revised Statutes, however, passed in 1828, the omission, if it may be so styled, was rectified. The chancellor has now the power of declaring the marriage contract void for (among other causes) physical incompetency in either of the parties existing at the time of marriage. It is further enacted, that a suit to annul a marriage on this ground shall only be maintained by the injured party against the party whose incapacity is alleged; and shall, in all cases, be brought within two years from the solemnisation of the marriage.†

In Pennsylvania, by an act passed March 13, 1815, it is enacted, "that if either party, at the time of the contract, was and still is naturally impotent, or incapable of procreation, it shall and may be lawful for the innocent and injured person to obtain a divorce."‡

whom ye may administer an oath, for the better clearing of the truth; which oath you are hereby empowered to give; as also to employ any other person or persons skilful in such matters, to make inquiry into the defect and impediments alleged; whereupon you are to give judgment and render an account, that I may make some final determination thereupon. Given under my hand and seal, this sixth day of May, in the 22d year of his majesty's reign, A.D. 1670.— Ibid. p. 175.

A Divorce granted to Rebekah W——, from Eleazer L——.

"Whereas Nicholas W——, of Oysterbay, on the behalf of his daughter Rebekah, the wife of Eleazer L——, and the said Rebekah for herself, did make their complaint unto me, against the said Eleazer L——, her husband; that she having been his reputed wife for the space of seven years and a half, she hath not, in all that time, received any due benevolence from her said husband, according to the true intention of matrimony, the great end of which is not only to extinguish those fleshly desires and appetites incident to human nature, but likewise for the well ordering and confirmation of the right of meum and tuum, to be devolved upon the posterity lawfully begotten betwixt man and wife, according to the laws of the land and practice of all Christian nations, in that case provided; and did therefore sue for a divorce. Whereupon, having appointed commissioners to call both parties before them, and strictly to examine into the affair, and to make report of their judgment thereupon; the which, after serious inquiry made by them, with the advice of chirurgeons well skilled, and sober matrons, who privily examined both the man and the woman, they made report of their judgment and opinion, that the defect was in the husband, and not in the wife, and there was a sufficient ground for a divorce. All which being afterwards represented to my council, and they having declared themselves in the same opinion, for the reasons afore specified, the pretended marriage between the said Eleazer L—— and Rebekah W—— is hereby adjudged and declared to be void, null, and invalid, together with all the consequences thereof; and the said Rebekah W—— is hereby acquitted, made free, and divorced from all pretences of marriage, or matrimonal ties and obligations between her and the said Eleazer; and the said Rebekah hath likewise free liberty to dispose of herself in lawful marriage with any other person, as if the ties and obligations between her and the said Eleazer had never been. Given under my hand, and sealed with the seal of the province, this 22d day of October, in the 22d year of his majesty's reign, A.D. 1670."— Ib. p. 260.

* Hopkins' Chancery Reports, vol. i. p. 557.

† Revised Statutes, vol. ii. pp. 142, 143. ‡ Griffith's Ryan, p. 111.

CHAPTER IV.

DOUBTFUL SEX.

Denial of the existence of hermaphrodites, in the ancient sense of the term—Notice of the various mal-conformations that have been observed — 1. Individuals exhibiting a mixture of the sexual organs, but neither of them entire. 2. Males with unusual formations of the urinary and generative organs. 3. Females with unusual formations of the generative organs. — Ancient laws concerning hermaphrodites—English common law concerning them. Notice of Geoffry St. Hilaire's late researches on hermaphrodism.

THE ancients have several fables founded on the idea of the union of the qualities of the male and female in the same individual. One of the personages who was supposed to be thus endowed was named Hermaphroditus; and from him the term *hermaphrodite* has come into general use, as applicable to this class of beings. Although formerly credited, yet it is now agreed that no such individual of the human species has ever existed; but it is equally well established that many cases of extraordinary mal-conformations have occurred. I conceive that the most useful notice of this subject will be to relate the more remarkable cases according to the arrangement usually adopted by writers of the present day.

Considering, therefore, the subject of proper hermaphrodites, or those endowed with the sexual organs of both sexes entire, and capable of performing the generative functions, as fabulous, we shall examine those to whom the above term is at present commonly applied, under three classes.

1. *Individuals exhibiting a mixture of the sexual organs, but neither of them entire.*—Examples of this class are rare; and even these, when closely examined, shew the predominance of one or other sex. Dr. Baillie mentions a case which was communicated to him by Dr. Storer of Nottingham. "The person," he observes, "bears a woman's name, and wears the dress of a woman. She has a remarkable masculine look, with plain features, but no beard. She has never menstruated; and, on this account, she was desired by the lady with whom she lived as a servant, to become an out-patient in the Nottingham hospital. At this time she was twenty-four years of age, and had not been sensible of any bad health, but only came to the hospital in order to comply with the wishes of her mistress. Various medicines were tried without effect; which led to the suspicion of the hymen being imperforated, and the menstrual blood having accumulated behind it. She was, therefore, examined by Mr. Wright, one of the surgeons to the hospital, and by Dr. Storer. The vagina was found to terminate in a cul-de-sac, two inches from the external surface of the labia. The head of the clitoris and the external orifice of the

meatus urinæ appeared as in the natural structure of a female; but there were no nymphæ. The labia were more pendulous than usual, and contained each of them a body resembling a testicle of a moderate size, with its cord. The mammæ resembled those of a woman. The person had no desire or partiality whatever for either sex."*

The Memoirs of the Academy of Dijon contain the following case, communicated by M. Maret. Hubert J. Pierre died at the hospital in October, 1767, aged seventeen years. Particular circumstances had led to a suspicion of his sex, and these induced an examination after death. His general appearance was more delicate than that of the male; and there was no down on his chin or upper lip. The breasts were of the middle size, and had each a large areola. The bust resembled a female; but the lower part of the body had not that enlargement about the hips which is usually observed at his age. On examining the sexual organs, a body four inches in length, and of proportionate thickness, resembling the penis, was found at the symphysis pubis. It was furnished with a prepuce to cover the glans; and, at its extremity, where the urethra usually opens, was an indentation. On raising this penis, it was observed to cover a large fissure, the sides of which resembled the labia of a female. At the left side of this opening there was a small round body like a testicle, but none on the right; however, if the abdomen was pressed, a similar body descended through the ring. When the labia were pushed aside, spongy bodies resembling the nymphæ were seen; and, between these, and at their upper part, the urethra opened as in the female, while below these was a very narrow aperture covered with a semilunar membrane. A small excrescence, placed laterally, and having the appearance of a caruncula myrtiformis, completed the similarity of this fissure to the orifice of the vagina. On further examination the penis was found to be imperforate; the testicle of the left side had its spermatic vessels and vas deferens, which led to the vesiculæ seminales. By making an incision into the semilunar membrane, a canal, one inch in length and half an inch in diameter, was seen, situated between the rectum and bladder. Its identity with a vagina was, however, destroyed by finding, at its lower part, the verumontanum and the seminal orifices; from which, by pressure, a fluid, resembling semen in all its properties, flowed. The most astonishing discovery was, however, yet to be made. The supposed vagina, together with the bladder and testicles, was removed. An incision was made down to the body noticed on the right side: it was contained in a sac filled with a limpid and red-coloured liquor. From its upper part on the right side, a fallopian tube passed off, which was prepared to embrace an ovarium placed near it. It seemed thus proved that the body in question was a uterus, though a very small and imperfect one; and, on blowing into it, air passed through to the tube.†

Giraud dissected a subject at the Hotel Dieu, who, during life, had been received in society as a woman, and was connected by a voluntary association with a man, who had for a long time performed the

* Morbid Anatomy, third edition, p. 410. † Mahon, vol. i. p. 100.

duties of a husband towards her. The bust had a masculine appearance; the chin was covered with firm hairs, very analogous to a beard; the neck was thick, the chest broad, the bosom slightly swollen, and the nipples exactly like those of a man. The lower half of the body presented a contrast to these characters. The soft and delicate contours of the lower limbs, the rounded hips, the broad pelvis, and the greater separation of the thighs, approximated decidedly to the female form. An imperforate penis, two testicles, and an appearance of vulva, were the external generative organs. The testes were well formed; the vesiculæ seminales imperfect; and the urethra opened at the cul-de-sac which represented the vagina.*

The following is a very recent case, exhibited in July 1834, at Liverpool. The individual is a native of Saxony, with the voice and features of a man, a light beard on the upper lip, and the breasts not developed. He is thirty-four years old, and was considered at birth as a female, and dressed as such until about a year since, when Blumenbach and Tiedemann told him that he was a man. He then assumed the male attire. The scrotum is divided along the median line, resembling the female labia; and each of these contains a testis. On separating them, the glans penis, resembling a clitoris, is seen; it is covered with a prepuce, and has a fissure, but is imperforate. About an inch below, and nearly half an inch to each side of the raphe, are two very small orifices, through which, at periods of excitement, the semen flows. Still lower is a canal three inches long, impervious except at a narrow orifice through which the urine flows. He had strong sexual desires.†

The case of the child examined by Professor Ackermann of Jena, probably belongs to this division. It was born at Mentz, on the 14th of June, 1803, and died on the 25th of the month following. Dr. Ackermann viewed the body during life, and also dissected it after death. The penis was little more than an inch long; the glans was distinct about one-third of its whole length, but imperforated; there was, however, a depression where the urethra should have opened. On raising this cliteroid penis, as he calls it, an opening was observed, which was the orifice of a canal one inch in length. The uterus and urethra opened into the posterior part of this canal; and the testicles, with their tunicæ vaginales, were found in the labia. As to the internal organs, the urinary bladder occupied its usual place; one of the testicles had descended into the scrotum, and the other had advanced no further than the groin; both were perfect, and had their usual appendages complete. In the place usually occupied by the female uterus there was found an organ closely resembling it. Its figure was pyriform, and it opened by a round orifice in the *vagina urethralis*, as he styles the canal, a little before the orifice of the urethra. The

* Rees's Cyclopædia, art. *Generation*. The case is quoted from the Journal de Médecine, par Sedillot.

† American Journal of Medical Sciences, vol. xv. p. 191, from the Liverpool Medical Journal. A more accurate account, by Dr. Handyside, with a plate, will be found in the Edinburgh Medical and Surgical Journal, vol. xliii. p. 313. This individual has constant connexion with the male sex.

vasa deferentia penetrated the substance of the uterus at the points where the fallopian tubes are usually placed, but without opening here, passed on, and at length terminated by very small orifices in the vagina urethralis.*

Other cases are mentioned by various authors, but the similarity between them is so great as to render a further detail unnecessary. The examples now given, shew the greatest deviations from the perfect structure that have been observed; and it will lead to clearer views concerning them, if we adopt the opinions of the reviewer of Ackermann, in the journal already quoted. "In the two sexes, there are organs which correspond to each other, and which may be called analogous organs—the penis to the clitoris, the scrotum to the labia, the testes to the ovaria, and the prostate to the uterus; and it further appears, that of these analogous organs, no two were ever found together in the same individual. *No monster has been described, having both a penis and clitoris; nor with a testis and ovarium of the same side—we may venture to say, with testes and ovaria; nor one having a prostate and uterus.*" This distinction will invalidate the account given by Maret, so far as it relates to the presence of an ovarium and a fallopian tube; but I suggest whether it is not probable that the organ in question was a testicle, and its appendages malformed. The idea of our author is also no doubt correct, that in repeated instances the part deemed to be a uterus is a *malformed prostate.* "The proof rises almost to certainty, when we recollect that the prostate is the only male organ not accounted for in the hermaphrodite."† If these views be adopted, it will follow as a result, that beings of this class are to be considered as males; and it need hardly be added that they are impotent.‡

There are, however, two cases on record, which we cannot explain in conformity to the above opinions. Even if the first be deemed, and it doubtless is, imperfect, yet the last is vouched for by one of the most eminent anatomists of the present day.

The late Dr. Handy of New York, in a letter to Dr. Edward Miller, dated at Lisbon in 1807, states that he saw at that place a Portuguese, twenty-eight years old, of a tall and slender but masculine figure. "The penis and testicles, with their common covering, the scrotum, are in the usual situation, of the form and appearance and very nearly of the size of those of an adult. The preputium covers the glans completely, and admits of being partially retracted. On the introduction of a probe, the male urethra appeared to be pervious about a third of its length, beyond which the resistance to its passage was insuperable by any ordinary justifiable force. There is a

* Edinburgh Medical and Surgical Journal, vol. iii. p. 202. Review of "*Infantis Androgyni Historia et Ichnographia*," &c. Auctore I. F. Ackermann.

† Edinburgh Medical and Surgical Journal, vol. iii. p. 208.

‡ To this division, among recent cases, probably belongs that at Guy's Hospital, of a person aged twenty, in January 1828.—Lancet, N. S. vol. i. p. 593; and American Journal of Medical Sciences, vol. ii. p. 412. A case much resembling that of H. J. Pierre, is said to have recently occurred in Sicily, in an individual dead at the age of eighty, and who had been married as a female.—London Medical Gazette, vol. x. p. 64.

tendency to the growth of a beard, which is kept short by clipping with scissors. The female parts do not differ from those of the more perfect sex, except in the size of the labia, which are not so prominent, and also that the whole of the external organs appear to be situated nearer the rectum, and are not surrounded with the usual quantity of hair. The thighs do not possess the tapering fulness common to the exquisitely formed female; the ossa ilia are less expanded, and the breasts are very small. In voice and manners the female predominates. She menstruates regularly, was twice pregnant, and miscarried in the third and fifth months of gestation. During copulation, the penis becomes erect. There has never existed an inclination for commerce with the female, under any circumstances of excitement of the venereal passion. She at present labours under the venereal disease, and has warts on the labia."*

Orfila and Marc both notice this case, and urge that a perfect anatomical examination of the supposed testicles was wanting. They incline to the idea that the partially perforated penis was of a cliteroid nature. They agree, however, in deeming the subject a female.

In the following case, however, the dissection was ample. It was related to the Academy of Sciences of Berlin in 1825, by Rudolphi. The body was that of a child, who had died, as it was said, seven days after birth; but from the developement present, it was probably several weeks old. "The penis was divided inferiorly; the right side of the scrotum contained a testicle, the left side was small and empty. There was a uterus which communicated at its superior and left portion with a fallopian tube, behind which was an ovary destitute of its ligament. On the right side, there was neither fallopian tube, nor ovary, nor ligament, but a true testicle, from the epididymis of which there arose a vas deferens. Below the uterus, there was a hard, flattened, ovoid body, which, when divided, exhibited a cavity with thick parietes. The uterus terminated above in the parietes of this body, and at the right, the vas deferens, without however penetrating into its cavity. Finally, at its inferior part, there was a true vagina, which terminated in a cul-de-sac. The urethra opened into the bladder, which was natural. The anus, rectum, and the other organs, were naturally formed. Professor Rudolphi considered the ovoid body, situated beneath the uterus, as the prostate and vesiculæ seminales in a rudimental state."†

2. *Male individuals with unusual formations of the urinary and generative organs* (androgyni).—"The ambiguity in these cases depends commonly on the testes being contained in separate parallel folds of the skin; the penis being imperforate, and the urethra opening in the perinæum, on the surface of a blind aperture, having a red and tender appearance, and easily mistaken for the vagina. In such an individual, the penis being imperforate, and probably smaller than usual, is considered as a large clitoris; the folds of the skin holding the testes, very much resemble the female labia, and the red slit

* New York Medical Repository, vol. xii. p. 36.
† American Journal of Medical Sciences, vol. ix. p. 499.

behind which the urethra ends, is tolerably analogous to the vagina."* A marine, answering perfectly to this description, was sent to the hospital at Toulon in 1799, as an hermaphrodite. He was about twenty years of age, with little beard, and breasts resembling those of a girl at sixteen. A discharge from the service was procured for him.† Individuals of this class appear to have the testes and vesiculæ seminales perfect, but they must evidently be impotent, from the imperforation of the penis, and the opening of the ejaculatory ducts near the perinæum. Here the semen is of course expelled.

Deviations less marked have also been observed, and among others, a confinement of the penis to the scrotum, by a particular formation of the integuments, has occasioned persons to be reputed hermaphrodites. In these, the urine passes in the direction downwards, and the confinement of the organ will not allow of its performing the sexual functions. Mr. Brand relates, that being consulted in 1779, on occasion of some complaint in the groin about a child, seven years of age, he found a vicious structure of the sexual organs, consisting in the presence of such an unnatural integument. This child had been baptized and brought up a girl, but, it was evident to him, erroneously, as the male organs were present. By a slight incision he liberated the restricted parts, and proved to the parents that they had mistaken a boy for a girl.‡

Lastly, males are supposed to be hermaphrodites, when the urinary bladder is deficient, together with the lower and anterior portion of the abdominal muscles and integuments, while a red and sensitive mass of an irregular and fungus-like substance, with the ureters opening on it, is placed at the lower part of the abdomen. I have already referred to the elaborate essay of Dr. Duncan, jun. on this subject. He has collected a great number of cases, and from his deductions, it appears that important alterations in the generative organs are generally observed, in consequence of this deformity. The urethra is deficient, and the penis consequently imperforate. It is also very short—never exceeding two inches, even in the adult. The vesiculæ seminales open near the fungous mass above mentioned, or in the urethra, or in a small tubercle at the root of the penis. The testicles are generally natural, either contained in the scrotum, or they have not descended. The sexual apetite in some of these individuals has been weak; in others strong; in others altogether wanting.§ They are not capable

* Rees's Cyclopædia, art. *Generation.*

† Foderé, vol. i. p. 357. An instructive case, accompanied with a plate, is related by J. S. Soden, surgeon at Coventry. The individual resided at that place, and wore the attire of a female. The beard was strong, the breasts flat, and the hips straight. The genital organs generally resembled the above description. The scrotum contained the testicles, but it was divided, and resembled the labia. The urine was evacuated at the perinæum. — Edinburgh Medical and Surgical Journal, vol. iv. p. 32. There certainly can be no doubt of this person being a male.

The Saxon case, that I have described on a previous page, might with propriety be arranged under this division, were it not for some circumstances, mentioned in Dr. Handyside's Narrative.

‡ Brand, quoted in Brewster's Edinburgh Encyclopædia, art. *Hermaphrodites.*

§ Edinburgh Medical and Surgical Journal, vol. i. p. 54 to 58. The following is an exception to the general rule, unless we suppose the mal-conformation to have

of procreating the species, in consequence of the shortness and imperforation of the penis, and the seminal ducts opening externally.*

been slight, and the prevalent opinion to have been drawn from the appearance. "In the year preceding (1459) there was a bairn which had the kinds of male and female, called in our language *a scarcht*, in whom man's nature did prevail. But because his disposition and portraiture of body represented a woman, in a man's house of Linlithgow he associated in bedding with the goodman's daughter of the house, and made her to conceive a child; which being divulgate through the country, and the matrons understanding this damsel deceived on in this manner, and being offended that the monstrous beast should set himself forth as a woman, being a very man, they got him accused and convicted in judgment for to be burnt quick, for this shameful behaviour."—Piscottie's History of Scotland. Edinburgh, 1778, p. 104.

* Under this head, I apprehend, must be arranged the case of Marie Derrier; in whom there was an imperforate penis, and an opening at the perinæum, but no testicles or traces of vagina. Hufeland and Mursinna declared her a female; Stark and Martens, on the other hand, considered her a malformed male. Orfila and Marc, who both notice the case (Leçons, vol. i. p. 161; and Dictionnaire des Sciences Médicales, vol. xxi. p. 115), seem to be of the latter opinion.

Also the case of Sarah Tibbert, aged six, admitted into St. George's Hospital, London, 1825.—Lancet, vol. viii. p. 95.

That of a negro child, aged six, described by Dr. Heustis of Alabama, in whom the penis is perforated, but the urethra opens externally at its root. The rudiments of testicles are felt in the sacculi on each side of the scrotum.—American Journal of Medical Sciences, vol. vii. p. 557.

One by Dr. Hervey, of an individual who died at the hospital of Bourg in France, aged seventeen.—American Journal of Medical Sciences, vol. iii. p. 185, from the Journal Général.

Mary Cannon, who died at Guy's Hospital in 1829, aged fifty-five or sixty. This hybrid formerly wore man's dress, had worked as a labourer, and had been engaged in pugilistic combats. For the last seven or eight years she appeared as a female.—Lancet, N. S. vol. v. p. 181; and London Medical Gazette.

Marie Marguerite, whose history was given by Dr. Worbe to the Faculty of Medicine in Paris, in 1815.—Dictionnaire des Sciences Médicales, art. *Hermaphrodite*.

The case by Gendrin, where the person was considered a female until the age of nineteen (in 1831), when, on examination, the registry of baptism was ordered to be altered, and the surname changed to that of a male.—Medico-Chirurgical Review, vol. xxi. p. 172, from the Revue Médicale.

And, probably, the two cases described by Dupuytren to the Royal Academy of Medicine at Paris, in 1830.—North American Medical and Surgical Journal, vol. xii. p. 224.

Nor can I, in concluding these references, avoid giving an abridged detail of the following case from Dr. Davis. A person in London was baptised as a female, dressed as such, and during the years of childhood and adolescence, believed herself belonging to that sex. Her passions became so far developed as to cause her to make advances to a gentleman, who, being disappointed, committed a furious breach of the peace. The police took both into custody, and this finally led to an examination, at which Dr. Davis, Professor Pattison, and several others, were present. A substance resembling the clitoris, but a little larger, was seen, having about half an inch of its gland uncovered by its prepuce. Below the root of this cliteroid body, on raising it a little, a small orifice was observed communicating with the bladder. Precisely at the usual locality of the opening into the vagina, there was a round aperture of scarcely half an inch in diameter. This aperture was surrounded by a carneo-membranous structure of no great thickness, but of considerable firmness and tenacity. Dr. D. experienced so much resistance on attempting to pass the finger, that he did not dare to continue it; but, on introducing a bougie, a cul-de-sac was found at about an inch beyond. On each side of this opening were two full developed pendulous bodies, evidently testes, which communicated by spermatic cords, of the usual bulk and feel, with the abdominal cavity. The breasts were not developed, and the voice was rough. Dr. Davis very justly considers the sex of this person as masculine.—Obstetric Medicine, p. 63.

3. *Females with unusual formation of the generative organs* (androgynæ). An enlargement of the clitoris is probably the most common cause that has led to mistakes concerning this sex. It seldom occurs in Europe, but is quite frequent in warm climates, insomuch that excision of it is said to be sometimes practised.

Sir Everard Home relates an instance in a Mandingo negress, aged twenty-four years. Her breasts were very flat, her voice was rough, and her countenance masculine. The clitoris was two inches long, and in thickness resembling a common-sized thumb; when viewed at some distance, the end appeared round and of a red colour; but, on a closer inspection, was found to be more pointed than that of a penis; not flat below, and having neither prepuce nor perforation. When handled, it became half erected, and was then three inches long, and much larger than before; and on voiding her urine she was obliged to lift it up, as it completely covered the orifice of the urethra. The other parts of the female organs were found to be in a natural state.* It is proper to observe in this place, that in new-born children the clitoris is proportionably very large.

In 1814, a female named Mary Magdalen Lefort, excited great attention in Paris, and subsequently in London, as a reputed hermaphrodite. She was examined by a committee of the *Faculté de Médecine* of that city (consisting of Chaussier, Petit-Radel, and Beclard); and from their report and the remarks of other observers, the following particulars are drawn. The breasts were sufficiently developed, and there were perfect areolæ on the nipples. The upper lip and chin were covered with a beard. The clitoris, resembling much a small penis, emerged from under the symphysis pubis, and shooting out from between the superior part of the labia, terminated by an imperforated glans. At the root of the clitoris is an opening, through which the urine and *menses* flowed. On separating the labia, a thick membrane was seen to extend from the one to the other, and from the lower angle formed by their union, upwards as far as the prominent clitoris already described. Dr. Granville supposed that this membranous partition covers the orifice of the vagina, and that an incision made into it would at once expose that cavity in its natural state. Mr. Brookes, the anatomist, proposed to effect an enlargement of the opening of the vagina, but the subject of the malformation refused, calculating no doubt that

* See Home on *Hermaphrodites*.—Philos. Trans. vol. lxxxix. p. 157. Many other cases are said to be collected in the work of Dr. Parsons on *Hermaphrodites*. See a case by him of a French girl, in Philos. Trans. vol. xlvii. p. 142.

I have stated in the text, that this malconformation seldom occurs in temperate climates; but I may add, that a sufficiency of cases are related. "An entire quarto thickly printed page of references to cases of monstrous clitorides, are given in the *Ephem. Germ.*"—Davis's Obstetric Medicine, p. 60. This author refers to a case of extirpation by Mr. Richard Simmons of London, in which the length was nine inches, and the circumference of the largest part of the stem five inches. Its general appearance was very smooth and fleshy, and its upper surface covered with cuticle. (Ibid. p. 61.) My colleague, Professor Delamater, has mentioned to me a case within his own observation, where the husband became extremely dissatisfied, and indeed thought of applying for a divorce, on account of the impediments he met with from what proved to be an enlarged clitoris. Its removal obviated his objections.

such an operation might have injured the interests of her gainful vocation. The urethra in this case was produced under the clitoris, and it was this circumstance which constituted its resemblance to a penis. But the presence of organs essential to the female, such as the uterus and vagina, leave no doubt of her sex.*

A prolapsus of the uterus is another circumstance which has occasioned females to be deemed hermaphrodites. Margaret Malaure came to Paris, in 1693, dressed as a man. She considered herself as possessing the organs of both sexes, and stated that she was able to employ both. Her person was exhibited; and several physicians and surgeons agreed with the common opinion so much, as to give certificates that she was an hermaphrodite. Saviard, an eminent surgeon, was, however, incredulous. He examined her in the presence of his brother practitioners, and found that she had a prolapsus uteri, which he reduced. †

Sir Everard Home mentions a similar case of a French woman, whom he himself examined. She was shewn as a curiosity; and in the course of a few weeks made 400*l.* The prolapsus was evident on inspection: she, however, pretended to have the powers of a male. ‡

It will readily be observed, from the above illustrations, that all the cases of supposed hermaphrodites are referable to the classes now described. They are either males, with some unusual organisation or position of the urinary or generative organs; or females, with an enlarged clitoris or prolapsed uterus; or individuals, in whom the generative organs have not produced their usual effect in influencing the developement of the body.‖ Thus it is evident, that instead of combining the powers of both sexes, they are, for the most part, incapable of exerting any sexual function. §

Yet the prejudices of ancient nations seem to have marked these unfortunate individuals as objects of persecution, and to have subjected them to the operation of the most absurd and cruel laws. Diodorus mentions that they had been burned by the Athenians and Romans. At an early period of Roman history, a law was enacted, that every child of this description should be shut up in a chest, and thrown into the sea; and Livy gives an instance, where, on some difficulty with

* London Medical Repository, vol. iv. p. 414. Orfila's Leçons, vol. i. p. 153. Davis's Obstetric Medicine, p. 62. Elliotson's Blumenbach, p. 420, 422. Cyclopædia of Practical Medicine, art. *Sex* (*doubtful*), by Dr. Beatty.

† Mahon, vol. i. p. 96.

‡ Home ut antea. A case similar to the above is related in Valentini Pandectæ, vol. i. p. 38.

‖ In a recent discussion at the Academy of Medicine of Paris, Adelon, a very high authority, maintained that all the cases were referable to one or other of the above classes; and that there never was "a coexistence of the parts belonging to, or characteristic of, either sex in one being."—Med. Chir. Review, vol. xxiv. p. 237.

§ Velpeau, in his Midwifery (American edition, p. 81), has suggested that in some of the supposed cases of hermaphrodism, congenital hernia of the ovaries may be mistaken for testicles. He refers to this the case of Professor Mayer of Bonn, and also one examined by Marjolin. In the former (a child six months old), there were a uterus, vagina, and fallopian tubes; while on the sides, there were folds of the skin like a split scrotum, with oval bodies in each. The clitoris was separated at its glans by a fissure.—Lancet, vol. ix. p. 169, from Graefe's Journal.

respect to the sex of a newly-born infant, it was directed to be thrown into the sea—*tanquam fœdum et turpe prodigium.** The Jewish Talmud, we are told, contains many ordinances founded on the apparent predominance of sex.

The canon and civil law have also many enactments concerning them. Among other questions vigorously debated, was that whether they should be allowed to marry; and it appears that they were even not prevented; but if the two sexes were equal, a choice of the object was left. Some learned opinions on this subject may be found in Valentini.†

Hermaphrodites could not, however, be promoted to holy orders, on account of their deformity or monstrosity; nor could they be appointed judges, "because they are ranked with infamous persons, to whom the gates of dignity should not be opened."

An old French law allowed them great latitude. It enacted that hermaphrodites should choose one sex, and keep to it.‡

These absurd notions and practices have now disappeared; but the subject is, notwithstanding, important on many accounts, as these unusual deviations often render the sex of an individual doubtful, and impose even on professional persons. The decision may be important in deciding the employment in life of an individual, the descent of property, and the judicial decisions concerning impotence or sterility. Thus, Mr. Ferrein, a modern physician, informs us, that he was consulted by the relatives of a young nobleman labouring under a dubious conformation, who, if a male, as was commonly believed by them, would inherit a considerable estate, but to which he could have no right if he belonged to the other sex. The whole external mien resembled that of girls of twelve years of age; the breasts were quite flat, and the voice masculine. An external sexual organ of small size was present, but without a urethra. In the scrotum was a deep fissure, through which the urine was discharged. He was induced to declare her a female, and thus she would consequently lose the expected inheritance. This decision is, however, incorrect, at least if we adopt the views already laid down.

The following circumstances are worthy of notice, in forming our opinions on contested cases. The beard, the hair on various parts of the body—the desires excited by the presence of women—the testes, and their cords—and the comparatively greater breadth of the shoulders than of the pelvis and hips, shew us that the individual is a man. The smoothness and softness of the body in general—the absence of the beard, and of hair on the body—the menstrual discharge—the want of testes—and the superior breadth of the hips, prove the individual to be a woman.

On proceeding to the sexual organs, a male with a fissure in the perinæum, and an imperforate penis, may be ascertained by the size of the penis; by the different organisation of the prepuce from that which covers the clitoris; by the absence of nymphæ and hymen, and

* Liv. xxvii. 37. Eutropius, iv. 36.

† Novellæ Cas. 10, de matrimonio hermaphroditi. ‡ Male, p. 278.

probably by the presence of testes. The different relation of the fissure in the perinæum to the penis, from that of the meatus urinarius to the clitoris in the female, will assist the decision: as also the want of power to pass an instrument towards the situation of the uterus.

On the other hand, a female is indicated by the size of the clitoris, and its different shape; by the connexion of its prepuce with the nymphæ, and the presence of the latter parts; by the separate opening of the vagina and meatus urinarius; and by the presence of the hymen, and the absence of the testicles.

All these circumstances now enumerated, tend to assist us in viewing the adult; but the difficulty is much increased with new-born children. In such instances, a close and accurate examination is required, founded on the distinctions already laid down, so far as they are applicable.*

The English common law on this subject, and which of course is binding in this country, is thus laid down by Blackstone and Coke. "A monster having deformity in any part of its body, yet if it hath human shape, may inherit."† And "every heir is either a male or a female, or an hermaphrodite, that is, both male and female. And an hermaphrodite (which is also called androgynus) shall be heir either as a male or female, according to that kind of sex which doth prevail; and, accordingly, it ought to be baptised."‡ The same rule, he observes (*hermaphrodita tam masculo quam feminæ comparatum secundum prævalescentiam sexus incalescentis*), guides in cases concerning tenant by the curtesy.§

It was not until I had prepared this chapter for publication, that I met with some brief notices of the recent work of I. G. St. Hilaire on Hermaphrodism. As it is not in my power to procure it in season for the purpose of recasting my observations, I prefer adding in this place an analysis of its contents, copied from the Lancet, N. S., vol. xii. p. 48; and the New Edinburgh Philosophical Journal, vol. xv. p. 298.

M. St. Hilaire divides the generative apparatus into six different portions or segments, three on a side, which, in several respects, are independent of each other. 1 and 2. The deep-seated organs; testicles and ovaries. 3, 4. The middle organs; womb or prostate, and vesiculæ seminales. 5, 6. The external organs; penis and scrotum, clitoris and vulva.

When the number of these parts is not changed, and there is simply a modification in their developement, we have the FIRST CLASS, or *hermaphrodism without excess.* This again is subdivided into four orders: 1. *Male hermaphrodism*, when the generative apparatus, essentially male, presents in some one portion the form of a female organ—as a scrotal fissure, resembling in some respects a vulva.

* I am much indebted, on this subject, to the articles *Generation* in Rees's Cyclopædia, and *Hermaphrodites* in Brewster's. The former is an elaborate and able production, from the pen of Mr. William Lawrence. See also the article on this subject by Marc, in the Dictionnaire des Sciences Médicales, vol. xxi.; and for some discussions on the Theory of Hermaphrodism, by Dr. Knox of Edinburgh: see Dr. Brewster's Journal of Science, N. S. vol. ii. p. 323.

† Blackstone, ii. 247. ‡ Coke, Littleton, 8, a. || Ditto, 29, b.

2. *Female H.* where the apparatus, though essentially female, yet offers in some one portion the form of a male organ, as in the excessive developement of the clitoris. 3. *Neutral H.* when the portions of the sexual apparatus are so mixed up, and so ambiguous, that it is impossible to ascertain to what sex the individual belongs. 4. *Mixed H.* when the organs of the two sexes are actually united and mixed in the same individual. Of this there are several species: *Alternate*, when the deep organs belong to one sex, and the middle to the other, while the external present a mixture of both. *Lateral.* In this, the deep and middle organs, when viewed on one side of the median line, appear to belong to the male sex, while on the other they are female; the external organs, as in the former species, are partly male and partly female. *Hemilateral. Interchanging.*

The SECOND CLASS includes all anomalies with excess of parts, and is divided into three orders: 1. *Complex Male H.* where we find, with an apparatus essentially male, some supernumerary female organ, as a uterus, &c. 2. *Complex Female H.* with the addition of a male organ, as a testicle, &c. to an apparatus essentially female. 3. *Bisexual H.* where a male and female apparatus exist in the same individual. M. St. Hilaire allows, however, unequivocally, that the external organs (as a penis and clitoris) have never been found perfectly double. "The researches of modern anatomists have completely set at rest the long-debated question of hermaphrodism, in the vulgar acceptation of the word. It is anatomically and physiologically impossible."

"With respect to legal medicine, it is sufficient for me to point out here," says the author, "the insufficiency of the precepts given by authors for the determination of the sex in doubtful cases—precepts which have appeared exact, only because there had been but a very few of the combinations distinguished which nature presents. This difficulty in distinguishing the sex is the consequence of the general fact, that while the internal organs vary almost to infinity in number, structure, and arangement (being either *internal male*—*internal female*—a *double set* of organs, which are male and female—or, finally, *ambiguous*, being neither male nor female), the external ones preserve their normal number; and the modifications which they present in other respects, being intermediate between the male and female sexes, are included within limits sufficiently narrow. It is then impossible that a particular arrangement of the external organs could correspond to each of the special combinations of the internal organs."

Lastly, the author remarks, that legislation, admitting only two grand classes of individuals, on whom it imposes duties, and grants different and almost opposite rights, according to their sex, does not truly embrace the entire of the cases; for *there are subjects who have really no sex*, such as neuter hermaphrodites, and hermaphrodites mixed by superposition; and, on the other hand, certain individuals, the bisexual hermaphrodites, who present the two sexes united in the same degree.*

* A remarkable case of this description, which occurred in Paris, to Professor Bouillaud, the editor of the *Journal Hebdomedaire*, is given from that journal in

If the reader will compare this analysis with the accompanying chapter, he will readily observe in what respects the observations of M. St. Hilaire are to be deemed original. So far as they relate to legal medicine, distinct from the mere enunciation of facts, we may presume that little or no improvement can be made in our existing law, unless the mixed class be actually precluded from the power of inheriting.

CHAPTER V.

RAPE.

1. Signs of virginity—opinion of anatomists concerning them. 2. Signs of defloration and rape—Diseases that may be mistaken for the effects of violence—Value to be attached to external injuries as proof—Possibility of consummating a rape—False accusations—Appearances when death has followed violation—Case of Mary Ashford. 3. Laws of various countries as to the violation of children under ten years of age—Credibility of witnesses in these cases—Laws of various countries concerning the punishment of rape—Discussion as to the circumstances which constitute the crime in law—Diversity of decisions in England and this country—Late English law defining them, with decisions under the same. 4. Whether the presence of the venereal in the female should invalidate her accusation—Of rape during sleep, without the female's knowledge—Of pregnancy following rape—Law on this point—Of pregnancy following defloration.

No case can occur in which public feeling is more warmly or justly excited, than where an attempt is made to injure or destroy the purity of the female. According to our system of laws, the testimony of the insulted individual is sufficient to condemn the criminal; yet, notwithstanding this correct disposition, it not unfrequently occurs that the opinion of the physician is required in order to elucidate various diffi-

the Lancet, N. S. vol. xii. p. 60; and Medico-Chir. Review, vol. xxiii. p. 237. The subject, aged sixty-two, and a widower, who died of cholera, was apparently a male; yet on dissection, a womb with its ovaries was found. There was a perfect prostate gland. The testicles, vesiculæ seminales, and vasa deferentia, were wanting. The penis had a well formed glans and prepuce. A vagina of about two inches long, connected the uterus with the urethra. The external genital organs of the female were entirely absent; but the general conformation (except a thick but soft beard) inclined to that sex.

Geoffroy St. Hilaire and Manec observe on this case, that "We must distinguish the organs of reproduction, and those of mere copulation; there may be an amalgamation or co-existence of the latter, but not of the former."

culties connected with the accusation, I shall, therefore, follow the plan pursued by all systematic writers on this subject, and commence with a notice of the signs of virginity. A knowledge of these is generally required in cases were children of a tender age have been abused; and again, they need to be known in those instances where malicious charges have been made by abandoned females. No remark can be more corect than that of Sir Matthew Hale, concerning this crime: "It is an accusation," says he, "easy to be made and harder to be proved, but harder to be defended by the party accused, though innocent." The signs of rape will necessarily form the second division; thirdly, the laws of various countries on that crime; and, lastly, an examination of some medico-legal questions connected with the subject.

1. The physical signs of virginity have been the subject of keen discussion among anatomists and physiologists, and none of them has led to greater inquiry than the *existence of the hymen*. This is understood to be a membrane of a semilunar or, occasionally, of a circular form, which closes the orifice of the vagina, leaving, however, an aperture sufficiently large to permit the menses to pass. A great difference of opinion has existed concerning its presence. Some distinguished physiologists have denied its existence altogether, or, in the cases where it is found, consider it a non-natural or morbid occurrence. Among these may be enumerated—Ambrose Paré, Palfyn, Pinnæus, Columbus, Dionis, and Buffon. "Columbus," says Zacchias, "did not observe it in more than one or two instances; and Fallopius, in not more than three females out of thousands whom he dissected."* "Paré," says Mahon, "considers the presence of the hymen as contrary to nature; and states, that he searched for it in vain in females from three to twelve years of age."† Those on the contrary, who, from dissection, have believed in its presence previous to sexual intercourse, or some other cause destroying it, are Fabricius, Albinus, Ruysch, Morgagni, Haller, Diemerbroek, Heister, Riolan, Sabatier, Cuvier, Blumenbach, and I may add Denman. Haller appears to have observed it in persons of all ages.‡ Cuvier has not only found it in females, but also in mammiferous animals; and thus gives strong evidence of its existence by analogy.‖ Gavard, who appears to have dissected a great number of subjects at the *Hospital de la Salpetrière*, and also at the dissecting room of Desault, states that he constantly found this membrane in the fœtus, and in

* Zacchias, vol. i. p. 376. † Mahon, vol. i. p. 118.

‡ "Ego quidem in omnibus virginibus reperi, quarum aliquæ adultæ erant ætatis, neque unquam desideravi, neque credo a purâ virgine abesse. Vidi hymenem bis in fœtu, sexies in recens natâ, bis in puellâ aliquot septimanarum, ter in annuâ, semel mense 18, semel in bimulâ, bis in sexenni, semel in decenni, semel in 14 annorum puellâ, semel in aliâ 17 annorum, semel in vetulâ."—Elementa Physiologiæ, tom. vii. pars ii. pp. 95, 97. Some satirical remarks by Michaelis on the German anatomists finding this membrane, and the French denying its existence, may be found in his commentaries, vol. i. p. 482. He quotes, also, the opinion of Roederer and Wrisberg in favour of its presence, and also of its being a sign of virginity.

‖ See, on this point, Godman's Anatomical Investigations, p. 72, &c.; Lawrence's Lectures on Physiology, London edition, p. 174.

children newly born. In others of a more advanced age he also observed it; and in particular, in a female fifty years old, whom he was called to sound, he found it untouched; so also in another, whom he attended with Professor Dubois.*

The weight of testimony is thus evidently in favour of the affirmative of this question; and the general sense of the profession is certainly decidedly opposed to considering it as a non-natural appearance. The following circumstances, however, require to be noted, before we form an opinion concerning it as a sign of virginity. *It may be wanting from original mal-conformation, or it may be destroyed by disease or some other cause, and yet the female be pure.* Thus, the first menstrual flux, if the aperture be small, may destroy it; or an accident, as a fall;† or disease, as, for example, an ulcer, may totally obliterate it. There have, certainly, occurred instances, where the pressure of the confined menstrual fluid has produced its destruction. Again, in the place of the hymen, are sometimes found the *caruncul*æ *myrtiformes.* Tolberg, according to Foderé, and also Belloc, have made this observation on dissection. They were, however, round and without a cicatrix, and in this respect very distinct from the organs usually so termed.‡ *This membrane may, on the other hand, be present, and yet the female be unchaste,—nay, she may become pregnant without having it destroyed.* Zacchias remarks, that it will not be ruptured when it is thick and hard. A disproportion between the organs, or connexion during the presence of menstruation, or fluor albus, are also mentioned by him. Gavard, whom I have already mentioned, found it perfect in a female thirteen years of age, who was labouring under the venereal.‖

In those cases where this membrane is found thickened, an operation has often been necessary. Paré relates of a mother who applied to him to examine it; and on dividing it, it was seen to be of the thickness of parchment.§ A similar case happened to Ruysch, of a female during labour, in whom he had not only to divide the hymen, but also another non-natural membrane placed further back. Imme-

* Foderé, vol. iv. p. 339. In a report by L. Senn, of La Maternite, at Paris, on the condition of the genital organs at birth, he states, that in examining between three and four hundred children from two to four years of age, he did not fail in a single instance to find the hymen.—Dewee's Midwifery, third edition, p. 48.

† Or, as in the following case of a young woman admitted into St. Thomas's Hospital in July, 1828, under the care of Dr. Elliotson. She stated, that about six months previous she was lifting a person out of a coach, when she suddenly felt intense pain in the back, and the uterus descended and protruded beyond the os externum. The descent was accompanied by profuse hæmorrhage. She recovered, and was married, and now came in for prolapsus uteri. She declared, that before her marriage, she was intact; and Dr. E. remarked on this, that a lesion of the hymen may result from *internal* as well as from *external* causes.—Lancet, N.S., vol. ii. p. 734.

‡ Foderé, vol. iv. p. 343. Belloc, p. 45.

‖ Foderé, vol. iv. p. 340. Ricord, surgeon to the Venereal Hospital at Paris, mentions a similar case. — Monthly Journal Medico-Chirurgical Knowledge, No. ii. p. 37.

§ Mahon, vol. i. p. 118.

diately after the operation, the child was born.* Baudelocque, Mauriceau, Denman, and other writers on midwifery, adduce many instances illustrating the same fact.†

These observations certainly lead us to doubt whether the presence or absence of the hymen deserves much attention; and I believe the opinion of physiologists generally is, that it is an extremely equivocal sign. I am, however, unwilling to go as far as most of the later writers on legal medicine, who virtually reject it altogether. While it must be allowed, that it can very often be destroyed by causes which do not impair the chastity of the female, we are justified, I think, in attaching considerable importance to its presence. It would be difficult to support an accusation of rape, where the hymen is found entire.‡

* Foderé, vol. iv. pp. 340. See also vol. i. pp. 389, 390, for similar and even more extraordinary cases.

† Capuron states, that a few years ago he divided this membrane in a female during labour, and in a short period she was delivered of living twins.—P. 32.

The following extract from so experienced a practitioner as Baudelocque, has some incidental interest:—"It is well known that the hymen is not always torn in the first connexion, and that it has been found entire in some women at the time of labour. I can myself adduce two examples." The first was in a young lady, who assured him that she had merely permitted the semen to be shed on the interior parts of the vulva, and did not allow the complete act. Here the hymen bound the vagina very closely, and left but a very small opening. She, notwithstanding, became pregnant, and the parts were found thus at labour. In the other, the membrane alone resisted, for half an hour, all the efforts of the last periods of delivery.— Midwifery, vol. i. p. 217.

Additional cases are recorded by Mr. Brennard, (London Medical Repository, vol. xxi. p. 398.)

By Dr. Blundell, an eminent lecturer on midwifery in London. "Four impregnations," says he, "in which the hymen remained unbroken, have fallen under my notice; the diameter of the vaginal orifice not exceeding that of the smaller finger; and this, too, though the male organ was of ordinary dimension." And again: "I know of three cases in which the male organ was not suffered to enter the vagina at all, and where, nevertheless—I suppose from the mere deposition of the semen upon the vulva—impregnation took place."—See his lectures in the Lancet, N.S., vol. iii. pp. 259, 260; vol. iv. p. 708.

By Dr. Davis, particularly a case of cribriform hymen, Obstetric Medicine, pp. 104, 105, 110. By Dr. Kennedy, p. 31.

By Dr. Montgomery, Cyclopædia of Practical Medicine, vol. iii. p. 495, article, *Pregnancy*. He quotes two cases, which deserve mention at least in this place. One is from Marc (article, *Violation*, in the Dictionnaire des Sciences Médicales.). A young female, severely afflicted with syphilis, was brought to La Pitie. The hymen was altogether wanting; the vagina greatly dilated, and the external genitals diseased. She was cured; and, to the astonishment of the medical observers, a well-formed semilunar hymen was found. The other is from Nysten:—A young girl, aged thirteen, had ovarian pregnancy, but had never menstruated: the vagina was much contracted, and the hymen was perfect!

‡ Smith, p. 397. A case is, however, given in East's Crown Law (i. 438), where two surgeons swore that the hymen was entire. "But as this membrane was admitted to be in some subjects an inch, in others an inch and a half beyond the orifice of the vagina, Ashhurst J. left it to the jury, whether any penetration was proved; *for, if there were any, however small*, the rape was complete in law. The jury found the prisoner guilty." In this case the female was ten years of age, and the parts were stated to be so narrow that a finger could not be introduced. This decision was, however, at variance with the evidence usually required in such cases in England; and, according to the present statute law of that country (see section 3 of this chapter), it would hardly be again made. On the trial of Gammon, for a rape on a child

I feel, therefore, justified in retaining it among the signs of virginity, although it should always be considered in connexion with other physical proofs.*

2. *Narrowness of the Vagina.*—In children this part is extremely small; but it increases in size as they approach to the age of puberty. At that period the developement produced by the determination of blood to the sexual organs causes a turgescence and enlargement which naturally place the parts in closer contact. In chaste females, also, rugæ are observed on the inner surface of the vagina; and these are removed by frequent connexions, and destroyed by one or two deliveries. It has been objected to this as a sign, that it varies according to the age of the individual, the temperament, and the state of health. Some of these deserve attention. In individuals of a sanguine temperament the parts will be most contracted; while, on the other hand, if fluor albus, chlorosis, or menorrhagia be present, there will be great dilatation.

3. I have already mentioned, that in the place of the hymen certain fleshy tubercles, termed *carunculæ myrtiformes*, have been observed by anatomists; and shall now add, that a variety in their appearance has been considered indicative of chastity or unchastity. Zacchias remarks, that in the former they are red, tumid, and connected together by fleshy cords; but, in married women (being situated at the entrance of the vagina), they are found pale, flaccid, and the cords torn asunder.† They are generally considered as the remains of the hymen, "*et corruptæ adeo pudicitiæ indicia.*" They are then found thick, red, and obtuse at their extremities, somewhat resembling a myrtle-berry; and, from this supposition, their name is derived. They generally disappear after frequent connexions or deliveries.

It has, however, of late years been asserted with positiveness, that the carunculæ and the hymen may be co-existent. Of this opinion are Dr. Hamilton of Edinburgh, Dr. Blundell, and Dr. Conquest; all, as it would seem, from actual observation.‡

In addition to the above, various signs have been enumerated by

under ten years of age, Mr. Woollett, a surgeon, stated that he found considerable local inflammation about the parts of the child; that the hymen had been recently ruptured; and that he had no doubt that penetration had taken place. Baron Gurney, who presided, observed, "I think, that if the hymen is not ruptured, there is not a sufficient penetration to constitute this offence. I know that there have been cases in which a less degree of penetration has been held to be sufficient, but I have always doubted the authority of these cases; and I have always thought, and still think, that if there is not a sufficient penetration to rupture the hymen, it is not a sufficient penetration to constitute this offence."—5 Carrington and Payne's Reports, 321. Rex *v.* Gammon.

* "In examining for the hymen in cases of rape, or for purposes of professional opinion or treatment in many other cases, it will be necessary to separate the labia, and even the thighs, to a considerable distance from each other, before the hymen, in the event of its being present, can be distinctly seen."—Davis's Obst. Med. p. 99.

† Zacchias, vol. i. p. 378.

‡ Ramsbotham's Lectures in London Med. Gazette, vol. xiii. p. 182; Blundell's Lectures in Lancet, N.S. vol. iv. p. 641; Conquest's Outlines, p. 17; Merat (Dict. des Sciences Méd. vol. xxxv. p. 143) is of the same opinion. Orfila, however, states, that in more than two hundred dissections made by him of females from two to

authors. These I will barely state, and refer the inquirer for more minute details to works on anatomy and midwifery. Pain during the first connexion is deemed a proof; although the presence of menstruation or of disease may prevent this in many cases: so also blood from the rupture of the hymen.* The red and tumid appearance of the labia and nymphæ, and the rupture of the fourchette, are each extremly uncertain signs, since the latter does not generally occur until delivery, and the former may be present in the unchaste.

It should be observed with respect to the signs last enumerated, that although they may be present notwithstanding the unchastity of the female, yet their absence is a proof against her. If the labia and nymphæ have the appearance which indicates previous connexion; if the fourchette be ruptured, and the fossa navicularis obliterated, the only deduction we can draw must be an unfavourable one. Capuron, a disbeliever in the physical signs, indeed, suggests that a foreign body, such as a pessary, introduced with too much violence into the vagina, may have ruptured the fourchette; or the menstrual fluid, by becoming acrimonious, may have eroded it.† Both these suggestions are, however, equally improbable, and deserve little attention in forming a general rule.

Systematic writers have added to these other signs, but they are generally equivocal. The bright red colour of the nipples, the hardness of the breasts, and, in fine, the general appearance of the female, all deserve attention, but can seldom be of any practical utility in determining on the point under examination.

From the above statement, an opinion may be formed concerning the dependence that is to be placed on the physical signs of virginity. It is not to be denied that many may be equivocal; but, notwithstanding, it is the duty of the medical examiner to notice them, and that *in connexion with one another*. It cannot be possible that all those which we have mentioned as present during the chaste state can be wanting, without justifying a strong suspicion against the female. Midwives should always be associated with physicians in such cases; and they would be the proper examiners, provided their information and knowledge of the system were sufficiently extensive. It is also necessary to recollect that these appearances are most striking in females of a tender age; and, as a general rule, guided however by the climate and the habit of body, they are found most perfect in females

fourteen years of age, and in whom, of course, the hymen was present, he could not detect the presence of the carunculæ.

Velpeau says, that the difference of opinion that exists may be settled by what he deems his own discovery: "Four carunculæ are commonly observed at the entrance of the vulvo-uterine canal, and which correspond to the four extremities of the respective diameters of this opening. Two of these, viz. that which is near the meatus, and that which is near the fourchette, belong to the middle columns of the vagina, while the other two only are the remains of the hymen. They may thus co-exist." He calls these last *lateral caruncles*.—Midwifery, p. 55.

* This is indicated in the Jewish law. The curious will find some extraordinary discussion on this point in Zacchias, vol. i. p. 376; and Michaelis, vol. iv. p. 192 to 199.

† Capuron, p. 29.

not further advanced in life than twenty or twenty-five years of age.*

II. *Of the Signs of Defloration and Rape.*

The marks of defloration, *i. e.* of connexion without violence, are, of course, the reverse of those which we have stated in the preceding section. It is not necessary to recapitulate them in this place; but, it is proper to observe, that they will most readily be seen if the examination be made within a very short period after the event complained of: and again, the most striking proofs will occur where it has been the first connexion on the part of the female. Here the parts are generally found bloody, inflamed, and painful.† Marks of a rupture of the hymen, or a disunion of the carunculæ, will also be present, together with an extreme sensibility to the touch, a sensation of heat, and a difficulty in walking. In married women, or libidinous females, the detection is more difficult, and, in truth, in a great degree impossible, and that whether they accuse or are accused. The reasons for this will readily suggest themselves.

By the term *rape*, however, is understood not only defloration, but a commission of it against the will of the female; and, again, the commission of this violence against a person of a tender age who has as yet, in the legal sense of the term, no will. Here not only the signs of defloration already enumerated will be present, but also others indicative of the employment of force, such as contusions on various parts of the extremities and body. These, however, are compatible with final consent on the part of the female.

It also deserves attention, that disease has produced the appearance of external injury, and led to suspicions against innocent persons. Dr. Percival relates a case of serious importance in medico-legal investigations. Jane Hampson, aged four, was admitted an outpatient of the Manchester Infirmary, Feb. 11, 1791. The female organs were highly inflamed, sore, and painful; and it was stated by the mother that the child had been as well as usual till the preceding day, when she complained of pain in making water. This induced the mother to examine the parts affected, when she was surprised to find the appearances above described. The child had slept two or three nights in the same bed with a boy fourteen years old, and had complained of being very much hurt by him during the night. Leeches and other external applications, together with appropriate internal

* The following remark of Foderé on this subject deserves quotation: "Having often been engaged in such examinations, and finding the above-named physical signs of virginity wanting, I have declared the female unchaste: and the pangs of childbirth have in a few months confirmed my decisions, although they were considered harsh at the time."—Vol. iv. p. 352. We must, however, add, that the faculty of medicine at Leipsic, declared that there does not exist any true and certain sign of virginity (Metzger, notes, p. 483), and Morgagni is of a similar opinion. —Opuscula Miscellanea, p. 37.

† It is important not to mistake the menstrual secretion or blood placed on the parts for the effects of violence. Dr. Campbell of Edinburgh, detected a case of pretended rape, by finding a stocking wire, covered with blood in a dried state, which had been applied to the vagina.—Midwifery, p. 53.

remedies, were prescribed; but the debility increased, and on the 20th of February the child died. The coroner's inquest was taken; previous to which the body was inspected, and the abdominal and thoracic viscera found free of disease. From these circumstances Mr. Ward, the surgeon, attending this case, was induced to give it as his opinion that the child's death was caused by external violence; and a verdict of murder was accordingly returned against the boy with whom she had slept. Not many weeks elapsed, however, before several similar cases occurred, in which there was no reason to suspect that external violence had been offered, and some in which it was absolutely certain that no such injury could have taken place. A few of these patients died. Mr. Ward was now convinced that he was under a mistake in attributing the death of Jane Hampson to external violence, and informed the coroner of the reasons which induced this change of opinion. Accordingly, when the boy was called to the bar at Lancaster, the judge informed the jury that the evidence adduced was not sufficient to convict; and that it would give rise to much indelicate discussion, if they proceeded to the trial, and that he hoped, therefore, they would acquit him without calling witnesses. With this request the jury immediately complied. The disorder in these cases, says Dr. Percival, had been a typhus fever, accompanied with a mortification of the pudenda.*

A complaint resembling the above in many respects has also been lately described by Mr. Kinder Wood. It is preceded by all the ordinary symptoms of fever for about three days. The patients then call the attention of parents to the seat of the disease, by complaints in voiding urine, &c. When the genital organs are examined, one or both labia are found enlarged and inflamed. The inflammation is of a dark tint, and soon extends internally over the clitoris, nymphæ, and hymen. Ulceration succeeds, and the external organs of generation are progressively destroyed. This affection has proved very fatal, and seems to constitute a peculiar kind of eruptive fever.†

* Medical Ethics, pp. 103 and 231. Capuron relates two cases of children, the one aged four, and the other six years, both of whom were affected with a white and very acrid discharge from the vagina, accompanied with swelling of the external parts, severe pain, and, indeed, ulceration: a high fever was also present. In one instance, the parents loudly declared that violence must have been used towards their child. Professor Capuron, however, ascribed both to an epidemic catarrhal affection then prevalent in Paris, and considered the local complaint as entirely dependent on it. By the use of proper regimen they readily recovered. — Pages 41 and 42.

"Judging from my own experience in a large town, cases like those related by Capuron, are by no means unfrequent. I have met with at least a dozen during the last five or six years, principally in children four or five years of age. They have been various in the severity of the symptoms, and in their duration, but have always terminated favourably."—DARWALL.

† Medico-Chirurgical Transactions, vol. vii. p. 84. Out of twelve cases seen by Mr. Wood, only two appear to have recovered. See also Quarterly Journal of Foreign Medicine, vol. ii. p. 224; Lancet, N.S. vol. i. p. 874; American Journal of Medicine, vol. ii. p. 468; North of England Medical and Surgical Journal, vol. i. p. 479. (Cases by Mr. Dunn, of mumps combined with leucorrhœal discharge.) Sir Astley Cooper says that he has seen at least thirty cases of this discharge in one year.— London Medical and Surgical Journal, vol. iv. p. 48. Additional cases

Mr. William Lawrence, in his Lectures on Surgery, when speaking of this disease, mentioned that he had been called as a witness in such a case at the Old Bailey, on a capital indictment. The idea was that the complaint was syphilis. He remarks, that "there is an excessively deep-coloured inflammation, with great disturbance of the health of the child, in the very commencement of the affection; and the ulceration that succeeds is foul and sloughing, and of a tawny colour, totally different from the character of any primary venereal sore.*

It is of great importance that the physician understand the possibility of such diseases occurring: "but we must take care not to run into the opposite error of ascribing inflammation, ulceration, and discharge, in cases where violence has been alleged, to this disease, without sufficient grounds; *for it is extremely improbable that diseases which occur so rarely, should happen to appear in a child to whom violence was offered, unless that violence had some effect in producing it.*"† The proper distinction to be made in these cases undoubtedly is, not to attribute laceration, tumefaction, and consequent inflammation to this disease. It resembles gonorrhœa, and the examination of the person suspected, if early made, will lead to a definitive opinion.‡ Marks of external injury are hence to be considered as *corroborating*, but not as *certain* proofs of the commission of a rape. The weight which they deserve depends on several circumstances which it is proper to notice.

1. *The age, strength, and state of mind of the respective parties.* However we may doubt whether a rape can be committed on a grown female, in good health and strength (and this point I shall presently notice), yet there can be no question but that it can be perpetrated on children of a tender age. Previous to the age of sixteen, or rather before the period of menstruation, the female is not only deficient in strength, but is also ignorant of the consequences of the act; and fear may induce her to consent to libidinous desires. Again, should a female accuse a man who is cachectic, or a valetudinary, little credit is to be given to her charges, as the respective strength of the parties will shew the improbability of the commission of the act. For a similar reason, the probability is increased when the accused is vigorous and the accuser infirm; and, above all, should the female labour under imbecility of mind to such a degree as to render her incapable of judging concerning the morality of her actions, her age ought not to be taken into account. An individual of this description

are mentioned by Dr. Beatty as occurring in Dublin, and where charges of rape were about to be made.—Cyclopædia of Practical Medicine, art. *Rape*. Also by Dupuytren, Medico-Chirurgical Review, vol. xxv. p. 524; North American Archives, vol. i. p. 201.

* London Medical Gazette, vol. vi. p. 828. A similar case occurred in London in 1829, where the prisoner was convicted of an assault, and sentenced to six months' imprisonment. Dr. Gordon Smith and others interested themselves in the man's behalf, and shewed that it was disease, instead of the result of violence.—London Medical and Surgical Journal, vol. iv. p. 48.

† Edinburgh Medical and Surgical Journal, vol. xiii. p. 491.

‡ Beatty in Cyclopædia of Practical Medicine, art. *Rape*.

at twenty-five, is less capable of resistance than another of sound mind and body at fourteen. We must also add, that all accusations against persons aged above sixty years of age, should, as a general rule, be rejected; and if maintained, the accuser should prove the presence of greater strength and virility than is the ordinary lot of that period of life.*

2. A comparison of the sexual organs may be necessary; since cases have occurred in which the male has proved impotency or defective organisation, or has exhibited proofs of the destruction of parts by the venereal disease. In the female, however, it must be remembered, that it will be difficult to find the physical marks of rape, provided she is subject to the diseases formerly enumerated, or has had several children. In opposite cases, severe marks of the violence will be more evident; and these have sometimes been of the most striking kind, inducing, in one instance, according to Teichmeyer, great inflammation, and an incurable paralysis of the lower extremities.†

3. A speedy examination of the parts is all important in disputed cases. The body of the male should also be inspected, whether there be scratches or bruises on it.‡

I have intimated that doubts exist whether a rape can be consummated on a grown female, in good health and strength. It has been anxiously inquired whether this violence, if properly resisted (and this is included in the very definition of rape), can be completed? And in the consideration of this, it is needless to observe that those cases in which insensibility by violence or soporifics has been previously produced, or where many are engaged against one female, are of course excluded.§ Some hesitation is doubtless proper in deciding on a question of this magnitude. The opinion of medical jurists generally is very decisive against it. "En un mot," says Mahon, "d'après la connoissance physique que les médecins ont de l'homme et de la femme, relativement à cet attrait imperieux qui porte invinciblement les deux sexes l'un vers l'autre; d'après surtout l'impossibilité presque entière où est un homme seul de forcer une femme à recevoir ses caresses, on doit rarement ajouter foi à l'existence du *viol;* je crois même qu'il seroit prudent de ne l'admettre que lorsque plusieurs hommes armés se sont réunis pour commettre ce crime."‖ "An attempt," says Farr, "under which is to be understood a great force exercised over a woman to violate her chastity, but where a complete

* I have known (says Prof. Amos) a person aged sixty left for execution for a rape; and in 1803, a youth aged seventeen, was convicted of it on a girl of nine, and executed.—London Medical Gazette, vol. viii. p. 33.

† MS. Notes of Stringham's Lectures.

‡ "The great points to be looked to (says Mr. Alison) are, 1. Whether they made resistance and cried out *before* they were discovered. 2. Whether they had received *blows and actual injury*, it being quite certain, that at least that violence was inflicted against the will."—Principles of the Criminal Law of Scotland, p. 187.

§ We must, however, remember, that the administration of soporific drugs for the purpose of the commission of the crime, will justify the charge of rape. This was the case of Luke Dillon, at Dublin, 1830, who was convicted, and exchanged execution for transportation only at the earnest solicitation of the female and her relations.—Alison, p. 213.

‖ Mahon, vol. i. p. 136.

coition is prevented, may be possible. But the *consummation* of a rape, by which is meant a complete, full, and entire coition, which is made without any consent or permission of the woman, seems to be impossible, unless some very extraordinary circumstances occur. For a woman always possesses sufficient power, by drawing back her limbs, and by the force of her hands, to prevent the insertion of the penis, whilst she can keep her resolution entire."* "Indépendamment de l'arme que la loi met dans la main de la femme pour repousser l'injure, elle a infiniment plus des moyens pour se defendre que l'homme n'en a pour attaquer, ne fut ce que le mouvement continuel." And again, "J'estime qu'une personne du sexe, qui a atteint l'âge de dix-huit à vingt ans, ne peut plus être prise par force par un homme seul, quel qu'il soit, à moins de la menace d'une arme meurtrière, et que la crainte de la mort ne soit plus forte que celle de perdre l'honneur."† Metzger only allows of three cases in which the crime can be consummated—where narcotics have been administered—where many are engaged against the female—and where a strong man attacks one who is not arrived to the age of puberty.‡

Notwithstanding these united authorities, it may with justice be supposed, that in addition to the cases allowed, fear or terror may operate on a helpless female—she may resist for a long time, and then faint from fatigue, or the dread of instant murder may lead to the abandonment of active resistance.§

* Farr, pp. 41, 42.

† Foderé, vol. iv. pp. 359, 360. Capuron advances the same opinion, p. 54; and Brendelius, p. 96.

‡ Metzger, p. 255. I must add to the above the following answer given by the medical faculty of Leipsic, to the question, whether a single man could ravish a woman. "Si circumstantias quæ in actu coeundi concurrunt, consideramus, non credibile, nec possibile videtur, quod unus masculus nubilem virginem (excipe impubem, teneram, delicatam, aut simul ebriam puellam) absque ipsius consensu, permissione, atque voluntate vitiare, aut violento modo stuprare possit; dum fœmina cuilibet facilius est, si velit, penis immissionem recusare, vel multis aliis impedire, quam viro eidem invitæ planè intrudent."—Valentini Pandectæ, vol. i. p. 61.

§ I am aware, that in the previous edition I spoke too strongly and exclusively, and I fully recognise the correctness of Dr. Ryan's criticism.—Midwifery, p. 157. In a trial at Edinburgh, in 1828, where the counsel for the prisoner did me the honour to quote this work, and the opinion now under consideration, the Lord Justice Clerk, in his charge to the jury, in reply to the argument, that there could be no rape without assistance, blows, or drugs, shewed, that a case had occurred in 1811, "where the woman swore that she was overcome on the sands, there being no others near. There was no proof of blows, but her evidence was confirmed by persons who had been looking in that direction with a spy-glass, and the man suffered the last punishment of the law."—Syme's Justiciary Reports, p. 332. I presume, however, that there can be no doubt, in cases like that cited by Professor Amos, of a woman, at Derby, who proved the rape, but on examination, was positive as to the time it had lasted—exactly ten minutes. How did you know it? She had counted. How did you count? One, two, three, &c. Did you count sixty ten times over? I did.—London Medical Gazette, vol. viii. p. 35.

Dr. A. T. Thomson, in his lectures recently published (London Medical and Surg. Journal, vol. vi. p. 647), agrees in the main with the authors that I have quoted. He suggests, that in this struggle "with a healthy female of adult age, who is really anxious to preserve her chastity unsullied, the mind of the man must necessarily be so much abstracted from the act itself, in overcoming the resistance offered to him, and in repelling the attacks of the female upon him, that, independent of corporeal

Cases in which false accusations of rape have been made against individuals, are scattered through most of the works on medical jurisprudence.* I shall quote one, both from its having happened not long since, and also as it shews the course pursued in such instances in France. A female at Martigues, in 1808, accused eight or ten of the principal persons in the place, of having violated her grand-daughter, aged about nine years and a half, at an inn. She laid her complaint before the justice (juge de paix); but stated that she would withdraw it, provided the accused would accommodate the matter with her. She had procured a daughter of the innkeeper, aged sixteen, and an idiot, as a witness. As the charge was obstinately persisted in, Foderé with two officers of health, was ordered to examine the child in the presence of the judge; and suspicion was immediately excited, from the delay used in admitting the visitors. On examining the parts, he found the hymen untouched, and the vagina extremely narrow. Around the pudenda, however, a red circle about the size of a crown, was observed, which appeared to have been induced recently; and this was indeed the fact; for at the end of half an hour, the circle had decreased in size, and the redness disappeared. Had this been the effect of great violence, it is natural to suppose that it would have increased in intensity of colour. A report was prepared, stating the above facts; and the consequence was, that the accuser was put in prison, and finally ordered out of the city.†

"It happened at an early period of the author's life, in a Welch country town, that a child of about eight years of age, of low connexions and mendacious habits, was induced to prefer against a respectable minister of religion, an accusation of an attempt to violate her person. It was averred on the part of her friends, that she became the subject of ulcerations of the pudendum, in consequence of the imputed assault, and the gentleman in question was committed to prison and confined there for several weeks. The grand jury ignored the bill on the ground that the prisoner had proved himself free from the disease which he had been accused of communicating, and also from other and conclusive moral and circumstantial evidence. The ulcerations on the child's pudendum were proved not to have been derived from a venereal source."‡

exhaustion, the state of his mind will render it utterly impossible for him ever to effect that penetration which constitutes the criminal intent."

* See the case of one *Stephen Nocetti*, which was referred to Zacchias, and where there was an actual deficiency of parts. The accusation was made four months after the supposed commission of the crime.—Consilia, No. 34, vol. iii. p. 62. Also, the case of *Erminio*.—Consilia, No. 41, vol. iii. p. 74. Foderé also quotes a case from Devaux, where there was nothing but a slight excoriation of the parts; and of course it was decided that there were no evidences of a rape having been committed.—Vol. iv. p. 371. I will only add a caution, not to mistake menstruation for the effects of defloration.

† Foderé, vol. ii. p. 456; and vol. iv. p. 371. The distinction made in Deuteronomy, chap. 22, between the commission of the crime *in the city or in the field*, deserves attention in the consideration of this point.

‡ Davis's Obstetric Medicine, p. 78. Mr. Roberton of Manchester, mentions a curious case of a female found in a field near Warrington, apparently dying in consequence of a rape, as she said, committed on her by two ruffians. Mr. R. found her in a paroxysm of hysteria. She complained of severe pain in various parts of her

Instances sometimes occur in which death has followed the consummation of a rape, from the violence employed. Here, if the physician be called on to examine the body, he should particularly notice the condition of the sexual organs, both internal and external; and also ascertain whether no proofs are present, from which the exertion of violence may be presumed, such as the introduction of substances into the mouth to prevent crying out, contusions, or dislocation, or fracture of the extremities. He should notice whether the labia are dilated and flaccid, the state of the hymen, clitoris, nymphæ, and vagina generally, and also, whether the fourchette is ruptured. The fluid (if any be present) contained in the vagina should be examined, whether sanguineous, mucous, or purulent, and the presence or absence of tumefaction and extraordinary dilitation should be remarked.*

The case of Mary Ashford, which occurred in England in 1817, is deserving of mention in this place. She was at a ball with the individual (Abraham Thornton) who was accused of first violating and then murdering her. It appears from his confession, that she made an assignation with him. They were seen together in the night, and the next day her dead body was found in a pit of water.

She had on a pair of white stockings at the ball. On her return she changed them for black ones. The white ones were found bloody in the bundle that she had made up before leaving the house. It was hence probable that she had the menses on her, and this was subsequently confirmed. At the place where the connexion took place, coagulated blood was observed. There was an evident impression of a human figure on the grass, and this was in the middle of the impression. Thornton's shirt and the flap of his pantaloons were bloody. Indeed, he confessed the connexion, but said it was with her consent. Mr. Freer, the surgeon who examined the body, found the parts of generation lacerated, and a quantity of coagulated blood about them. On opening the body, these marks were seen still more manifest, and it was also evident that the menses had been present. In the stomach, he found a portion of duck-weed, and about half a pint of a thin fluid, apparently chiefly water. The lacerations (two in number) were quite fresh, and he had no hesitation in asserting, that she was pure, until these occurred. He also stated the distinction between menstrual and non-menstrual blood, and explained that what was observed could not be the former, in consequence of its coagulation. The lacerations

body, but excused herself, on account of exhaustion, from an examination. Two men were arrested on suspicion, and on being confronted, she immediately identified one as the violator, and he was sent to jail. On further inquiry, however, the injury on the body was found to be slight, while on the inner surface of the pudenda, were simply two slight wounds, such as might have been inflicted by the finger-nail. The investigation ended in proving her, on her own confession, to be an impostor, who pretended these injuries, and also admirably imitated the paroxysms of hysteria, for the sake of exciting charity. Whenever she was hard pressed with unpleasant questions, a fit of hysteria came to her relief.

She was tried and punished as an impostor, but succeeded for years afterwards in imposing on individuals. Another of her devices was suddenly to fall down in labour.—London Medical Gazette, vol. xv. p. 506.

* Foderé, vol. iv. p. 372.

might, he said, have occurred with or without consent on the part of the female.

Thornton escaped conviction by an alibi.* There was a considerable difference as to the time of the clocks and watches, and they had not been sufficiently compared. "Less than an hour of additional time," says Professor Amos, "would have put an end to the alibi."

It may be considered an omission not to notice the chemical investigations of Orfila, for the detection of semen, if its presence should require to be proved, and I therefore add a brief notice of them.

Semen forms, when dry on linen, irregular spots of a light yellow or grayish colour; but so indistinct, that frequently it is necessary to hold them between the eye and the light to discover their presence. On pressing them with the fingers, the linen appears as if starched. When dry, they are inodorous; but as soon as they are moistened, the spermatic odour is given out. If the linen be gently heated, they assume a yellow fawn-colour, and this, indeed, will indicate spots, which otherwise would pass unnoticed. This property is important in distinguishing the discharge. And it is also found, if the linen be left for some time in distilled water, the above result will not be reproduced on heating it. The semen has become mixed with the water—and no change of colour is occasioned.

In water, the spots become completely moistened; which is not the case if they have been caused by grease: and, on being rubbed, give out their peculiar odour. The fluid itself is of a flocculent, milky appearance, and on being evaporated, is found alkaline, and assumes a mucilaginous appearance; and if the process be continued to dryness, it leaves a semi-transparent residue, resembling gum arabic, and of a light fawn colour. This again is decomposable in distilled water, if the mixture be shaken into two parts; one soluble, but the other glutinous, insoluble in water, but soluble in potash. The soluble portion yields a white flocculent precipitate with alcohol, chlorine, acetate of lead, or corrosive sublimate. Pure nitric acid gives it a slight yellowish tint, *but does not render it turbid.*

Alcohol dissolves but a very trifling portion, if the linen, spotted as above, be left in it for twenty-four hours.

When blenorrhagic matter, obtained from syphilitic females, was treated in a similar manner, the linen took a yellowish green colour, but the spots do not become yellow, when held to the fire. The peculiar odour is wanting, but the solution is also alkaline. When evaporated, the product is of a white yellowish colour, opaque and decomposable by heat. It dissolves with difficulty in distilled water, but alcohol and the other re-agents already named, yield a white precipitate; and *nitric acid also a white one.* Leucorrheal matter wants many of the characters of the spermatic fluid, and the re-agents cause but a slight precipitate, if it be treated in the same manner as already described.†

* 1 Barnewell and Alderson, p. 405, Ashford *v.* Thornton.

† Orfila, Leçons, 2d edition, vol. ii. p. 573, translated by Dr. Gross, in Western Medical Gazette, vol. ii. p. 244. Sedillot, p. 93.

For cases examined under the direction of the public prosecutor in France by

III. *The laws of various countries concerning this crime.*

There are two reflections which are of deep weight in all our investigations on this subject, and which should particularly be kept in mind when noticing the laws concerning it. The nature of the crime, being an offence against the weaker sex, and committed in secrecy; being of so detestable a character, and so difficult to be proved, the law has wisely ordained that the testimony of the injured person shall be sufficient, unless impeached, to convict the criminal. But again, and this is the second remark, false accusations are frequently made for the gratification of malice and revenge. The scriptures, and the records of courts in all countries, bear testimony to this.* In this point of view, the medical jurist may often aid the ends of justice in punishing the wicked, and absolving the innocent.†

I have thought that a sketch of the laws of various countries concerning this crime might prove interesting, and in some degree useful. The materials for this purpose have been collected in a great measure by Blackstone and Percival, and I have added to these, the laws existing in various states throughout the union. I shall notice, separately, the laws respecting the commission of the crime, on the female of tender age, and on the female who has arrived at maturity.

1. As this crime can be committed with the greatest facility on children under the age of puberty, in consequence of their want of strength, but particularly from their ignorance of the consequences of the act, the law has wisely directed that the consent or non-consent of the female under age is immaterial, " as by reason of her tender age she is incapable of judgment and discretion."

In the 3d year of Edward I. by the statute, Westminster, the offence of ravishing a damsel within age (that is, *twelve* years old), either with her consent or without, was reduced to a trespass, if not prosecuted by appeal within forty days, and the offender was subjected to two years' imprisonment, and a fine at the king's will. This lenity, however, was in a short time found very injurious, and by statute 18 Elizabeth, chap. 7, carnally knowing and abusing a child under the age of *ten* years, was made felony, without benefit of clergy. Sir Matthew Hale, says Blackstone, is indeed of opinion, that such actions

Chevalier, see Annales D'Hygiène, vol. xi. p. 210. Medico-Chirurgical Review, vol. xxiv. p. 516.

* On the trial of Levi Weeks for the murder of Miss Sands, held at New-York, March, 1800, the counsel for the prisoner stated, that " in that very city, a young man, not many years ago, had been charged with the crime of rape. The public mind was highly incensed, and even after the unfortunate man had been acquitted by the verdict of a jury, so irritated and inflamed were the people, that the magistrates were insulted, and they threatened to pull down the house of the prisoner's counsel. After that, a civil suit was instituted for the injury done the girl, and a very enormous sum given in damages, and the defendant was ignominiously confined within the walls of a prison. Now it has come out, that the accusation was certainly false and malicious."—Report of the Trial, &c. p. 67.

† A man named Stewart was tried at the Old Bailey in 1704, for ravishing two female children. The evidence being at variance as to the fact of penetration, the children were sent out of court to be examined, and the eldest was found to have the signs of virginity."—Smith, p. 397.

committed on an infant under the age of *twelve* years, the age of female discretion by the common law, either with or without consent, amount to rape and felony, as well since as before the statute of Queen Elizabeth; but that law, he adds, has in general been held only to extend to infants under *ten*.*

By a recent act, however (9 George IV. chap. 31), passed in 1828, it is ordained, that any one unlawfully and carnally knowing and abusing any female under the age of ten years, shall be guilty of felony and shall suffer death. If the same be committed on a female above ten and under twelve, the offence shall be deemed a misdemeanor, and liable to imprisonment.

In Scotland, it is held that consent cannot be given below the age of twelve years.†

The French code of 1810 ordains, that if the crime has been committed on a child under the age of *fifteen* years, the offender shall be condemned to hard labour for a limited time, (travaux forcés à temps).‡ But it would seem that CONSENT on the part of the minor female modifies the nature of the crime in France. At least such was the decision of the Court of Assizes at Strasburg in 1827. An individual escaped from the punishment of rape for this reason.§

In the state of New-York, the statute of the 18th of Elizabeth appears to have been copied. By an act passed Feb. 14, 1787, it was ordained, that if any person should unlawfully or carnally know a woman child under ten years of age, such unlawful or carnal knowledge shall be adjudged a felony, and the criminal should suffer death.‖ But, by an act passed March 21, 1810, the above punishment was changed to that of imprisonment in the state prison, and continues so at the present time.¶ In Massachusetts alone, so far as I am able to ascertain, the punishment is death.** In Virginia, Connecticut, New Hampshire, Maine, New Jersey, Illinois, Ohio, Michigan, and Tennessee, the punishment is either imprisonment for life, or a term of years, or fine or imprisonment, or both. All these specify the period of *ten* years.†† The law in Vermont varies from this. It directs that whenever any individual over the age of fifteen shall abuse any female under *eleven*, with or without her will, he shall suffer fine and imprisonment.‡‡ In Indiana, the age of the female is extended to *twelve* years, and the punishment is imprisonment for a term of years.§§ In Missouri, a rape on a female under the age of *ten* years is punished by castration.‖‖ In Delaware, the law directs a fine, standing in the pillory for one

* Blackstoue's Commentaries, vol. 4, p. 212. † Alison, Principles, p. 213.
‡ Code Penal, Art. 332. § Briand, 2d Edit. p. 10.
‖ Jones and Varick's Edition of the Laws of New York, vol. 2, p. 47.
¶ Revised Statutes, vol. ii. p. 663.
** General Laws of Massachusetts, 1807, vol. iii. p. 340.
†† Revised Laws of Virginia, 1803, vol. i. p. 356; Session Laws of Connecticut, 1830, p. 254; Laws of New Hamshire, 1830, p. 137; Laws of Maine, 1829, p. 1190; Digest of the Laws of New Jersey, 1833, p. 223; Revised Laws of Illinois, 1833, p. 179; Laws of Ohio, 1831, p. 136; Laws of Michigan, 1820, p. 193; Digest of Laws of Tennessee, 1831, vol. i. p. 245.
‡‡ Laws of Vermont, 1825, p. 254. §§ Revised Laws of Indiana, 1831, p. 136.
‖‖ Revised Laws of Missouri, 1825, vol. i. p. 283.

hour, sixty lashes on the back well laid on, imprisonment for not more than two years, and afterwards to be sold as a servant for a term not exceeding fourteen years.*

A few remarks are here necessary as to the credibility of witnesses in these cases. "If a rape," says Blackstone, "be committed on an infant under twelve years of age, she may still be a competent witness, if she hath sense and understanding to know the obligation of an oath, or even to be sensible of the wickedness of telling a deliberate lie. Nay, though she hath not, it is thought by Sir Matthew Hale, that she ought to be heard without oath, to give the court information; and others have held, that what the child told her mother or other relatives, may be given in evidence, since the nature of the case admits frequently of no better proof.† But it is now settled," he adds (Brazier's case before the twelve judges, 19 George III.), "that no hearsay evidence can be given of the declaration of a child who hath not a capacity to be sworn; nor can such child be examined in court without oath; and that there is no determinate age at which the oath of the child ought either to be admitted or rejected.‡ Yet," he adds, "where the evidence of children is admitted, it is much to be wished, in order to render their testimony credible, that there should be some concurrent testimony of time, place, and circumstances, in order to make out the fact; and that the conviction should not be grounded singly on the unsupported accusation of an infant under years of discretion."§

2. I shall now proceed to give an enumeration of the laws of various

* Revised Laws of Delaware, 1829, p. 129.

† Formerly it was the practice in the English courts to refuse the evidence of children. (See the King *v.* Travers, in 1 Strange, p. 700). Lord Chief Baron Gilbert and Chief Baron Raymond, at two different trials, refused the evidence of the injured child, who was six years old, and the man was acquitted for the want of evidence.

‡ The case above mentioned was as follows: One Brazier was indicted at the assizes for York, for a rape on an infant seven years of age. The information of the infant was received in evidence against the prisoner; but as she had not attained the years of presumed discretion, and did not appear to possess sufficient understanding to be aware of the danger of perjury, she was not sworn. The prisoner was convicted, but the judgment was respited, on a doubt whether evidence, under any circumstances whatever, could be legally admitted in a criminal prosecution, except upon oath. Mr. Justice Gould accordingly reserved this point for the opinion of the twelve judges, and they unanimously agreed, "that no testimony can be received legally, except upon oath, and that an infant, though under the age of seven years, may be sworn in a criminal prosecution, provided such infant appears, on strict examination by the court, to possess sufficient knowledge of the nature and consequences of an oath; for there is no precise or fixed rule as to the time within which infants are excluded from giving evidence, but their admissibility depends upon the sense and reason they entertain of the danger and impiety of falsehood, which is to be collected from their answers to questions propounded to them by the court; but if they are found incompetent, their testimony cannot be received."—East's Crown Law, vol. i. p. 444.

§ Blackstone, vol. iv. p. 214. In South Carolina a case occurred, in 1813, where the material witness was the female injured, of seven years of age. The prisoner was convicted; and on appeal, the judgment was held good. The court remarked that this testimony was sufficient, if corroborated by circumstances; and in this instance, both the prisoner and witness had the same disease.—State *v.* Le Blanc. 2 South Carolina Constitutional Reports, p. 354.

countries against the crime of rape, arranged, as much as possible, in chronological order. "If a man," says the Jewish law, "find a betrothed damsel in the field, and the man force her, and lie with her, then the man only that lay with her shall die: but unto the damsel thou shalt do nothing; for he found her in the field, and the betrothed damsel cried, and there was none to save her."* In case the female was not betrothed, then a fine of fifty shekels was to be paid to her father, and she was to be the wife of the ravisher, without permitting him the power of divorce.

Among the Athenians, rape was punished with death; and by the Roman or civil law, with death and confiscation of goods.† The latter, however, ordained, "*Rapta raptoris, aut mortem, aut indotatas nuptias optet;*" and upon this, says Dr. Percival, there arose what was thought a doubtful case. "*Una nocte quidam duas rapuit, altera mortem optat, altera nuptias.*"‡ The Roman law also would not receive the complaint of a prostitute.§

Among the Lombards, after their settlement in Italy, "Crimes against chastity were visited sometimes too mildly; at others, too severely. He who forced his own female slave, provided she were single, escaped without punishment; but if she were married, both she and her husband were enfranchised. If he forced the bondwoman of another, he was subject to the penalty of twelve, twenty, or forty sols, according to her comparative state. The ravisher of a free woman was mulcted at a much heavier sum — at nine hundred sols."‖

It would appear that there was no punishment provided for this crime, in the codes of several of the original Germanic tribes. At least, "the code of the Bavarians had none, except such as the ecclesiastical law directed, for the freeman who violated a female unmarried slave. The slave, however, who violated a free maiden, was surrendered to her parents, to do with him what they pleased, even to put him to death."¶

Charlemagne punished with death, whoever violated the daughter of his master.** The Burgundian laws provided that if the young wo-

* Deuteronomy, xxii. 25. Michaelis, however, contends, that for rape, *as rape*, no punishment is appointed by the Mosaic law; and he explains the above passage by considering it only as a rape *committed on a bride*. In either case, whether in the city (verse 23) or in the field, the perpetrator was to be punished — but not if the female was not betrothed. Our author proposes several reasons for this omission, and amongst others, the debasement which polygamy produces in the female sex, and the law that whoever debauched a damsel should marry her. This last he deems a more effectual preventive of rape, than capital punishment. — Michaelis's Commentaries, vol. iv. pp. 169–174.

† Gibbon, vol. ii. p. 252. Law of Constantine.

‡ Medical Ethics, Note, 17, p. 231. § Foderé, vol. iv. p. 325.

‖ Europe during the Middle Ages, in Lardner's Cyclopædia, vol. i. p. 16.

¶ Ibid., vol. ii. p. 137.

** "Si quis filiam domini sui rapuerit, morte moriatur."—See Memoirs of Literature, vol. vi. p. 103. "A Notice of the Monumenta Paderbornensia, to which is added the Capitulary of Charlemagne, from a very ancient Palatine manuscript in the Vatican, published in 1713." Hallam also mentions, that under the feudal system it was considered a breach of faith in the vassal, to violate the sanctity of his master's roof. In the establishment of St. Louis, chapter 51, 52, it is said, that a lord seducing his vassal's daughter, entrusted to his custody, lost his seignory; and

man carried off, returned to her parents actually corrupted, the offender should pay six times her price or legal valuation, and also a mulct of twelve shillings. If he had not wherewithal to pay these sums, he should be given up to her parents or near relatives, to take their revenge on him in what way they pleased.

By the Welsh laws of Prince Hoel Dha, if two women were walking together without other company, and violence was offered to either or both of them, it was not punishable as a rape; but if they have a third person with them, they might claim their full legal redress. If the perpetrator of a rape, being accused, confessed the fact, besides full satisfaction to the woman, he was to answer for the crime to his sovereign, by the present of a silver stand as high as the king's mouth, and as thick as his middle finger, with a gold cup upon it, so large as to contain what he could take off at one draught, and as thick as the nail of a country fellow who had worked at the plough seven years. If the offender was not able to make such a present, *virilia membra amittat.*

By the law of Æthelbert, the first Christian king of Kent, it was enacted, that if any person takes a young woman by force, he shall pay her parent or guardian fifty shillings, and shall make a further compensation for a ransom. If she were espoused, he shall compensate the husband by an additional payment of twenty shillings; but if she were with child, the augmented fine shall be five and thirty shillings, and fifteen more to the king.

There is also an ordinance of Alfred in existence, for the punishment of rapes committed on country wenches who were servants; an offence (says Dr. Percival) which may be supposed to have been prevalent at that time.* Rape, however, by the Saxon laws, particularly those of King Athelstan, was punished with death; which was also agreeable to the old Gothic or Scandinavian constitutions. Besides this, the horse, greyhound, and hawk of the offender were subjected to great corporal infamy. Instead of this, a new punishment was inflicted by William the Conqueror, who probably brought the custom from Normandy, viz. castration, and loss of eyes. During the period that this was in force, the woman who was the sufferer might (by consent of the judge and her parents) redeem the criminal from all the penalties, if, before judgment, she demanded him for her husband, and he also was willing to agree to this exchange. This law of William continued in force in the reign of Henry the Third; but in order to prevent malicious accusations, it was then law (and it seems still continues to be so in appeals of rape), says Blackstone, that the woman should immediately after, "*dum recens fuerit maleficium*," go to the next town, and there make the discovery to some credible persons of the injury she has suffered, and afterwards should acquaint the high constable of the

a vassal guilty of the same crime towards the family of his suzerain, forfeited his land.—Hallam's Middle Ages, vol. i. p. 187, American edition.

* It is as follows: "Si quis coloni mancipium ad stuprum comminetur, 5 sol. Colono emendet et 60 sol.; mulctæ loco. Si servus servam ad stuprum coëgerit, compenset hoc virgâ suâ virili. Si quis puellam teneræ ætatis ad illicitum concubitum comminetur, eodem modo puniatur quo ille qui adultæ servæ hoc facerit."—Percival, p. 228.

hundred, the coroners, and the sheriff, of the outrage. This seems to correspond in some degree with the ancient laws of Scotland and Arragon, which require that complaint must be made within twenty-four hours; though afterwards, by Statute Westminster, the time of limitation was extended to forty days. This statute, passed in the 3d of Edward I. repealed the law of the Conqueror, and greatly mitigated the punishment. The offence of ravishing a woman against her will was reduced to a trespass, if not prosecuted by appeal in forty days; and it subjected the offender only to two years' imprisonment, and a fine at the king's will. But this lenity was found productive of the most terrible consequences; and in ten years after, 13th Edward I. it was found necessary to make the offence of forcible rape felony by statute.*

The constitution of Charles the Fifth enacted the punishment of death for rape; and the edict of Francis the First, preserved by Coquille, together with the ordinances of Orleans and Blois, forbade the asking of pardon for this crime. Henry the Second of France, by an ordinance of 1557, condemned those who had forced a woman or a girl, to be hung. Such was also the edict of Louis XV. in 1730; and such are the laws of various states in Italy. The ancient parliaments of France, during the sixteenth and seventeenth centuries, enforced the law with great severity on those accused of the crime.†

The above gleanings will elucidate, in some degree, the laws of former times concerning this crime. I now proceed to mention those which are, or lately have been, in force. The following maxims, says Foderé (which he quotes from Boerius), have been adopted for thirty years in Neapolitan jurisprudence, viz. that in accusations for rape, there be full proof of the following facts: 1. That there has been a constant and equal resistance on the part of the person violated. 2. That there is an evident inequality of strength between the parties. 3. That she has raised cries; and 4. That there be some marks of violence present. The French code of 1791, ordained that a simple rape should be punished with six years confinement in irons; but if the rape be committed on a child under fourteen years, or if the criminal had effected the crime by violence, or by the aid of accomplices, the punishment should be twelve years' confinement in irons. The law of 2d Prairial l'an 4, (1796) prescribed the same punishment for an attempt, if accompanied by violence. All these ordinances were, however, annulled by the Napoleon code, which prescribes imprisonment for the crime, if consummated or attempted with violence. If, however, the criminal has any

* Blackstone, vol. iv. pp. 210, 211. Percival, p. 100; and Note 17, p. 228. Chitty's Criminal Law, vol. ii. p. 813.

† Foderé, vol. iv. p. 326. "Among the familiar customs of the Isle of Man, are the following: If a man ravish a wife, he must die—if a maid, the deempsters (the judges) deliver to her a rope, a sword, and a ring; and she is then to have her choice to hang, behead, or marry him."—See Review of a Tour through the Isle of Man, by David Robertson, Esq., London, 1793, in the British Critic, vol. iii. p. 408.

In China, rape is punished with death.—Edinburgh Review, vol. xvi. p. 498. Review of the Penal Code of China, translated by Sir George Staunton.

In Modern Egypt, under the present Pacha, rape by a bachelor is punished with one hundred blows, and banishment from six months to a year; but, if by a married man, he is stoned to death.—Annales D'Hygiène, vol. x. p. 204.

authority over the person injured, such as a guardian or a teacher, if he be a servant, public functionary, or clergyman, and, finally, if the individual, whoever he be, is aided by one or more persons, the punishment shall be imprisonment for life.*

In Scotland, according to Baron Hume, the following facts are necessary to be proved on a charge of rape. 1. Penetration; but there is no distinct reference made to emission. 2. Actual force in the consummation, but it is held to be forcible knowledge if the female discontinue her resistance out of fear of death, or be rendered incapable of it by the giving of narcotic drugs, or be under the age of puberty. So also if she faint during the struggle from terror or fatigue, or is incapable of opposition from natural infirmity. Thus James Mackie was condemned, in 1650, for a rape on a cripple, lame lass, sixteen years old, laying bedridden in her father's house alone. No limitation as to the time of making the complaint exists at present, although a long delay might doubtless prejudice a jury against the prosecutor. †

The ravisher is exempted from the pains of death, only in case of the woman's subsequent consent, or her declaration that she went off with him of her own free will; and even then he is to suffer an arbitrary punishment, either by imprisonment, confiscation of goods, or a pecuniary fine.

The law at present in force in England, is the statute 18th Elizabeth, chap. 7, in which rape is made felony, without benefit of clergy. It is a necessary ingredient in the English law, that the crime should be against the woman's will, and in this it differs from the Roman, which prescribed the same punishment, whether the female consented or not. The civil law, also (as we have already stated), does not seem to suppose a prostitute capable of any injuries of this kind, whilst the English law holds it felony to force even a concubine or harlot, because the woman may have forsaken that course of life. At present also, no time of limitation for making complaint is fixed, but the jury will rarely give credit to a stale accusation. In addition to these, we may add, that the common law considers a male infant, under the age of fourteen, as incapable of committing a rape, and therefore cannot be found guilty of it. For though (says Blackstone), in some felonies, *malitia supplet ætatem*, yet as to this particular species, the law supposes an imbecility of body as well as mind.‡

In the state of New York, death was formerly the punishment for committing a rape on a married woman or a maid. (Act passed Feb.

* Foderé, vol. iv. pp. 328, 329; Code Penal, art. 331–333.

† Hume's Commentaries on the Laws of Scotland, vol. ii. p. 3, 5, 6, 14; Brewster's Edinburgh Encyclopædia, vol. xi. p. 823, Law of Scotland.

‡ Blackstone 4, chap. xv. sect. 3.—A case, bearing on the above point, was decided some years since, in Massachusetts. In 1823, a boy, under the age of fourteen, was convicted of an *assault with intent to commit a rape*. On a motion in arrest of judgment, the law, as above quoted, was urged, shewing that a person is deemed incapable, and consequently that it would be absurd to punish him for *attempting*, what the law presumes him incapable of *doing*. But the court decided that the judgment must stand. "The law which regards infants under fourteen as incapable of committing rape, was established *in favorem vitæ*, and ought not to

14, 1787). And it was also ordained at the same time, that if a woman had been ravished, and afterwards consented to her ravisher, her husband, father, or next of kin, might sue by appeal against such offender.* These laws, however, have been repealed, the punishment altered, and appeals of felony abolished. The acts now in force prescribe the punishment of imprisonment for ten years in the state-prison, on the offender and his accomplices, if he have any, for ravishing by force any woman-child of the age of ten years or upwards, or any other woman. An assault with an intent to commit a rape, may be punished by fine and imprisonment, or both.

The following enactment has also been recently added. "Every person who shall have carnal knowledge of any woman above the age of ten years, without her consent, by administering to her any substance or liquid, which shall produce such stupor, or such imbecility of mind or weakness of body, as to prevent effectual resistance, shall, upon conviction, be punished by imprisonment in a state-prison not exceeding five years.†

In the states of Massachusetts, Rhode Island, Delaware, and South Carolina, the punishment prescribed is death.‡ While in Connecticut, Georgia, Illinois, Indiana, Ohio, Maine, New Hampshire, New Jersey, Vermont, Pennsylvania, Virginia, and Michigan, imprisonment for a term of years, or for life, is directed. In some few cases, fine or imprisonment, or both.§ In Louisiana, imprisonment and hard labour for life, is the punishment.‖ In the state of Missouri, and also in the territory of Arkansaw, the punishment prescribed is castration.¶

The attempt to commit this crime, or its actual completion by a negro or mulatto, is made a subject of special legislation in several states. Thus in Tennessee, Alabama, and Louisiana, even the attempt on a white woman is made a capital offence.** In Virginia and Missouri, the same is punished by castration.††

be applied by analogy to an inferior offence, the commission of which is not punished with death. An intention to do an act does not necessarily imply an ability to do it, and females might be in as much danger from precocious boys as from men, if such boys are to escape with impunity from felonious assaults, as well as from the felony itself." Commonwealth *v.* Green, 2 Pickering's Massachusetts Rep. p. 380.

* Jones and Varick's edition of the Laws, vol. ii. p. 57.

† Revised Statutes, vol. ii. pp. 663–666.

‡ Laws of Massachusetts, 1807, vol. iii. p. 340. Revised Laws of Delaware. 1829, p. 128. Public Laws of South Carolina, edited by Judge Grimke, p. 30. Fourth Report of American Prison Discipline Society.

§ In addition to the references on a former page, Prince's Digest of Laws of Georgia, 1817, p. 349. Laws of Pennsylvania, 1803, vol. v. p. 2. Revised Laws of Virginia, 1803, vol. i. p. 356. In New Jersey, a second offence is punished with death.—Laws, 1828.

‖ Digeste Générale des Actes de la Legislature de la Louisiana, 1828, vol. i. p. 441.

¶ Revised Laws of Missouri, p. 125, vol. i. p. 31. Nuttal's Journey to the Arkansaw, p. 224.

** Laws of Tennessee, 1833, p. 94. Laws of Alabama, 1830. Code Noir of the Louisiana Digest, vol. i. pp. 234, 297. Virginia punishes actual rape on a white woman by a slave with death.

†† Mr. Jefferson, who was appointed a reviser of the Laws of Virginia, in 1778, proposed castration as the punishment in all cases of rape. (Works, vol. i. p. 126). This was not, however, adopted.

In a few of the states some specific provisions are made as to the proof of rape. In Illinois, it is not necessary to prove emission in order to constitute it; and in Indiana and Tennessee, penetration is held sufficient.

The reasons on which this change is founded may deserve some consideration at the conclusion of the present section.

Rape is the *carnal knowledge* of a female, forcibly and against her will. It has been a subject of some legal discussion as to what constitutes this carnal knowledge. Some judges have supposed that penetration alone was sufficient, while others have contended that penetration and emission are both necessary. All seem agreed that the latter without the former will not suffice. The following abstract, taken from Chitty's Treatise on the Criminal Law, will give an idea of the fluctuating state of jurisprudence on this subject: —"Lord Coke, in his Reports, supposes both circumstances must concur, (12 Cok. 37,) though he does not express himself so clearly in his Institutes. Hawkins, without citing any authority, or hinting a doubt, declares the same opinion. Hale, however, differs from both, and considers the case in Coke's Reports as mistaken. In more modern times, prisoners have been repeatedly acquitted in consequence of the want of proof of emission. In one instance (Rex *v.* Russen, 14 Petersdorff. 116), on the other hand, the prisoner was found guilty, under the direction of Justice Bathurst, who did not consider this fact as necessary to the consummation of the guilt. But in Hill's case, which was argued in 1781, a large majority of the judges decided that both circumstances were necessary, though, Buller, Loughborough, and Heath, maintained a contrary opinion. "This, then," he adds, "seems to be the stronger opinion; and at the present day, if no emission took place, it would be more safe to indict for an attempt to commit, by which means a severe punishment might be inflicted."*

* Chitty's Criminal Law, vol. ii. p. 810. This abstract is for the most part taken from East's Pleas of the Crown (vol. i. pp. 437–440). In this last a number of cases are given, which very strikingly prove the diversity of opinion that has existed amongst the English judges. The leading particulars in the case of Hill, cited above, are also stated; and the great majority of the judges that deemed both necessary to constitute the crime, seems to have settled the law in that country. A decision conformable to it was made by Baron Richards, at the Northumberland Assizes, in 1815; and, as the case is interesting, I shall detail its leading particulars. The prosecutrix was a married woman, apparently between thirty and forty years of age. The defendants were two brothers, by one of whom the act was alleged to have been perpetrated, while the other held the husband forcibly down at not more than two yards distance from the spot where his wife was said to have been violated. The woman swore positively to the penetration, but could not swear to the emission; and she assigned as a cause the agitation and syncope which supervened during the struggle. She perfectly comprehended the import of the question put to her, and declared explicitly that she had, on every previous coition with her husband, been sensible of the act of emission. Nor could she say that she was aware of any unusual humidity of the parts immediately after the commission of the crime. This she ascribed to having tumbled or waded through some water at the bottom of the dean where the assault took place. On both these points Baron Richards laid great stress; and told the jury that the fact of emission must be sworn to or proved in order to constitute the crime of rape, according to the law of England. The evidence of the husband also went to prove that the ravisher remained long enough on the

Although the definition of the crime seems thus to be settled, yet if we proceed to notice the mode in which the emission is to be proved, we shall find some discordance. East observes, that penetration has *primâ facie* evidence of it, unless the contrary appears probable from the circumstances; and adds, that Hawkins is express to that purpose. "So where, upon an indictment for an assault with an intent to ravish the prosecutrix, she swore that the defendant had had his will with her, and had remained on her body as long as he pleased, though she could not speak as to emission, Judge Buller said that this was a sufficient evidence to be left to a jury of an actual rape; and therefore ordered the defendant to be acquitted under the present charge. He said, that he recollected a case where a man had been indicted for a rape, and the woman had sworn that she did not perceive any thing come from him but she had had many children, and was never in her life sensible of emission from a man: and that was ruled not to invalidate the evidence which she gave of a rape having been committed on her."* Chitty observes, "It is certain that no direct evidence need be given to the emission; but that will be presumed on proof of penetration, until rebutted by the prisoner. And it will suffice to prove the least degree of penetration, so that it is not necessary that the marks of virginity should be taken from the sufferer."† So also Baron Richards in the case cited below, although he deemed emission essential, and the woman was not sensible of it, yet he told the jury that it was for them to deliberate whether, on a careful examination of all the other collateral circumstances of the case, they had reason to be satisfied that this part of the crime, as well as every other, had been actually consummated.‡.

If there be any truth in the views already intimated concerning the possibility of committing this crime, and the cases in which it may be completed, certainly the necessity of establishing the fact of emission must prove an insuperable barrier to any conviction. We may divide females, with reference to this subject, into two classes — the young unmarried persons; and the married, or those accustomed to sexual intercourse. As to the first, it may be considered very improbable that they could be conscious of this while labouring under the influence of terror, severe pain, faintness, or insensibility. And to this class also belong those of a very tender age, who are totally ignorant of the nature of the crime and of what is necessary to complete it.

body of the female to complete his purpose. The evidence for the prosecution, however, failed in credibility; as the prisoner's counsel, besides the above particulars, shewed satisfactorily that the man and his wife were at the time in a state of intoxication, sufficient to destroy the validity of what they had sworn to. The prisoners were accordingly found not guilty. — Edinburgh Medical and Surgical Journal, vol. xii. p. 207.

* East, ii. p. 440. This case was tried at the Winchester Assizes, 1787.

† Chitty, ii. p. 812. I have already quoted the case (p. 76) on which the latter part of this dictum is founded. This may probably be correct in children under ten years of age; but, in all others, it will be readily observed, that if it be allowed all possibility of the female's proving the emission is in a great measure done away. Surely such instances are rather to be considered as *attempts to commit the crime* than the *consummation of it.*

‡ Edinburgh Medical and Surgical Journal, vol. xii. p. 208.

It is, however, urged, that there is great propriety in requiring this testimony from married females, and that if they are not sensible of that "which constitutes the very essence and climax of feeling," their declarations do not deserve much credit as to the other parts in which a less degree of poignancy of sensation is requisite.* I confess that language of this kind appears to me misapplied. If proper resistance be made, where the contest is solely between two individuals of strength in any degree proportionate, the crime can scarcely be completed without violent personal injury to the female. The exhaustion that must be present, superadded to mental agitation, leave us some reason to doubt whether this enjoyment can be realised. And it also deserves consideration, that if the resistance has been *complete throughout*, such pain may ensue from the repeated attempts to effect the crime as to dull all sensation on this point. I forbear pressing the case mentioned by Judge Buller, although it is probable that other females, like the one mentioned by him, may not be sensible of it.†

The diversity of opinion that I have noticed has extended to our own country. In a case tried some years since at the Albany Circuit, in this state, by the late Justice Platt, he declared the law to be as laid down by the judges in Hill's case. But, in Pennsylvania, emission is not deemed essential. In a case tried in 1793, when it was urged that both penetration and emission should be proved, the judge said — "We are inclined to the opinion that the crime is sufficiently proved when penetration is proved. It is not to be expected that the woman, especially agitated by such outrage, should be able to give explicit proof of this circumstance."‡ So also in South Carolina, in 1813, Judge Nott said he had strong doubts whether it was necessary to prove emission, and the court refused to disturb the verdict.§

The difficulties attending such conflicting decisions in England probably led to the enactment of a recent law there, by which it is ordained, that on trials for the crime of rape, and of carnally abusing girls under the respective ages of ten or twelve years of age, it is not necessary to prove actual emission in order to constitute carnal knowledge, but this shall be deemed proved upon testimony of penetration only.‖ This law was passed in 1828, 9th George IV., and it

* Edin. Med. and Surg. Journal, vol. xii. p. 209.

† "Considering the nature of the crime—that it is a brutal and violent attack upon the honour and chastity of the weaker sex—it seems more natural and consonant to the sentiments of laudable indignation which induced our ancient lawgivers to rank this offence among felonies, if all further inquiry were unnecessary, after satisfactory proof of the violence having been perpetrated by actual penetration of the unhappy sufferer's body. *Under what principle, and for what rational purpose, any further investigation came to be supposed necessary, the books which record the dicta to that effect do not furnish a trace.*"—East, pp. ii. 436, 437.

‡ Commonwealth *v.* Sullivan, Addison's Pennsylvania Reports, p. 143.

§ State *v.* Le Blanc, 2, South Carolina Constitutional Reports, 351. I have already mentioned, that in Illinois, the statute requiring proof of emission was formally repealed. Acts passed in 1819, p. 219.

‖ Professor Amos queries, whether under this law, an *eunuch* may not be found guilty of a rape; and again, he suggests the possible case, where no penetration is proved, but emission only.—London Medical Gazette, vol. viii., pp. 33—96. In this last, however, the jury would doubtless infer the one from the other, particularly as Lord Hale has pronounced emission an *evidence* of penetration.

is often called Lord Lansdowne's Act, as that nobleman introduced it.

Scarcely, however, had this become the statute law of the realm, when difficulties occurred in its construction. In August, 1831, on a trial before Justice Taunton, the female proved penetration, and also that she felt warmly in her private parts, but could not prove emission. The counsel for the prosecution submitted that this was a case exactly coming within the late law. The judge, however, said that all that constitutes carnal knowledge should have happened. The jury must be satisfied from circumstances that emission took place, and although it was not necessary specifically to prove it, yet the circumstances should be such as to infer it. The prisoner was accordingly acquitted.*

I must be permitted to agree with the reporter of the case, in saying that this decision makes the statute of George IV. inoperative. Even before its enactment it was unnecessary to give *direct* evidence of emission. It was enough if the circumstances were such as to satisfy that it had taken place. But how can Judge Taunton's opinion be reconciled with the statute, which says, that it is *sufficient to prove penetration only?*

His decision, however, appears to have been subsequently overruled. In Rex *v.* Cox, at the Worcester Assizes, in 1832, before Justice Littledale, the jury found that there had been penetration, but no emission from the prisoner, and the judge, after passing sentence on the prisoner, reserved the case for the consideration of the fifteen judges. They held the conviction to be right.†

In Scotland, after much diversity of opinion, the point now considered was settled in 1821, by Lord Gillies, who "laid it down, with the concurrence of the court, that rape may be perpetrated by complete penetration without emission, and that when the injured party is below the age of puberty, it is enough if her body has been entered, though not to the degree which takes place with a full-grown woman.‡

By a recent enactment in the state of New York, a similar provision has been adopted in the following words:—"Proof of actual penetration into the body shall be sufficient to sustain an indictment for rape, or for the crime against nature."§

IV. *Of some Medico-Legal Questions connected with this Subject.*

Three questions relating to the subject before us have, at various times, been discussed, and they all deserve a brief notice.

1. *Whether the presence of the venereal disease in the female violated is a proof in favour or against her accusation?* If, on examination, the marks of this disease be found recent, it will be proper to consider them as corroborating circumstances. It is necessary, however, to

* 2 Moody and Malkin, p. 122; Rex *v* Russell.

† 5 Carrington and Payne, p. 297; American Jurist, vol. xi. p. 459; Chitty's Med. Jurisp. part i. p. 379.

‡ Alison's Principles of the Criminal Law of Scotland, p. 210.

§ Revised Statutes, vol. ii. p. 735.

remark, that the symptoms of venereal infection do not commonly make their appearance until three days after receiving it, while the examination should be made within that time. Should the appearances indicate any thing like a disease of long standing, they must, of course, tend to weaken the complaint of the female. The following are cases which will illustrate these observations. On the 11th of Dec. 1811, Foderé was directed by the imperial attorney of the court of Trevoux, to visit a female aged from eleven to twelve years, who accused a man aged fifty, and of large stature, of having committed a rape on her. The crime, she stated, was consummated on the 26th of Nov. preceding. On examination, our author found that in this person the menses had not yet appeared, the nymphæ were inflamed, and the parts surrounding the meatus urinarius discharged an acrid gonorrhœal fluid, the hymen was ruptured, and the entrance of the vagina enlarged, but the fourchette was not ruptured, nor were there any signs of great violence, or such as might be expected from the disproportion between the individuals. Foderé reported that the venereal disease in this child was a proof of connexion, but he did not consider it so of rape. Her conduct, he adds, was destitute of all modesty. The accusation was, however, persisted in; but, on the trial, it was proved that the parents had placed her with a woman who was a prostitute, and also that the child had never complained of violence until after she discovered symptoms of the venereal. The prisoner was acquitted.*

A somewhat opposite, but very interesting, case occurred a few years since at Rome. A young man, of excellent family and high character, was accused of a rape by a girl not yet arrived at the age of puberty. He was arrested, and a medical examination of the female was had by three physicians and two midwives. They reported, that they found "the sexual organs altered and tumid, and at the entrance of the vagina the hymen was entirely wanting; the whole of the vagina was irritated, inflamed, and of a deep red colour, but particularly so at the point of the frænulum." The vagina was dilated, so as to admit a finger with perfect facility; and, finally, they observed a copious discharge of purulent and sanguinolent matters. The medical witnesses gave it as their opinion, that the complainant had been recently deflowered, and that the above-mentioned flux, by its quantity and appearance, might be derived from a mechanical injury, or actually from a communicated gonorrhœa.

The girl swore that the discharge commenced *immediately* after the rape. It did not yield to the ordinary antiphlogistic treatment, and two subsequent examinations by the same physicians induced them to lean still more strongly to the idea of its being syphilitic.

The accused (named Crespi) was condemned. His case was reviewed by Metaxa, professor of anatomy at the Sapienza College, and the argument resolved itself into two points,—first, to endeavour to set aside the charge of rape; and, secondly. to demonstrate the pre-existence of leucorrhœa in the female.

On the first, the usual objections were urged as to the uncertainty

* Foderé, vol. iv. pp. 365, 366.

of the proof to be derived from the absence of the signs of virginity; and it was argued, that a rape thus committed on a female under the age of puberty, should have left more marked and severe traces.

His observations on the second were more conclusive. Condemning the insufficiency of the examinations, he asserts that the actual nature of the affection might have been ascertained with certainty. Leucorrhœa is constantly derived from the uterus, while gonorrhœa does not extend further than the external organs. If, therefore, these last be washed carefully, and inspected, no mistake could occur. Again, he urged that gonorrhœa has its regular periods of high inflammation and decline; whereas leucorrhœa is often chronic, and increases and diminishes at indeterminate times. The occurrence of the discharge *immediately* after the alleged violence, is also against the idea of its syphilitic origin.

Some criticisms on the depositions of the examining physicians, conclude this work of Professor Metaxa; such as their speaking of most acute inflammation, and yet no pain appearing to have been present; the vagina was much inflamed, and yet it could be examined with perfect facility. No hæmorrhage, nor inability to move, appears to have followed the crime: further, no mention was made of the presence of the carunculæ myrtiformes, which should have been seen from the laceration of the hymen.

Our author also brought testimony to prove that the accuser was of a scrofulous habit, and, at a very early age, had suffered from leucorrhœa.

On these grounds, Professor Metaxa, and twenty-eight professors and physicians at Rome, who approved and signed his publication, gave an opinion in favour of the convicted criminal. It led to a reversal of his sentence.

It is curious to remark, and the observation is a shrewd one of the reviewer whom I quote below, that the very argument of Professor Metaxa, while it certainly goes to prove that the physicians were wrong in supposing gonorrhœa to be present, strengthens greatly the physical proofs of rape. We should not expect marks of severe injury or violent inflammation in parts previously relaxed by leucorrhœal disease, but appearances corresponding to what was observed. Such, indeed, was probably the truth of the case, and the Illustrissimo Signor Crespi escaped from a sufficient want of discrimination on a collateral point of testimony.*

I add the following, because it occurred in New York:—H. Flynn was indicted in 1822 for an assault with intent to commit a rape on a child aged ten years. She said that he had taken her into the cellar, and kept her there for half an hour between one and two P.M. At night, the mother found her linen discoloured, and stained with blood; and in a short time symptoms of what Dr. Brown, one of the

* I have obtained all my knowledge of this case from a review of "Dissertazione medico-forense riguardante la causa della Illmo. Sig. Achille Crespi, accusato di stupro immaturo. Autore Luigi Metaxa, pubblica professore, &c. Roma, 1824," in Chapman's Journal, vol. ix. p. 427.

witnesses, considered gonorrhœa, came on. The prisoner was put into Bridewell, and Dr. Walker, the attending physician, proposed an examination, which he resisted, until forced thereto by the police. His linen was found discoloured, and conclusive marks of disease appeared. On the trial, these facts were proved. Dr. Mott, for the prisoner, stated that he had been called upon two days after the examination made by Dr. Walker, and found no marks of disease. He had also visited the child, and was uncertain whether it was the venereal or not—he deemed it impossible to tell at that age, and under the circumstances of the case. Dr. Walker was again called, and urged in explanation, that by using proper remedies the most skilful physician might be deceived by the patient, and the disease be so far removed as not to be visible in even much less time than two days. This opinion was concurred in by Dr. Mott. The prisoner was found guilty.*

2. *Can a female be violated during sleep without her knowledge?* If the sleep has been caused by powerful narcotics, by intoxication, or if syncope or excessive fatigue be present, it is possible that this may occur; and it ought then to be considered, to all intents, a rape. In such cases, the quantity of stupifying drugs administered may be so great as to render her unable, even if awakened by the violence, to withdraw from it. The proof of the crime is to be obtained from the injury sustained; from the symptoms attendant on the exhibition of narcotics (if they have been given), and which will be noticed under the head of Vegetable Poisons; and finally, by (what may certainly happen) pregnancy occurring, and its term corresponding to the above era. As to natural sleep, I totally disbelieve its possibility with a pure person. The medical faculty of Leipsic, however, in 1669, decided that it might be accomplished. I prefer, however, the opinion of the juridical faculty of Jena, who, in a similar case, only allowed the exceptions already stated.† As to females accustomed to sexual intercourse, it has been supposed practicable; but if we do agree to that opinion, the circumstances certainly should be very corroborative. Some degree of scepticism may, I think, be permitted concerning it.‡

3. *Does pregnancy ever follow rape?* On this question a great diversity of opinion has existed. It was formerly supposed that a certain degree of enjoyment was necessary in order to cause conception, and, accordingly, the presence of pregnancy was deemed to exclude the idea of a rape. Late writers, however, urge that the functions of the uterine system are, in a great degree, independent of the will; and that there may be *physical constraint* on those organs sufficient to induce the required state, although the will itself is not

* Wheeler's Criminal Cases, vol. i. p. 74.

† The faculty of Leipsic decided, "dormientem in sella virginem insciam deflorari posse."—Valentini Novellæ, pp. 30, 31. In his introduction (p. 2), our author sneers at the ridiculous decision in this case: "Non omnes dormiunt, qui clausos et conniventes habent oculos."

‡ See on this question, Foderé, vol. iv. p. 367; Capuron, p. 52; Smith, p. 401; and Brendelius, pp. 96, 98, 9. This last doubts its possibility, even in the exceptions stated in the text.

consenting. We do not know, nor shall probably ever know, what is necessary to cause conception; but if we reason from analogy, we shall certainly find cases where females have conceived while under the influence of narcotics, of intoxication, and even of asphyxia, and, consequently, without knowing or partaking of the enjoyment that is insisted on. I should, therefore, consider that pregnancy was not incompatible with the idea of rape, under the limitations already laid down. Several writers on this subject are, however, of a different opinion, and particularly Dr. Bartley, who goes so far as to recommend that pregnancy shall be considered a proof of acquiescence; and that, in order to ascertain this, the punishment of the criminal be delayed till the requisite time.*

The law is in accordance with the opinion advanced above. Foderé mentions that there is a decree of the parliament of Toulouse, which decides in the affirmative, and that on the opinion of physicians who reported, "*Posse quidem voluntatem cogi, sed non naturam, quæ semel irritata pensi voluntate fervescit, rationis, et voluntatis sensus amittens.*† The English law anciently appears to have considered pregnancy as destroying the validity of the accusation. Dalton quotes Stamford, Britton, and Finch, in favour of this opinion; but later writers, and in particular Hawkins and Hale, question its correctness, and deny its being law.‡ "It was formerly supposed," says East, "that if a woman conceived it was no rape, because that shewed her consent: but it is now admitted on all hands, that such an opinion has no sort of foundation either in reason or law."§

A few words are necessary on the *crime against nature*, and they may be properly introduced here.‖ It may be required to examine

* Bartley p. 43. The scope of his argument is, that the depressing passions, such as fear, terror, &c., will prevent the necessary orgasm from occurring. Farr intimates a similar opinion (p. 43), and so does Meierius, the editor of Brendel. —Note, p. 99. Those who entertain the belief maintained in the text, are—Capuron, p. 57; Foderé, vol. iv. p. 369; Metzger, pp. 257, 486.

"It is not, perhaps, altogether impossible," says Dr. Good, "that impregnation should take place in the case of a rape, or where there is a great repugnancy on the part of the female; for there may be so high a tone of constitutional orgasm as to be beyond the control of the individual who is thus forced, and not to be repressed even by a virtuous recoil, or a sense of horror at the time."—Good's Study of Medicine, vol. iv. p. 100.

† Foderé, vol. iv. p. 360. ‡ Burns' Justice, art. *Rape*.

§ East's Crown Law, vol. i. p. 445.

In connexion with this, it has been inquired whether pregnancy may follow defloration? I apprehend that this is to be answered in the affirmative, although the instances are comparatively rare. It is quite common, in cases of seduction, to swear that there has been only a single coitus; and although this may be doubted in some, yet in others there is hardly just ground to disbelieve a solemn affirmation. It also has occasionally, I presume, occurred to most physicians, on comparing the term of gestation with the period of marriage, to render it probable that the pregnancy must have happened at the earliest possible term.

"Ce qui rend un premier coit infructueux (says Metzger, p. 486), c'est, à mon avis, la précipitation de l'homme, bien plutôt que la douleur qui suit la défloration. Knobel est également de cet avis."

‖ The following extract is curious, and for want of a better place, I subjoin it here:—"De tous les crimes contre les personnes, l'attentat à la pudeur est celui pour lequel l'influence des saisons est le plus évidente. Sur 100 crimes de cet espèce,

the individual on whom it has been committed. If without consent, inflammation, excoriation, heat, and contusion, will probably be present. The effects of a frequent repetition of the crime, are a dilatation of the sphincters, ulcerations on the parts, or a livid appearance, and thickening. It has been suggested, that secondary symptoms of lues might be mistaken for these; but I am hardly of this opinion. No man, however, ought to be condemned on medical proofs solely: the physician should only deliver his opinion in favour or against an accusation already preferred.*

The punishment of this crime has always been signal. Death was prescribed by the Jewish and Roman laws, and is still by the English; and where both consent, provided the one on whom it is committed is above the age of fourteen, both are punished. In this state it was also formerly made capital, but now is changed to imprisonment for life.

CHAPTER VI.

PREGNANCY.

1. Laws of various countries concerning the presence of pregnancy in civil and in criminal cases. 2. Signs of real pregnancy — Reasons of the difficulty of ascertaining it in medico-legal cases — Notice of the principal signs: Enlargement of the abdomen — Diseases that may produce this: Appearance of the areola; Suppression of the menses—Circumstances that may mislead with this: Nausea, &c.; Motion of the fœtus; Quickening—Explanation of this—Variety as to its occurrence — Auscultation: Directions for its application — Impropriety of relying on any single proof of pregnancy — Extra-uterine pregnancy — Pregnancy complicated with dropsy—Concealed pregnancy—Pretended pregnancy—Circumstances to be noticed: the age and state of the menstrual function — Diseases that may be mistaken for pregnancy: Moles; Hydatids; Physometra, &c. 3. Superfœtation — Cases that have been deemed instances of it: A blighted and a perfect fœtus; Different coloured children; Children born at considerable intervals — Explanation of these cases by the opponents of the doctrine — Double uteri — Application of superfœtation in legal medicine. 4. Whether a female can become pregnant, and remain ignorant of it until the time of labour — Cases in which this has been deemed possible.

Few questions occur in legal medicine of greater importance than the one we are about considering. On its proper decision may depend the

on en compté en été, 36; au printemps, 25; en automne, 21; et en hiver, 18 seulement.—Guerry, Essai sur la Statistique Morale de la France. Paris, 1833. P. 29.

* Zacchias, vol. i. p. 382. Foderé, vol. iv. p. 374. Mahon, vol. i. p. 138.

property, the honour, or the life of the female. It will probably lead to a better understanding of this subject, if we notice,

1. The laws of various countries relating to the presence of pregnancy.

2. The signs of real pregnancy, together with the best mode of ascertaining concealed or pretended pregnancy.

3. The arguments and proofs in favour and against the doctrine of superfœtation; and,

4. Some questions arising out of the previous examination.

I. *Of the laws of various countries which relate to the presence of pregnancy.*

The Roman law exempted a condemned female from punishment, if she was pregnant, until after her delivery—"*quod prægnantis mulieris damnatæ pæna differatur quoad pariat.*"

There are two leading cases in the English or common law, which may require a knowledge of the signs of pregnancy. One is a proceeding at common law, "where a widow is suspected to feign herself with child, in order to produce a supposititious heir to the estate. In this instance, the heir presumptive may have a writ *de ventre inspiciendo*, to examine if she be with child or not; and if she be, to keep her under proper restraint until delivered; but if the widow be, upon due examination, found not pregnant, the presumptive heir shall be admitted to the inheritance, though liable to lose it again on the birth of a child within forty weeks from the death of a husband."

The interest that cases of this nature sometimes occasion, and the precautions that have been taken in England, may be learned from the following report. Sir Francis Willoughby died, seised of a large inheritance. He left five daughters (one of whom was married to Percival Willoughby), but not any son. His widow, at the time of his death, stated that she was with child by him. This declaration was evidently one of great moment to the daughters, since, if a son should be born, all the five sisters would thereby lose the inheritance descended to them. Percival Willoughby prayed for a writ *de ventre inspiciendo*, to have the widow examined; and the sheriff of London was accordingly directed to have her searched by twelve women, &c. Having complied with this order, he returned that she was twenty weeks gone with child, and that within twenty weeks, *fuit paritura*. "Whereupon another writ issued out of the common pleas, commanding the sheriff safely to keep her in such an house, and that the door should be well guarded; and that every day he should cause her to be viewed by some of the women named in the writ (wherein ten were named), and when she should be delivered, that some of them should be with her to view her birth, whether it be male or female, to the intent there should not be any falsity." And upon this writ the sheriff returned, that accordingly he had caused her to be kept, &c., and that such a day she was delivered of a daughter.*

* Croke's Elizabeth, p. 566. See also in the matter of Martha Brown *ex parte* Wallop, in Brown's Chancery Cases, vol. iv. p. 90; *ex parte* Aiscough, Peere

The other instance is evidently borrowed from the Roman law, as quoted above. When a woman is capitally convicted, and pleads her pregnancy, though this is no cause to stay the judgment, yet it is to respite the execution till she be delivered. "In case this plea be made in stay of execution, the judge must direct a jury of twelve matrons, or discreet women, to ascertain the fact; and if they bring in their verdict, *quick with child* (for barely *with child*, unless it be alive in the womb, is not sufficient), execution shall be staid generally till the next session, and so from session to session, till either she is delivered, or proves, by the course of nature, not to have been with child at all."*

"Here (says Dr. Paris) the law of the land is at variance with what we conceive the law of nature, and it is at variance with itself; for it is a strange anomaly, that by the law of real property, an infant in *ventre sa mere* may take an estate from the moment of its conception, and yet be hanged four months after for the crime of its mother."† In the striking language of Dr. Kennedy, "the maxim of British law is, that a child in the *fifteenth* week of its fœtal existence is to be deprived of life for its mother's crime, whilst a child in the *sixteenth* is to be protected from such an unjust and unmerited fate." Nor is the evil confined to this. The manner of administering the law is equally repugnant to the dictates of humanity and justice. "A jury of twelve matrons, or discreet women," are little calculated to decide on the presence or absence of pregnancy, at the very period when (as we shall hereafter see) there is often the greatest doubt. A few examples will strikingly illustrate this. Ann Hurle, condemned for forgery at the Old Bailey, in 1804, as a last resource pled pregnancy. She contrived so to baffle the skill of the female examiners, that they could not come to any decision. The sheriff had recourse to the judgment and experience of Dr. Thynne, who declared that she was not pregnant, and she was executed. In a case that happened in Ireland, where also the female jury could not decide, some of them were *unmarried*, and not one of them ever attended a lying-in case. (Kennedy, p. 195.) But they are sometimes not contented with the confession of ignorance. At Norwich (England), in March 1833, a murderess pled pregnancy. Twelve married women, after an hour's investigation, returned a verdict that she was not quick with child. She was ordered for execution, when three of the principal surgeons in the place, fearing that there might be a mistake, waited on the convict, examined her, and found her not only pregnant, but *quick with child*. They ascertained this by manual examination. On a representation to the judge she was respited, and on the 11th of July was safely delivered of a living child.‡

In Scotland, a pregnant female is entitled to have sentence delayed;

Williams' Reports, vol. ii. p. 591; *ex parte* Bellet, Cox's Chancery Cases, vol. i. p. 297.

* Blackstone, vol. iv. pp. 394, 395. † Paris and Fonblanque, vol. iii. p. 141.

‡ London Medical Gazette, vol. xii. pp. 24, 585. Kennedy, p. 200. Mr. Smith, who has added some legal notes to Dr. Kennedy's work, has ingeniously argued that the above provision is not contained in the ancient common law, and that all which it required was the presence of pregnancy. I fear, however, that the quotation from Blackstone gives the *actual* law of England.

or if it has passed, to be respited, till her delivery takes place; and that equally whether *she be quick with child or not.**

Foderé and Capuron appear to have examined every law in the French code, which has a bearing on this subject. The Civil code, sect. 185, declares, that no female shall be allowed to contract marriage before the age of fifteen full years. Nevertheless, such marriage shall not be dissolved, 1, when six months have elapsed after the female, or both of the parties, have attained the required age; and 2, *when the female, although not of the required age, has become pregnant before the expiration of six months.* The penal code, sect. 27, also declares, that if a female, condemned to die, states that she is pregnant, and if it be proved that she is so, she shall not suffer punishment until after her delivery. Several other laws are mentioned, which, by implication, may be referred to this subject, but it is not necessary to state them. The above are the important ones now in force in France.† I may, however, add, that the law last quoted was in existence and has been acted upon since the year 1670 in that country.‡

The following is a recent enactment in the state of New York, intended to take the place of the common law.

"If a female convict, sentenced to the punishment of death, be pregnant, the sheriff shall summon a jury of six physicians, and shall give notice to the district attorney, who shall have power to subpœna

* Alison's Practice of the Criminal Law of Scotland, p. 654. The English courts will also interfere when a pregnant female has been imprisoned. Thus, in the case of Elizabeth Slymbridge (Croke's James, 358), "upon suggestion that she had been imprisoned for divers weeks, and was with child, and would be in danger of death if she should not be enlarged," Sir Edward Coke, the chief justice, admitted her to bail, to prevent the peril of death to her and her infant; and, in giving his opinion, he cites a similar case, which happened in the 40th of Edward III. The editor remarks, that *these cases are cited as extraordinary instances.* The last case is mentioned in Coke Littleton, 289, *a*. The record states, "Quia eadem Elena pregnans fuit, et in periculo mortis, ipsa dimittitur per manucaptionem, &c. ad habendum corpus, &c." And recently, legal protection has been extended to witnesses who may be pregnant. In an act passed 1 William IV. (chap. xxii.) and intitled, "An act to enable Courts of Law to order the examination of witnesses upon interrogatories and otherwise," it is directed, among other things, that no examination or deposition shall be read in evidence, unless it shall appear to the satisfaction of the judge that the examinant or deponent is unable, from permanent sickness, or other permanent infirmity, to attend the trial. In the case of Abraham *v.* Newton (8 Bingham's Reports, 274), the question came up, whether pregnancy and imminent delivery was a cause for examination under this act. It was decided that it might be; but it must be shewn by the affidavits of competent persons, that the delivery will probably happen about the time fixed for the trial of the cause.

† Foderé, vol. i. pp. 421—432. A law, passed on the 23d Germinal, year 3, (1795) was still more mild in its provisions. It prescribed, that no woman accused of a capital crime *should be brought to trial until it was properly ascertained that she was not pregnant.* In conformity with this, the court of cassation reversed several decisions of inferior criminal courts, where it appeared that the female had not been properly examined; and it seems, indeed, that it demanded proof, that in such cases the examination had always been made. (Ibid. pp. 428—431). This is probably abolished, as no mention is made of it in the code now in force.

‡ I take the following from a newspaper. "The supreme court of Massachusetts, at its law session in Boston, in March 1834, decided, that a grand-child born eight months and a half after the death of his grandfather, is included in a bequest to grand-children '*living at his decease.*'"

witnesses. If on such inquisition it shall appear that the female is quick with child, the sheriff shall suspend the execution, and transmit the inquisition to the governor. Whenever the governor is satisfied that she is no longer quick with child, he shall issue his warrant for execution, or commute it, by imprisonment for life in the state prison."*

II. *Of the signs of real pregnancy, and of concealed and pretended pregnancy.*

In the ordinary practice of medicine, but little difficulty ever occurs in ascertaining the presence of pregnancy. The female, when she consults a physician, is frank in her avowal of the symptoms present; and from her narrative an opinion sufficiently accurate can generally be formed. The reverse, however, takes place in legal medicine. Here, pregnancy may be CONCEALED by unmarried women, and even by married ones under certain circumstances, to avoid disgrace, and to enable them to destroy their offspring in its mature or immature state. It may also be PRETENDED, to gratify the wishes of relatives—to deprive the legal successor of his just claims—to extort money—or to delay the execution of punishment.

Neither of these can be properly investigated without recurring to the signs of real pregnancy, and this remark deserves particular notice, since, with all the light that modern science affords, serious errors have, notwithstanding, been committed. The female has an interest and a wish to deceive the examiner, and her testimony, which, in ordinary cases is so much relied on, is here suspicious, or not to be credited.

Mahon has suggested a useful division of the signs of pregnancy, viz. those which affect the system generally, and those which affect the uterus.†

The changes observed in the system from conception and pregnancy are principally the following: increased irritability of temper, melancholy, a languid cast of countenance, nausea, heart-burn, loathing of food, vomiting in the morning, an increased salivary discharge, feverish heat, with emaciation and costiveness, occasionally depravity of appetite, a congestion in the head, which gives rise to spots on the face, to headach, and erratic pains in the face and teeth. The pressure of increasing pregnancy occasions protrusion of the umbilicus, and sometimes varicose tumours, or anasarcous swellings of the lower extremities. The breasts also enlarge, an areola, or brown circle, is observed around the nipples, and a secretion of lymph, composed of milk and water, takes place.

All of these do not occur in every pregnancy, but many of them in most cases.

* Revised Statutes, vol. ii. p. 658.

† Mahon, vol. i. p. 142. In considering this subject, I rely mainly on the opinion of men skilled in the science of midwifery, and accordingly have particularly noticed the works of Dr. Kennedy (Obstetric Auscultation). Dr. Gooch (Diseases of Women, chap. iii. and Midwifery.) Dr. Davis (Obstet. Medicine). Dr. Blundell (Lectures). Dr. Denman, Dr. Dewees, Mr. Ashwell, Dr. Ryan, Mr. Hogben, Professor Capuron, Dr. Montgomery (Cyclopædia of Practical Medicine, *art.* Pregnancy).

The changes that affect the uterus are—a suppression of the menses. These cease returning at their accustomed period.—An augmentation in the size of the womb. This is not perceptible until between the eighth and tenth weeks. At that time the fœtus, with the surrounding membranes, and the waters contained in them so enlarge it, that it may be felt lower down in the vagina than formerly; nor does it ascend until it becomes so large as to arise out of the pelvis, and this is accomplished at about the fourth month.* In the intermediate space, an examination *per vaginam* will discover the uterus to be heavier and more resisting; and by raising it on the finger, this indication will be particularly remarked between the third and fourth months. The enlargement continues—it becomes visible, and at the seventh month, the uterus is as high as the umbilicus; at the eighth, it is half way between the umbilicus and scrobiculus cordis, and at the ninth, it has reached the latter—its highest elevation. A short time before delivery, it somewhat subsides.† About the middle of the pregnancy, or between the seventeenth and twenty-second weeks, the female feels the motion of the child, and this is called *quickening*. Its variations as to time will be hereafter noticed. The vagina is also subject to alteration, as its glands throw out more mucus, and apparently prepare the parts for the passage of the fœtus.

These, as now stated, are the signs of pregnancy usually enumerated. It would not, however, be doing justice to the subject, if the reader were left to suppose that all or most of them are the invariable attendants on pregnancy. Some may accompany diseases; others may be altogether wanting in a state of true pregnancy. It will, therefore, be proper to examine the more important signs in detail.

1. *Of the expansion or enlargement of the abdomen.*—This sign is not visible during the first months; and after that period, it may be concealed for a length of time by various means, such as the peculiar disposition of the dress, and the confinement of the abdomen by stays. Formerly, fashion lent its aid to this deception. As early as 1563, satires were written in France on the articles of dress that were used to increase the size of the female figure, both before and behind; and in 1579, in the reign of Henry III. these were in general use. Contemporary writers considered them, and not without great reason, as subservient to, and productive of great depravity in manners, and particularly for the concealment of pregnancy.‡ Another circumstance that may lead to error, is the variety that exists with respect to corpulence or peculiarity of form. This, in some instances, conduces to render the question doubtful; so much, indeed, as in some cases to exhibit

* "In pregnancy, the uterus does not rise out of the pelvis before the third month."—Gooch, Diseases of Women, p. 209.

† "The uterus, at the end of the third month, generally measures from the mouth to the fundus, above five inches, one of which belongs to the cervix; on the fourth, it measures five inches from the fundus to the beginning of the neck; in the fifth, about six inches from the cervix to the fundus. In two months more, it measures eight inches, and at the ninth month ten or twelve inches, and is oviform in its shape."—Ashwell on Parturition, p. 137.

‡ British Critic, vol. vii. p. 539.

hardly any tumour. Waving these, however, we observe, that this sign is generally observed at the end of the fourth month. It then remains to inquire whether the enlargement is the result of pregnancy or of disease. If the former, it has generally some peculiarities, which serve to distinguish it. The enlargement is progressive from the fourth month to delivery; and by the fifth month, it can scarcely pass unnoticed, particularly if the female be standing. Recollect also, that the uterus lays in front of the abdominal cavity, and occupies the lower and middle parts. It grows from below upwards, and remains for a long time flattened at its sides, and a little puffy beneath the ribs, while in front, it is hard and prominent.*

But the enlargement may originate from disease — from suppression or retention of the menses — tympanites — the various species of dropsy — or schirrosity of the liver and spleen.

In retention of the menses, and particularly if accompanied with imperforate hymen, the abdominal enlargement is remarkably similar to that of natural gravidity. It occupies the anterior part of the abdomen, and presents the same character as to resistance and hardness, as is given by the pregnant uterus. It also gradually ascends, and is accompanied by no distinct fluctuation, as in ascitic dropsy. Pain and vomiting may also be present. On the other hand, however, the uterus is found unaltered in size; no motion can be felt by the examiner; and, above all, the fact of retention will appear on inquiry, and the hymen generally be found distended.† So, also, if this last be not present. The symptoms occurring from time to time should be carefully studied.‡

In tympanites, the abdomen is hard and elastic, and sounds like a drum when pressed; and there are irregular elevations, which appear to roll under the finger. Continued pressure causes the air to yield before it, which may thus be urged from one part to the other; but the intumescence of pregnancy is firm and unyielding.

Dropsy, also, when not encysted, is characterised by its peculiar

* Gooch, Blundell, Velpeau. "I will give you a little advice as to the unmarried class. Never give an opinion till six months have elapsed since the last menstruation. Do not believe one word they say. Listen to them as you would to a jockey praising his horse. *Never rely upon the evidence of their tongues, but on that of their* ——."— Gooch's Midwifery, p. 103. The uncertainty mentioned above, will be understood, by citing a case that occurred to Dr. Montgomery of imperforated hymen in a girl of seventeen. All the symptoms allowed above were present, and along with them, the *breasts were painful.* — Cyclopædia of Pract. Med. vol. iii. p. 472. Dr. Kennedy adds to the common symptoms, distention of the breasts, with darkened areola.—P. 166.

† Davis's Obstetric Medicine, p. 106. He gives a long list of references to cases of imperforate hymen.

‡ An instructive case, shewing the doubts which envelope some cases of suppression of the menses, and the equivocal symptoms to which it gives rise, is related by Dr. Dewees, in Chapman's Journal, vol. iv. p. 126. The female had not menstruated for a year — her breasts swelled — she had nausea and vomiting in the morning: and Dr. D. thought, on examination, that he perceived motion. As the female was unmarried and irreproachable, proper medicines were prescribed, which relieved her only for a time. Finally, on treating it as a case of ascites, there was manifest improvement, and the disease ended with a sudden gush of fluid blood from the vagina.

characteristic and local symptoms. The swelling appears general over the abdomen, and is not confined to the space over the pubis. "It is soft to the touch, wanting the solid and consistent feel observed in pregnancy, and diseased uterine, and sometimes ovarian structures." There are also marked indications of disease in various organs, which serve to establish the nature of the complaint.

Frequent mistakes have, however, been made, and these should teach great caution. "I was desired (says Sir Astley Cooper) to see a lady, who I was told laboured under dropsy. When I entered the room, I saw a tall, delicate female, with an immense abdominal swelling, giving a distinct sense of fluctuation. I requested the physician accoucheur, whom I met, to examine if the lady was not with child; he said he thought it was unnecessary, as the fluctuation was very distinct; but that he would do so, and let me know the result in a few days. I heard no more of her for a week, and then I learned that she had been put to bed on the morning following my visit."*

Encysted dropsy is often more difficult to be understood; as here we are not to expect fluctuation. The symptoms should be carefully noted, as they daily become more aggravated in this disease, while the slighter affections of pregnancy generally wear off. The cervix uteri also, in ovarian dropsy, is of its natural size and length; and the tumefaction is often distinct in its character from that of the gravid uterus. But it may be, that there is an enlarged ovary with pregnancy in the same person. The tumours, says Dr. Gooch, in such instances go on growing side by side; and he has known instances, where living and healthy children were born, leaving the abdomen still distended with the ovary. The case here (he observes) is puzzling. Suppressed menstruation is common in ovarian dropsy; the enlargement of the uterus may be mistaken for the ovarian enlargement; the child may be feeble or dead, and protrusion of the umbilicus attends each. Patient and assiduous examination is evidently necessary, and a particular attention to all the leading proofs of pregnancy.†

On schirrosity, it is sufficient to remark, that patience and judgment will generally teach us to distinguish its peculiarities, particularly as it is accompanied with striking and chronic indications of disease.

But even if we have settled that neither of the above diseases is present, and that there is an actual tumour of the uterus, it is not certain that it is caused by a fœtus: it may arise from a mole—from hydatids in the uterus, and various other diseases of that organ. These remarks sufficiently prove that enlargement of the abdomen is an uncertain sign in determining the presence of pregnancy.‡ We

* Lectures, vol. ii. p. 163. A case, detected by the application of the stethoscope, is quoted from Professor Elliotson, in Lancet, N. S. vol. vii. p. 656.

† Gooch, Diseases of Women, p. 239.

‡ Nor must we always suppose that a sudden reduction of size after enlargement has been owing to pregnancy and its results. Dr. Montgomery saw "an instance in a woman separated from her husband, who became affected with what was considered ovarian dropsy, and which enlarged the abdomen to the size of six months' pregnancy, some of the other symptoms of which state were also present. After an attack of inflammation, during which it is to be presumed the parietes of

have also to remember that the fœtus may die at any period, and be retained. Here, of course, there will be no increased enlargement noticed, and yet there has been pregnancy.*

2. *A change in the state of the breasts*, has by many been considered as a sign. They are said to grow larger and more firm, while the areolæ round the nipples become of a brown colour; and this is accounted for on the principle of revulsion—the blood, after the cessation of the menses, being determined upwards, in consequence of the connexion that subsists between the breasts and uterus, through the anastomises between the epigastric and internal mammary arteries. Milk also is secreted.

Now all these have been questioned or denied as proofs of the presence of pregnancy. *Enlargement of the breasts* occurs in suppressed menses, and sometimes at the period of the cessation of the menses.† Occasionally they do not enlarge until after delivery. The most unequivocal state is where, during a first pregnancy, they become full and tender, and have an appearance approaching to inflammation; and particularly if, previous to connexion, they have been small. We must not mistake their enlargement from corpulence, as this will be equally manifest in other parts of the body. (*Blundell.*)

A still greater diversity of opinion exists as to the *appearance of the areola*. I will quote several of the leading authors. Dr. Gooch says that the dark colour is very distinct in women with dark eyes and hair; but it is often difficult to tell whether it exists or not in those of a light complexion. In brunettes, it remains dark ever afterwards, and hence is no guide in future. He had, however, recently seen two young and newly married women, who were not pregnant, in whom the areola was dark. In chronic inflammation of the uterus, he had also known this colour produced, together with fulness and pricking pains in the breast. Notwithstanding these exceptions, he advances the opinion that this appearance rarely depends on other causes; and when it exists, deems it a sign either of present or previous pregnancy. He informs us also, that Dr. Hunter relied greatly on it, and asserted that he could judge by it whether or not a woman

the tumour formed an adhesion with the upper part of the vagina, there took place suddenly a discharge of gelatinous fluid from that cavity, and the abdomen completely subsided in the course of a day, and the previously entertained suspicion appeared to be confirmed beyond a doubt; but on examination, the woman had not about her one of the signs of delivery; yet, had not the case been at once investigated, loss of reputation at the least would have inevitably, though most undeservedly, followed."—Cyclopædia of Practical Medicine, vol. iii. p. 503, art. *Pregnancy.* A similar case is given in Medico-Chirurgical Review, vol. xxiv. p. 206.

* If an examination at an early period of pregnancy be deemed necessary, the following directions of Foderé and Mahon should be observed: Empty the intestinal canal, and let the female lie on her back, with the knees a little elevated, so as to prevent any tension of the abdomen. If the woman be not too fat or deformed, the uterus may be felt through the parietes of the abdomen, by applying the extended hand over the middle of the hypogastrium, so that the thumb touches the navel, and the small finger the pubis. On her making an expiration, the enlarged uterus may be felt, hard, and of a spherical form. If these be present, they *indicate an increase in size of the uterus, but not the cause of it.*—Foderé, vol. i. p. 443. Mahon, vol. i. p. 149. See also Smith, p. 485.

† John Pearson.—Medico-Chirurgical Review, vol. iv. p. 838. Denman, p. 227.

was pregnant. "A subject was brought to him for anatomical purposes; but on looking at the breast, from the appearance of the areola he declared that the female died while pregnant. One of his pupils examined, and found that she had a hymen. This seemed a contradiction; but the doctor still adhered to his opinion, and thought more attention due to the former than the latter appearance. On opening the body, his assertion proved just, for the uterus was found impregnated."—*Lowder, MS. Lectures.*

Dr. Dewees deems it equivocal, *except in a first pregnancy;* and he also remarks, that sometimes it is not present. Ashwell mentions three instances in which there was no pregnancy.

On the other hand, White (*Regular Gradation of Man*) states that he one morning examined the breasts of twenty women in the Lying-in Hospital in Manchester, and found that nineteen of them had dark-coloured nipples—some of them might be said to be black; and the areola around the nipple, being from one inch to two and a half inches in diameter, was of the same colour.

Dr. Blundell relies greatly on it. He states that there are three varieties of it, numerically discriminated according to the degree of change. "When the alteration rises to the highest point,—when the areola becomes broad and dark, and embrowned in fullest measure, more especially when pale before, it changes to a deep brown, so dark that it reminds one of the skin of a negro, the indication ought to have great weight—at least in a first pregnancy." In several instances where its existence was positively denied he thus detected it; and it has the advantage of manifesting itself very early in gestation. When the change is only in the first or second degree, or when it occurs in females who have been pregnant before, less reliance is to be placed on it.

Dr. Montgomery, in his elaborate and valuable article on the signs of pregnancy, remarks that much of the discrepancy that exists on this point is owing to exclusive attention to one of the characters, viz., the colour, and which he conceives of all others the most liable to uncertainty. He attaches, however, great importance to the appearance of the areola as a result of pregnancy; and I shall therefore mention the circumstances deemed by him to be characteristic.

As early as the second month he has noticed a change of colour; but in general it is then little more than a deeper shade of rose or flesh-colour, slightly tinged with a yellowish or brownish hue. During the next two months it is usually perfected, and varies in intensity with the peculiar complexion of the individual—being generally much darker in persons with dark hair, dark eyes, and sallow skin, than in those of fair hair, light-coloured eyes, and delicate complexion. In negro women the areola is almost jet black. The extent of this circle varies in diameter from an inch to an inch and a-half, and increases in some as pregnancy advances. In a recent case Dr. Montgomery found it, at the time of labour, to exceed three inches in diameter.

But in connexion with these changes, and as confirmatory of their cause, the following are also observed: The nipple partakes of the altered colour of the part, and appears turgid and prominent; and the

part of the areola more immediately around its base has its surface rendered unequal by the prominence of the glandular follicles, which, varying in number from twelve to twenty, project from the sixteenth to the eighth of an inch; and, lastly, the integument covering the part is observed to be softer and more moist (sometimes so as to damp and colour the woman's inner dress) than that which surrounds it. Such (he adds) we believe to be the essential characters of the true areola, the result of pregnancy; and that when found possessing these distinctive marks it ought to be looked upon as the result of that condition alone, no other cause being capable of producing it.

The observer must, however, understand that pregnancy may be present and the colour be wanting. In two cases mentioned and seen by Dr. Montgomery the areola could hardly be distinguished in this respect from the surrounding skin, yet all the other changes just mentioned were well developed. Again, it must be recollected, that in persons who have recently miscarried, and in nurses, the characters of the areola are kept up, and continue for some time. It is also conceded by our author that in some cases the colour remains permanent after a first pregnancy.

I apprehend that the authorities which I have given on this sign will incline the reader to attach considerable importance to its presence.*

The *secretion of a milky fluid* may occur without the presence of pregnancy. Hebenstreit states that he has known females in whom this fluid was produced by repeated friction, suction, &c.† A servant girl, says Belloc, slept in a room with a child whom it was wished to wean. Being disturbed in her repose by its cries, she imagined that by putting it to her breasts it might be quieted. In a sort time she had milk sufficient to supply its wants.‡ An account is also given in a manuscript in the collection of Sir Hans Sloane, of a woman at the age of sixty-eight, who had not borne a child for more than twenty years, nursing her grandchildren one after another.§ Similar cases are

* Gooch's Diseases of Women, p. 201, &c, and Midwifery, p. 100. Dewees' Midwifery. Ashwell, p. 171. Lawrence's Lectures, p. 449. Blundell's Lectures. Lancet, N.S. vol. iii. p. 325.

"The areola encircling the nipple (which in young women who have not borne a child is of a rosy tinge) assumes a brown cast, and becomes broader. This change may also occur when the breasts are enlarged from other causes than pregnancy. The seat of the areola being in the *rete mucosum*, it will sometimes during pregnancy become dark. When the child is weaned the areola gradually disappears."—Hogben's Obstetrical Studies.

It would appear from a remark of Dr. Ryan that Dr. Hamilton deems it an infallible sign, especially during a first pregnancy. Dr. Stringham was of a similar opinion.

† Hebenstreit, p. 185.

‡ Belloc, p. 70. Dr. Dewees witnessed its secretion in a female who had never been pregnant; Baudelocque in a girl eight years old, in the village of Alençon, who was presented to the Royal Academy of Surgery, Oct. 1783.—Midwifery, vol. i. p. 219.

§ Smith, p. 484. There are several cases on record of grandmothers suckling. One aged 60.—Philosophical Transactions, vol. ix. p. 100. One seen by Dr. Stack, and aged 68.—Philosophical Transactions, vol. xli. p. 140. A negro grandmother, aged 70, seen by Dr. Farquhar in the island of Jamaica.—Coxe's Medical Museum,

mentioned by Foderé; and, in particular, he relates an instance of a female who, on the point of being conducted to prison, declared herself a nurse. Although this was a falsehood, yet in a few moments she produced the requisite proof. The author also suggests that immediately after the cessation of the menses milk is often secreted.*

3. *The suppression of the menses.* This may take place, as already stated, from disease, without the presence of pregnancy; and, again, it is asserted that the menses have continued in certain cases during pregnancy.

It is important to understand the diversity of opinion that exists on this last point. Dr. Heberden knew a female who never ceased to have regular returns of the menses during four pregnancies, quite to the time of her delivery.† Deventer mentions of one who became pregnant before menstruating, and immediately after her conception this discharge returned periodically, until her delivery; and this was the case during several successive pregnancies—inverting, as it were, the usual order of nature.‡ Dr. Hosack had a patient who, during her last three pregnancies, menstruated until within a few weeks of her delivery, and, notwithstanding, brought forth a healthy child at each labour.§ Additional authorities are given below.

vol. i. p. 267. A case by Dr. Montegré, in France: female aged 65.—*Cas rares*, in Dictionnaire des Sciences Médicales. A case by Mr. Semple, in England. The grandmother was 49 years old, and continued to menstruate regularly during the time of suckling.—North of England Medical and Surgical Journal, vol. i. p. 230. A case by Dr. Kennedy, in England, of a woman who gave suck uninterruptedly from the twenty-fifth to the seventy-second year of her age; and now, in her eighty-first year, had still a regular secretion of milk.—Medico-Chir. Review, vol. xxi. p. 202. A case communicated to Dr. Campbell by Dr. Steintal of Berlin—a grandmother of 63 suckling a grandchild for seven months.—Campbell's Midwifery, p. 493.

* Foderé, vol. i. p. 440. The following case occurred to the late Professor Post of New York: "A lady of this city (New York) was, almost fourteen years ago, delivered of a healthy child, after a natural labour. Since that period, her breasts have regularly secreted milk in great abundance; so that, to use her own language, she could at all times easily perform the office of a nurse. She has uniformly enjoyed good health, is now about thirty-five years of age, and has never proved pregnant a second time, nor had any return of her menses."

Dr. Shurtleff, in the Boston Medical and Surgical Journal, vol. i. p. 462, gives a case where the milk continued flowing for three years after delivery. Dr. Blundell mentions a similar instance in his Lectures.

Even men have suckled children.—See the Bishop of Cork's case in Philosophical Transactions, vol. xli. p. 810, where the father had fed his child in this way. The bishop examined the breasts, and found them very large. Humboldt and Bonpland saw a similar case in South America. The mother was sick, and the father, aged 32, put the child to his breast in order to quiet it,—milk shortly came. Another well authenticated case is mentioned by Captain Franklin, in his Journey to the Polar Sea, of a young Chippewyan, whose wife died in labour. "Our informant," says Sir John Franklin, "had often seen this Indian in his old age, and his left breast, even then, retained the unusual size it had acquired in his occupation of nurse."

Blumenbach gives a very rational explanation of this occurrence. The connexion between the uterus and breasts seems to depend on the anastomosis between the epigastric and internal mammary arteries, and this anastomosis exists in men as well as in women.—Medico-Chirurgical Review, vol xiii. p. 114.

† Commentaries.

‡ Foderé, vol. i. p. 437. Similar cases are mentioned by Baudelocque, &c.

§ Haller refers to similar cases vol. vii. part ii. p. 142. Of authors and

On the other hand, it is denied that this occurs. Dr. Denman deems suppression to be a never-failing consequence of conception. Dr. Davis is of opinion that *genuine menstruation has never existed during pregnancy.* The orifice of the uterus, he remarks, is then hermetically sealed; and it is incompatible with the safety of its contents, as is seen in the occurrence of hæmorrhage and premature discharge of the ovum. He is willing to allow (and this is the prevalent doctrine on his side) that cases of periodic discharge of blood occur, but not *menstruous:* it has an extra-uterine origin; and, as the parts are in a state of plethora, the vaginal branches of the uterine arteries may furnish it.*

Probably the last is the preferable explanation. It is most consonant with our ideas of the phenomena of pregnancy. When applied, however, in medical jurisprudence, we must recollect the remark of Dr. Gooch, that whether it be menstruation or periodical hæmorrhage, from the above cause, or from partial separation of the ovum, the female cannot discriminate; and, I may add, the examiner will often be in extreme doubt.

observers in favour of menstruation, or rather a periodical discharge, during a part or the whole of pregnancy, I may mention Baudelocque, vol. i. p. 230; Capuron, p. 63; Belloc, p. 62; Gooch, Diseases of Women, p. 203; Prof. Carus, American Medical Recorder, vol. 13, p. 421; Dr. Dewees; Dr. Blundell, Lectures; Dr. Power, Medico-Chirurgical Review, vol. ii. p. 413; Dr. Montgomery, Cyclopædia of Practical Medicine, art. *Pregnancy;* Dr. Kennedy, p. 12 (who also quotes a case from Mauriceau). Cases are related by Mr. Mayo (in Middlesex Hospital), London Medical and Surgical Journal, vol. iv. p. 179. Instances similar to those of Deventer are mentioned by Dr. Dewees, and by Stein, a German accoucheur, American Medical Review, vol. i. p. 411.

Dr. Maunsell of Dublin, in his report of the obstetric practice at the Wellesley Female Institution during 1832, remarks thus: "Three cases were noted, in which a species of menstruation occurred during pregnancy. In one, a discharge of blood, which the woman could not distinguish from the menses, took place regularly every twenty-eight days."—Edinburgh Medical and Surgical Journal, vol. xl. p. 301.

Dr. Campbell (Midwifery, p. 44), had a case in which menstruation was regular during six months after conception.

I subjoin the following as I find it: "Dr. J. P. Frank had under his care a woman who had three healthy children, and yet had never had either catamenia or lochia."—Quarterly Journal of Foreign Medicine and Surgery, vol. iv. p. 324.

* Davis's Obstetric Medicine, p. 253. Dr. Sims denied its existence, except in the form of manifest hæmorrhage.—Ibid. p. 257.

John Burns (edition of 1823) says the weight of authority is decidedly against menstruation during pregnancy. In several cases that came under his own observation, although the discharge had considerable periodical regularity, yet he always found it to consist of pure coagulable blood.—P. 139.

Dr. Hamilton of Edinburgh, according to Dr. Ryan, is of a similar opinion; so also are Hogben, Ashwell, and Ramsbotham. The latter, however, mentions in his lectures, that he has a patient who always menstruates once after having conceived, to her proper time, though very sparingly.—London Medical Gazette, vol. xiii. p. 268.

In the Boston Medical Magazine, vol. ii. p. 367, there is an interesting case given by Dr. Fisher, which I apprehend will assist in explaining this much discussed discharge. The female, ten weeks married, suffered under bloody discharges—at three weeks, and again at two weeks after that. For some time before her death, they were frequent. She died at the end of the above period; and although no impregnation was suspected, yet the case was found to be one of tubular pregnancy, and hæmorrhage from the placenta had been the cause of death.

Menstrual blood does not coagulate. I feel justified in asserting this on the authority of Burns, Denman, Gooch, Charles Mansfield, Clarke, Dewees, and a host of others; although I am aware that it is doubted and opposed by some.* Attention must, of course, be paid to this circumstance. It will be recollected that it was noticed in the case of Mary Ashford.

Dr. Lavagna of Milan ascertained that the menstrual secretion differed principally from blood, in containing little or no fibrine.† It is evident, however, on many accounts, that chemical tests are scarcely applicable in the present case. Not unfrequently the two discharges are blended together—some of the smaller vessels giving way at the very time that the secretion is going on.

I will add in this place, principally for the purpose of citing a case from Belloc, that pregnant females may feign menstruation by staining their linen with blood. This deception was attempted on him by a a girl three months advanced.‡ Dr. Montgomery of Dublin detected the pregnancy of a female, who for two months had thus stained her linen, by examining the areolæ. They exhibited the characteristic appearance so perfectly, that he charged her with the fact. She was so completely taken by surprise, as to confess it.§

Notwithstanding the exceptions stated, we should attach great importance to the *absence of the menses* as indicating pregnancy; and the remarks of Belloc on this point are deserving of great attention: "When a female experiences the suppression, along with other symptoms of pregnancy, we may consider her situation as yet uncertain, because these signs are common to amenorrhœa and pregnancy; but if, towards the third month, while the suppression continues, she recovers her health, and if her appetite and colour return, we need no better proof of pregnancy. Under other circumstances, her health would remain impaired, and even become worse."‖

4. I merely notice *loss of appetite, nausea, vomiting*, &c. &c. to state that they are equivocal. They accompany many diseases—are wanting in many pregnancies—and even if present, occur in the early stages, the time precisely when no certain judgment can be formed. There are, however, some points worthy of observation. If the sickness and vomiting occur only in the morning, and the patient is well during the rest of the day, it is suspicious. So also with *anasarcous swellings of the extremities.* If this comes on suddenly, and the patient is otherwise in good health, it is a sign of some importance, according to Dr. Blundell.

Dr. Denman was disposed to place much reliance on *protrusion of*

* Mr. Clarke exhibited some at his lectures, which had remained in a fluid state for years. A very full and able statement in favour of the opposite doctrine, by Dr. Manley, is contained in the New York Medical and Physical Journal, vol. iv. p. 67.

† Anderson's Journal, vol. i. p. 624. See also Med. Chir. Review, vol. xxiv. p. 95.

‡ Belloc, p. 65. "Il faut éxiger alors que les parties soient lavées avec de l'eau tiède; si le sang ne réparait pas, le cas est suspect."—Capuron, p. 81.

§ Cyclopædia of Practical Medicine, vol. iii. p. 472.

‖ Belloc, p. 60. Smith, p. 485.

the navel, in doubtful cases. It emerges, he observes, in pregnancy, until it comes to an even surface with the integuments of the abdomen. Mahon, Gooch, and Dewees, however, deny its infallibility. It occurs from dropsy, or any chronic enlargement. The reverse, however, may assist in some cases. If the umbilicus is depressed, and the abdomen soft and yielding, the existence of pregnancy is doubtful. It should be remembered that the protrusion seldom occurs before the sixth month; and the further the pregnancy is advanced, the more distinct it will be.*

5. Another sign that has been depended on, is the *motion of the fœtus in the womb of the mother*. It is wanting in the early months of pregnancy, but during the latter ones, may generally be ascertained. This sensation, however, which in real pregnancy the female always mentions at an early period, is of course not spoken of in concealed cases, and it remains with the examiner to discover it by other means. To this end, he dips his hand in cold water, and applies it suddenly over the region of the uterus. If the fœtus is alive, its motion will be felt, except, according to authors, where it is very feeble, or where the woman is dropsical. But, unfortunately, this sign is not infallible; the fœtus may be dead, or there may be twins, in which case the motion is sometimes not felt until a late period. On the other hand, flatus in the bowels, nervous irritation,† or a mole in the uterus, has been mistaken for it. A case, shewing the uncertainty of its occurrence, is related by Capuron. A female, with a very large abdomen, was

* I may add in this place one or two other equivocal signs, but which should not be overlooked in a medico-legal investigation. If present, they assist in completing the mass of evidence. The appearance of the blood is generally sizy. —Blundell. This, however, is denied by Montgomery. The secretion from the salivary glands is often viscid, of a white and frothy appearance, and sometimes so much increased in quantity as to constitute salivation.

A chemical test has lately been announced by M. Nauche of Paris, although it is not altogether original with him. He asserts, that by allowing the urine of pregnant women to stand for some time, there will form a white flaky pulverulent matter, being *the caseum, or peculiar principle of milk formed in the breasts during gestation*. In a case where the stethoscope and an examination *per vaginam* failed, he was enabled, it is said, to predict the presence of pregnancy. — Lancet, N. S. vol. viii. p. 676. Dr. Montgomery repeated the experiment with success in several cases; the peculiar deposit appearing as if a little milk had been thrown into the urine, and which was partly deposited and partly floating. Mr. Kane, at the request of Dr. Kennedy, made a similar examination, and found the white flocculent precipitate not only in the urine of pregnant women, but also in equal quantity from that of a female of fourteen, and a woman nursing for two months.—Kennedy, p. 57. It is evidently an equivocal sign.

† Many of the French writers on midwifery speak of a "*fausse grossesse nerveuse*."

"The name of simulated pregnancy has been given to some cases of hysteria, in which the abdomen enlarges gradually, sickness occurs, and so many signs of an impregnated uterus are present, that time alone can solve the doubts they raise. The catamenia are suppressed, the breasts are tumid, and there is pain in the back." Mr. Tate says of these cases: "In what this enlargement consists I am utterly ignorant; that it is not merely a mere accumulation in the colon I know, that it is substantial I am equally sure." It is, we apprehend, a mixed state of vascular fulness and tympanitic distention. — Cyclopædia Pract. Med. art. *Hysteria*, by Dr. Conolly.

received into one of the hospitals of Paris. She was visited by many distinguished accoucheurs, surgeons, and physicians. Some declared that she laboured under ascites—others, that a schirrous and dropsical ovarium was present. An abdominal pregnancy was also suspected, but no one believed it to be real pregnancy, since no motion of the fœtus could be felt. The woman was kept on light food, and innocent remedies were administered. The volume of the abdomen enlarged, and at last, after three weeks of examinations and consultations, a strong and healthy child was born.*

It may also be simulated. Dr. Blundell relates of a case, in his lectures, which was examined by Lowder, Mackenzie, and other celebrated accoucheurs of their day, and where the female had attained such skill in counterfeiting, that they declared they would have been deceived, if they had not by personal examination found the uterus unenlarged.

The motion of the fœtus, when felt by the mother, is called QUICKENING. It is important to understand the sense attached to this word formerly, and at the present day. The ancient opinion, and on which indeed the laws of some countries have been founded, was, that the fœtus became animated at this period—that it acquired a new mode of existence. This is altogether abandoned. The fœtus is certainly, if we speak physiologically, as much a living being immediately after conception, as at any other time before delivery; and its future progress is but the developement and increase of those constituent principles which it then received. The next theory attached to the term, and which is yet to be found in many of our standard works, is, that from the increase of the fœtus, its motions, which hitherto had been feeble and imperfect, now are of sufficient strength to communicate a sensible impulse to the adjacent parts of the mother. In this sense, then, quickening implies the first sensation which the mother has of the motion of the child which she had conceived.†

A far more rational, and undoubtedly more correct opinion, is that which considers quickening to be produced by the *impregnated uterus starting suddenly out of the pelvis into the abdominal cavity.* This explains several peculiarities attendant on the phænomenon in question—the variety in the period of its occurrence—the faintness which usually accompanies it, owing to the pressure being removed from the iliac vessels, and the blood suddenly rushing to them—and the distinctness of its character, differing, as all mothers assert, from any subsequent motions of the fœtus. Its occasional

* Capuron, pp. 73, 74. There are cases, "though rare, where it does not occur during the whole of pregnancy, although the child has been born alive and vigorous. Of this I have known one instance, and read of others."—Gooch, Diseases of Women, p. 203. A case that occurred to Baudelocque and Vicq. D'Azyr is related in Dict. des Sciences Méd. vol. xix. by Murat, art. *Grossesse.* Dr. Kennedy corroborates this by his own experience, and also gives some striking instances of self-deception.—Pp. 25–27.

Again, suppose, in a doubtful case, that pregnancy has actually happened, but after a time the fœtus dies and is retained.

† See Denman, &c.

absence in some females is also readily accounted for, from the ascent being gradual and unobserved.*

This subject will again be noticed in the chapter on Abortion. At present it will be sufficient to remark, that considerable variety occurs as to the *time* of quickening. Dr. Denman observes, that it happens from the tenth to the twelfth week, but most commonly about the sixteenth after conception. Drs. Dewees and Blundell agree that it most generally occurs nearer the fourth than the third month. Roederer kept a register of 100 women, as to the period of probable impregnation, quickening, and delivery. Of these, eighty quickened at the fourth month, a part of the rest at the third, and the remainder went to the fifth.† Dr. Montgomery found the greatest number of instances to occur between the end of the twelfth and sixteenth weeks. ‡ Again, Puzos, a celebrated continental accoucheur, says, that it takes place at the end of two months, but most commonly at the expiration of eighteen weeks. Hydropic women, he adds, do not observe it until the sixth or seventh month.§ And in a late trial for abortion in England, the medical witness deposed that it took place at eighteen weeks, sometimes in fourteen, and sometimes not till twenty weeks, but mostly at eighteen. That he never knew it so late as twenty-five, though it might happen in some cases at twenty-one or two.‖

This discordance in the observations of physicians is readily explained, by recurring to the cause just now assigned. And we may reasonably suppose that the motion in question will be soonest felt when the developement has been most rapid. The practical deduction respecting it, in a case of supposed pregnancy, is not to pronounce a female unimpregnated because it cannot at once be felt. The examination should be frequently repeated, before a decisive opinion be given.

6. Connected with the previous sign is an *alteration in the state of the uterus;* and this is ascertained by what is called the *touch.* It is founded on the following physiological facts. After conception, the fundus and body of the uterus both increase, and the former, from its becoming heavier, will naturally descend lower down in the pelvis, and thus project further into the vagina. The uterus remains in this situation until it becomes so large as to rise out of the pelvis; and

* Mr. Royston appears to have been the first that satisfactorily developed this opinion to the public, although he gives the credit to Dr. H. S. Jackson, of originally advancing the idea. See his paper copied from the London Medical and Physical Journal, in Eclectic Repertory, vol. iii. p. 25.

Writers on Midwifery are embracing this opinion. See Conquest, p. 38; Hogben in London Med. Repository, vol. i. p. 146; Blundell and Burns; Lancet, N. S. vol. iii. p. 104; Dr. James in Burns's Midwifery, 1823, vol. i. p. 208; Morley, p. 206; Campbell, p. 489; Davis, p. 854. Dr. Dewees is, however, opposed to it; Dr. Kennedy suggests that it may arise from either cause.—Page 23.

† James's Burns, vol. i. p. 208.

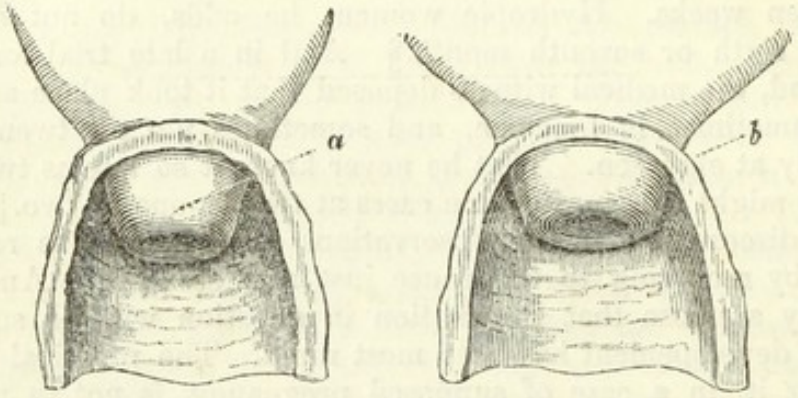
‡ The earliest case that he has met with was one of eleven weeks and two days. "If the woman has quickened she has passed sixteen weeks at least, and is probably near eighteen."— Ramsbotham's Lectures; London Medical Gazette, vol. xiii. p. 551.

§ Foderé, vol. i. p. 446.

‖ Edinburgh Med. and Surg. Journal, vol. vi. p. 248.

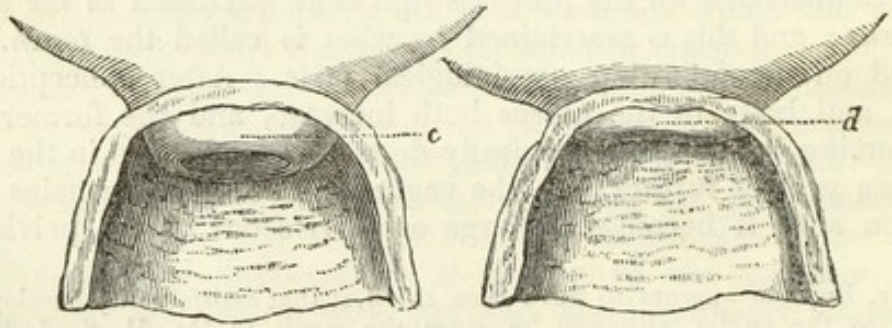
accordingly, this temporary abbreviation of the vagina is a sign of pregnancy, though, of course, an equivocal one. The body of the uterus enlarges. The changes in the neck are also striking. In the unimpregnated state it projects into the vagina about two-thirds of an inch, like a thick, firm, and fleshy nipple. At the termination of pregnancy, this neck is completely obliterated; the portion of uterus which lies over the top of the vagina, no longer projecting into its cavity, but forming a flat roof.

This obliteration generally commences, in a first pregnancy, about the fifth month; but in females who have had several children, the neck yields more readily, and accordingly with some it is as much altered at the fourth, as it is in the previous case at the sixth month.* The progressive changes will be best shewn by copying the accompanying sketches from Dr. Gooch's work on the diseases of women.



a. The neck of the uterus before the fifth month, when it has undergone no change in its length.

b. The neck at the sixth or seventh month, when it has begun to shorten.



c. The neck at the eighth month, when it is nearly obliterated.

d. The neck at the end of the ninth month, when it is quite obliterated.

During the period of these alterations the vagina is more elongated, since the uterus rises further up; but towards delivery, this viscus gradually re-descends. The os uteri also varies with the

* Gooch, p. 213. Velpeau corroborates this, and states expressly that repeated observations and the most carefully conducted experiments have shewn him that the changes which the cervix uteri undergoes during pregnancy, vary almost as much as its anatomical characters in the unimpregnated females.—London Medical Quarterly Review, vol. iii. p. 92.

changes in the cervix. The lips gradually flatten and disappear, and towards delivery, a small rugous hole only is discoverable.*

Now, with a knowledge of these facts, we may proceed to an examination to ascertain their presence. Having evacuated the bladder and intestines, the female is laid in such a position that the muscles of the abdomen may be in a state of relaxation. The fore and middle fingers of the right hand are then introduced into the vagina, whilst the abdomen is to be felt with the left. The orifice of the uterus, its neck, and body, are then examined, and having hold of the uterus, it is gently moved, until motion is perceived.†

This investigation, it will be perceived, elucidates the state both of the womb and of the fœtus. It is certainly one of the most unequivocal modes of ascertaining pregnancy; but it requires long habit to become expert at it, and this few practitioners will have an opportunity of obtaining. The most distinguished accoucheurs have been, and probably will continue to be deceived, with it. Of this, the works of Mauriceau and Baudelocque bear testimony; and Foderé relates a case which should make every physician distrust his skill. In a hospital where he attended, a female was detained on suspicion of being pregnant. Several medical persons visited and examined her. Some declared that she was in the eighth month of pregnancy, while others denied that she had ever conceived. She was kept in the hospital during a whole year, and was then dismissed as large as ever.‡

There are also some varieties in the conformation of parts that render this sign useless or unavailable. The neck of the uterus is oftentimes seated very low, both in married and unmarried females, while in others it is almost out of reach. Moles and hydatids, with several other affections, also produce an increase in the volume of the uterus, and an examination by the touch may give an impression very similar to that of a child contained in it. But above all, the value of it is diminished from the fact, that it can be made with most readiness at the early stages of pregnancy, when the uterus is low down; while, at the seventh month, the uterus has risen high up, and can be examined with much greater difficulty. It can thus be applied with greater certainty of success only at periods when our opinions, at the best, must be doubtful.

7. I have until now omitted all mention of another proof of pregnancy, which I am inclined to believe will, before long, be deemed the most infallible one,—I allude to the results attained from the application of AUSCULTATION to the impregnated uterus.

Dr. Kergaradec, of Paris directed by the brilliant discoveries of

* Denman, W. Hunter, Burns. The os uteri is also found closed with a gelatinous matter.

† Foderé, vol. i. p. 450; Smith, p. 485. The examination may also be made in the standing posture.

‡ Foderé, vol. i. p. 451. Capuron mentions another case, in which both Corvisart and Baudelocque were mistaken. One said it was encysted dropsy with extra-uterine pregnancy; and the other, that it was an enormous schirrus of the uterus; and yet in three weeks a large and healthy child was born.—London Medical Quarterly Review, vol. ii. p. 274.

Laennec, was the first who fully noticed this subject.* In a memoir read before the Royal Academy of Medicine in 1821, and published in 1822, he developed the leading facts, and has left scarcely any thing to future observers than to verify and strengthen his inferences.

The indications of the presence of a living fœtus in the womb, as derived from auscultation, are two:—1. *The action of the fœtal heart.* This is marked by double pulsations, and it greatly exceeds in frequency the maternal pulse. In the first case noticed by Kergaradec, it varied from 143 to 148 in a minute, while the pulse of the mother was not more than 70. These pulsations may be perceived as early as the fifth, or between that and the sixth month. Their situation *varies with the position of the child;* and, accordingly, they are more distinct at one time than another in the same place, and in different places at different times. Their most general situation, however, is the lower part of the abdomen. The space over which they are perceptible at the later period of pregnancy is about a foot long, and three or four inches broad, and their intensity, of course, corresponds with the nearness of the observer to the source of the sounds. In the early months they are necessarily less manifest in each respect. The fœtal circulation does not appear to be affected, in health, by agitation in the maternal. It varies from 120 to 160 in a minute, always far exceeding, as already stated, that of the mother. The only opposite case ever noticed was that by Dr. Ferguson, in which the fœtal heart was distinctly heard to beat only twenty-eight,† and the mother's one hundred. From its rareness, it is possible that some peculiarity in structure may have been the cause. Dr. Kennedy, however, relates instances in which the mothers were labouring under disease and the loss of blood, either by hæmorrhage or venesection, produced striking changes in the fœtal circulation.

2. The second auscultatory sign of the presence of the fœtus has been variously termed the *placental sound*, the *placental bellows sound*, and the *utero placental soufflet*. It is generally agreed that its seat is in the enlarged vessels of that portion of the uterus which is immediately connected with the placenta. Laennec remarks, that it is evidently an arterial pulsation perfectly isochronous with the pulse of the mother, and accompanied by a rushing noise, resembling the blast of a pair of bellows. The place which it occupies never changes; but it varies in different individuals, and is seldom so large in extent as the space in which the fœtal heart is perceptible. The time at which it commonly begins to be heard, is the fourth month, or as soon as the fundus of the uterus has risen above the upper brim of the pelvis, so that it can be brought in contact with the abdominal parietes by the pressure

* Dr. Mayer of Geneva, stated in the Bibliothèque Universelle, previous to the publication of Kergaradec, that the fact of the fœtus being alive near the termination of pregnancy, might be ascertained by applying the ear to the abdomen of the mother, the pulsations of the heart being then very perceptible. — Kergaradec's Memoir, p. 36.

† Dr. Hayes, in his edition of the Select Medico-Chirurgical transactions, gives the number as in the text. Dr. Forbes, art. *Auscultation*, in Cyclopædia of Practical Medicine, mentions twenty. Not having the original, I cannot say who is right.

of the extremity of the stethoscope.* It is said to be even louder then than at the full term. Certainly at later periods the sound is duller, more diffused, and no longer gives the sensation of being confined to a single artery. Dr. Ferguson observes, that he has most frequently found the placental sound in either iliac region, although he has detected it in almost every part of the abdomen.

"The noise of the placenta, and the action of the fœtal heart, are commonly found on opposite sides of the body. This, however, is not constantly the case, for sometimes both the phenomena are audible on the same side, and, in one case, Laennec and Kergaradec perceived the heart's action behind that of the placenta—the place where they were examined, being the interior part of the hypogastric region."

In a case of twins, Laennec detected the pulsations of two fœtal hearts by the stethoscope, previous to delivery.

It must not, however, be imagined that this investigation can be made without attention, or that it is not occasionally liable to doubt. The examiner should be a person well versed in the use of the stethoscope; he should be cautious not to express a positive opinion in medico-legal cases before the fifth month has passed; and he must recollect that in some, the fœtal pulsations cannot at once be observed; in other instances, sometimes hours, and even days, elapse without detecting them, although they had been already noticed. This is attributed to feebleness in the child, to its removal from that side of the body over which its body rested, or to a very copious secretion of liquor amnii. This last will, at all events, render the sounds feebler. They must not be confounded with the action of the mother's heart, which is often distinctly audible in the region of the uterus,† with intestinal motions, or with muscular contractions, produced by the pressure of the stethoscope. Dr. Ferguson suggests, that possibly pulsations in the iliac arteries, accompanied with the bellows sound, might be mistaken for the placental soufflet. These, however, he adds, would only be noticed in the groin, whereas the noise of the placenta will be heard over a space of some inches in extent. Again, if the placenta be attached to the posterior part of the uterus, especially towards its neck, the thrill may be beyond the reach of the instrument.

The examination may be made either in the standing, sitting, or horizontal position. The two last are, however, preferred. It has the advantage, that it can be used without removing the ordinary dress. Every thing in the shape of stays or corsets should, however, be previously put aside.

It is impossible to peruse the cases of Kergaradec, Laennec, Ferguson, Kennedy, Elliotson, and Dr. John D. Fisher of Boston, without attaching much faith to these combined signs. In many instances,

* According to Dr. Kennedy (pp. 80, 82), he distinctly detected it in the tenth, eleventh, and twelfth week. Drs. Montgomery and Velpeau have never succeeded until four months of pregnancy had been completed.

† In such cases, Dr. Kennedy found the sound to become more audible as it was traced from the fundus of the uterus into the maternal cardiac region, and the beats corresponded with the mother's pulse.—P. 116.

the female strenuously and indignantly denied the possibility of pregnancy. The fœtal and placental actions were, however, present; and in a few months the presence of labour satisfied every doubt. Kergaradec examined a female near her time: the simple soufflet was very manifest, but no double pulsation could be discovered. In a few days a fœtus, far advanced in putrefaction, was born. May we not conclude with Dr. Forbes, that although the absence of these signs is not an absolute test of the non-existence of pregnancy, yet their presence is almost infallible. They do not accompany any other known state or condition of the abdominal organs.*

The lengthened review that has been taken of the signs of pregnancy, sufficiently indicates the difficulty that attends the subject. I will not say, as in a previous edition, that there is *no invariable sign of pregnancy*, but I will repeat the caution there given, that the medical witness is called upon to prove its existence on oath. He is, accordingly, bound to weigh all the *possible causes* that may produce these symptoms, and he is to recollect the most of them have proved equivocal.† Even the last and the best will require frequent practice to

* The following authorities deserve perusal: The original Memoir of Kergaradec, Paris, 1822. American edition of Laennec, 1830. — Appendix. Cyclopædia of Practical Medicine, art. *Auscultation*, by Dr. Forbes. Dr. Ferguson on Auscultation, as the only unequivocal evidence of pregnancy, Dublin Medical Transactions; in Select Medico-Chirurgical Transactions, vol. i. p. 172. Dr. Kennedy on the Placental Soufflet—Dublin Hospital Reports, vol. v.; in ibid. p. 189. Dr. Adams on Auscultation in Difficult Labour, from Dublin Medical Journal.—Boston Medical and Surgical Journal, vol. viii. p. 277. Dr. Montgomery, in Cyclopædia of Practical Medicine. Medico-Chirurgical Review, vol. ix. p. 607; vol. xxi. p. 163: a case is given where the pulsations (supposed to be fœtal) were only 128 in a minute. Deeming these too few, the pulse of the mother was examined, and found to be the same. No other sounds could be detected, and the female, as the event proved, was declared not pregnant. Dr. John D. Fisher, in Boston Medical and Surgical Journal, vol. iii. p. 97. Mr. Probart, in London Medical Repository, April, 1828. Dr. Elliotson, in Lancet, N.S. vol. vii. p. 656: a supposed case of dropsy shewn to be pregnancy by the stethoscope. Dr. Nagele: cases of twins. —Lancet, N.S. vol. vii. p. 232. This author denies that the placental sound is a safe test of the presence of pregnancy: he states that he has met with it when no placenta was present. Dr. M'Keever, on the information afforded by the stethoscope in detecting the presence of fœtal life. — Lancet, N.S. vol. xii. p. 715. Dr. Hohl, on Obstetric Auscultation.— London Medical Quarterly Review, vol. ii. p. 83. And last, but among the most important, Dr. Kennedy's separate work on Obstetric Auscultation. For some facts tending to weaken our confidence in this mode of examination, see Dr. Maunsell, in Edinburgh Medical and Surgical Journal, vol. xl. p. 302. It would also seem that Velpeau does not agree in considering the *soufflet* as peculiar to pregnancy, "as it has been heard in cases where the uterus contained a simple tumour, or even where the ovary was the diseased part."—Lancet, N.S., vol. xiv. p. 246. Capuron is also a disbeliever in auscultation.

† Mary Heath was tried before the Court of King's Bench in Ireland, for perjury in the great Annesley cause. The object of this cause was to ascertain whether James Annesley was the son of Lord Altham. On the trial of Mary Heath, Dr. Samuel Jemmat, an aged and respectable practitioner, testified that he had formerly been consulted by Lady Altham, and found her with child: she had all the usual symptoms. One of the counsel asked him, "Upon your oath, sir, are there any rules in your profession, by which a pregnancy can be discerned from a tympany, or any other like disorder? *Answer.* By virtue of my oath, *that question would puzzle not only the Colleges of Physicians of England and Ireland, but the Royal Society too. Jury.* Is there such a thing as a false conception? *A.* Very

enable the physician to speak with certainty. The female, also, in most of the cases, conceals her knowledge of symptoms. It is evident, therefore, that nothing can be lost, but much may be gained, by delay, —that the examinations should be frequently repeated, and that an opinion should seldom be hazarded before the end of the sixth month. When it is recollected that he may have the life of a fellow-being, or her property, at his disposal, surely he will not desire to be in haste on so important a subject.* At the period mentioned, however, he may venture to give a nearly decisive opinion, if it be founded on the presence of most of the leading signs that have been enumerated.

A few remarks are here necessary with respect to *extra-uterine pregnancy*. The early symptoms of it are generally the same as in common gestation: the abdomen and uterus enlarge, the menses are suppressed, the breasts increase in size, and very often the child quickens at the proper time, but is moré felt on one side than the other. The distension is also unequal—not occupying the front of the abdomen, as in true pregnancy, but inclining either to the left or right. Severe pain, owing to the violent and preternatural distension of the narrow parts in which the ovum is confined, is also a common attendant. The body of the uterus enlarges often in particular parts, and sometimes throughout its extent; but I do not find alterations in the cervix particularly noticed. At the end of eight, nine, or ten months of gestation, appearances of labour come on, and continue for a longer or shorter period of time; the motions of the child cease, and milk is secreted. The case terminates sometimes in death, from the irritation produced; sometimes the fœtus is voided by the natural passages, while again it will remain in the abdomen for years without affecting the health.†

often; a mola, there is. *Q.* Are the symptoms the same? Have women grown big with a false conception? *A.* They have done it."—Hargrave's State Trials, vol. ix. p. 463.

"Concludamus ergo, ex prædictis; quod certa pregnantiæ cognitio ex nullis signis indubitato haberi potest, sed bene conjecturalis ac dubia; nullum enim signum tam proprium pregnantiæ habemus, quod ex aliqua præternaturali causa originem haberi non possit."—Zacchias, vol. i. p. 90.

"Toute notre sagacité, misé en œuvre, ne peut nous fournir aucun signe invariable qui déterminé l'éxistence du fœtus dans la matrice."—Mahon, vol. i. p. 141.

"The verification of the pregnant state cannot depend on the importance due to any *particular* sign: it must depend on the existence of several."—Smith, p. 484. See also Foderé, vol. i. p. 433; Capuron, p. 81.

* Cases are said to be mentioned by various writers, as Ambrose Paré, Mauriceau, &c., where female criminals have been executed on the decision of examiners, that pregnancy was not present; and, notwithstanding, a fœtus has been found after death. The following, from Deveaux, is a melancholy example: In November 1655, in France, several midwives examined a female under sentence of death, and deposed that no sign of pregnancy was present. She was executed; but on dissection, a fœtus of the third or fourth month was discovered. The midwives were severely admonished by the magistrates; and it was decided, that whenever a female declared herself pregnant, her punishment should be delayed for a sufficient length of time to determine the certainty of the fact.—Foderé, vol. ii. p. 444.

† A very full collection of references to cases of extra-uterine pregnancy will be found in the Notes to Burns's Midwifery. See also the Philosophical Transactions, *passim*; and Foderé, vol. i. p. 453. Professor James on Extra-Uterine Pregnancy,

Should the physician, as a medical jurist, suspect the presence of a case of this kind, he can do nothing more than desire a delay until the supposed termination of the gestation. The proofs are not so infallible, but that a fœtus in utero may possibly be present.

The most difficult case of concealed pregnancy that probably can occur, is when it is accompanied with ascites. The motion of the fœtus cannot be perceived; and it is also added by Foderé, that the uterus does not take on its ordinary developement. Yet many cases are on record, where females, with this disease on them, have been delivered of healthy children. In suspected cases, the practitioner should weigh the symptoms, and ascertain whether they are all referable to the disease; his medicines should be mild, and patience practised as to the event. In many cases, the difficulty may be solved by the application of the stethoscope.*

In the sketch now given of the signs of real pregnancy, most of the remarks are directly applicable to concealed or pretended cases. With respect to the latter, I may observe, that in addition to the circumstances already enumerated, the following should also be noticed:

1. *The age of the individual.* It is generally conceded that no female can be impregnated, in our own climate, under the age of thirteen, nor above that of fifty, provided she has been previously barren. This, however, is only to be taken as a general rule, subject to exceptions.† The presence of menstruation, in every country, constitutes the state of puberty; and the irregularity of its occurrence is noticed by most practitioners. It is to be regretted, however, that so few have given the result of their observations. Out of 450 cases investigated at the Manchester Lying-in Hospital in England, the following results were obtained:

in the North American Medical and Surgical Journal, vol. iv. p. 277; Dr. Ramsbotham in Medico-Chirurgical Review, vol. xxi. p. 310. A very remarkable case of pregnancy succeeding to an extra-uterine case, and in which the latter was some years after discharged by an opening at the umbilicus, is given by Dr. Montgomery, Cyclopædia of Practical Medicine, vol. iii. p. 492.

* There are many cases on record of pregnancy complicated with ascites. A Memoir, by Scarpa, in Quarterly Journal of Foreign Medicine and Surgery, vol. i. p. 249. He operated with success, and twins were subsequently safely delivered; they died, however, soon after. See Medico-Chirurgical Review, vol. v. p. 500; vol. vi. pp. 265, 506; vol. x. pp. 234, 270: Edinburgh Medical Essays, vol. vi. p. 137: Langstaff in Medico-Chirurgical Transactions, vol. xii.: North American Medical and Surgical Journal, vol. iv. p. 190: Lancet, N. S. vol. ix. p. 117. In most of these the operation for paracentesis was performed, and living children born; they did not, however, usually survive any time.

† Many cases of births in advanced age are on record. See Capuron, pp. 93, 98. The succession to an estate was disputed in France, because the mother was fifty-eight years old when the child was born. It was decided in favour of the applicant, because similar instances are mentioned by ancient and modern writers. Smith, p. 493, mentions cases of early and late fecundity. I quote the following, because it happened lately:—"May 1816, Mrs. Ashley, wife of John Ashley, grazier, of Firsby near Spilsby, at the age of sixty-four was delivered of two female children, which, with the mother, were likely to do well."—Edinburgh Annual Register, vol. ix. Part II. p. 508.

For several instances of menstruation at advanced periods of life (between seventy and eighty-seven years of age), I refer to Mr. Semple's paper in the London Med. Gaz. vol. xv. p. 467.

The menstruation began

in the eleventh year, in	10	sixteenth, ...	76
twelfth, ...	19	seventeenth, ...	57
thirteenth, ...	53	eighteenth, ...	26
fourteenth, ...	85	nineteenth, ...	23
fifteenth, ...	97	twentieth, ...	4

Again, out of 10,000 pregnant females registered at the same hospital, 436 were upwards of 40 years of age;

397 from 40 to 45;
13 in their 47th year;
8 48
6 49
9 50
1 52
1 53
1 ..... 54.

Mr. Roberton also adds, that so far as he could ascertain, and particularly in the three cases above fifty years, the catamenia continued up to the period of conception.*

* See Mr. Roberton's papers on the natural history of the menstrual function, in Edinburgh Medical and Surgical Journal, vol. xxxviii. p. 227; and also on the period of puberty, in North of England Medical and Surgical Journal, p. 69. Mr. Roberton endeavours to combat the prevailing idea that climate has an effect on the period of puberty. His historical testimony goes to shew that it sometimes is as early in northern as in southern countries; and if any general cause is to be assigned for precocity, certainly the one suggested by him, of early licentiousness, or even connexion, is the most probable. Mr. R. mentions the case of a girl who worked in a cotton factory, becoming pregnant in her eleventh year. When in labour she was seized with convulsions; but ultimately, without unusual difficulty, was delivered of a full-grown child, still born. The fact was perfectly ascertained by a reference to the church register, that at the time of her delivery she was only a few months advanced in her twelfth year. She menstruated before she became pregnant.

There are, however, some facts contradicting the opinion of Dr. Roberton, as in the following:—

"The author has known the instance of an European child who went to the East Indies at the age of six, in whom menstruation took place at the ninth year, and continued to occur regularly during three months; but the child then returning to a more temperate climate, the secretion ceased, and has not yet returned. The child is now twelve."—C. M. Clarke, Part i. p. 12.

"Heat, whether natural or artificial, seems to produce sexual maturity in the animal body, in a way, perhaps, analogous to that which it performs on the same principle in the vegetable kingdom. Bruce mentions, that in Abyssinia he has frequently seen mothers of eleven years of age. In Bengal I have seen many girls come to the age of puberty at that period, and sometimes a mother under the age of twelve. I formed an opinion, though perhaps I had not a sufficient number of facts to bear me out in it, that precocious pubescence was to be found more frequently among an unfortunate class of females, who are sold, when very young, by their parents, for the purpose of prostitution, and who being brought up in the stews, their passions are daily excited by voluptuous and licentious scenes. In Manchester and Glasgow, the girls who work in the cotton mills, which are of necessity kept at a high temperature, and where morality is not at a much higher pitch than in a Rhindy Ghurr in India, the same effect obtains."—Dunlop.

See also Davis's Obstetric Medicine, p. 226, &c. Dewees (Hays's Cyclopædia of

"In the statement sent to Parliament by Bartholomew Mosse, when endeavouring to procure a grant for the Dublin Lying-in Hospital, he mentions that eighty-four of the women delivered under his care were between the ages of forty-one and fifty-four; four of these were in their fifty-first year, and one in her fifty-fourth."*

Osiander noticed at Gottingen, out of 137 females, that 9 menstruated at 12, 8 at 13, 21 at 14, 32 at 15, 24 at 16, 11 at 17, 18 at 18, 10 at 19, 8 at 20, 1 at 21, and 1 at 24. At Paris, according to Velpeau, the function occasionally commences at 10, 11, or 12 years; but generally between 12 and 16.†

Although impregnation is supposed to depend on menstruation, yet there are cases on record, where females have become pregnant without ever menstruating. Sir E. Home, in the Philosophical Transactions of 1817, mentions the case of a young woman who married before she was seventeen, and although she had never menstruated, became pregnant. Four months after her delivery, she became pregnant a second time; and four months after the second delivery, she was a third time pregnant, but miscarried. After this, she menstruated for the first time, and continued to do so for several periods, and again became pregnant.‡

2. We should ascertain whether any of the causes of sterility, as already enumerated, be present.

Practical Medicine, vol. i. p. 344), denies the correctness of Mr. Roberton's opinion, from his own observations on this Continent; and there certainly cannot be a better field for examination. Dr. Ramsbotham also, I observe, in his lectures, doubts it.—London Medical Gazette, vol. xiii. p. 269.

Among extraordinary cases connected with the history of menstruation, I may refer to one occurring in Italy, where the function continued from the fifty-third to the ninety-fourth year, without injury to health.—American Journal of Medical Sciences, vol. vii. p. 513.

* Cyclopædia of Practical Medicine, vol. iii. p. 491. Dr. Montgomery adds a case, on the authority of Dr. Labbat of Dublin, of a female marrying at forty, and conceiving and bringing forth a living child for the first time when past the age of fifty.

† Velpeau's Midwifery, p. 84. Osiander's numbers amount to 143, and it is hence possible that there may be some misprint.

‡ See Foderé, vol. i. p. 396; Capuron, p. 96, for similar cases. Also, Moseley on Tropical Diseases, pp. 103, 104. "Ego habui amicam laudabilis temperamenti et complexionis, quæ octo filios tulit consequenter, id est, omni anno unum, nunquam tamen visa una gutta sanguinis menstrui."—Low, p. 523. Impregnatio nullis unquam præviis menstruis.—Stalpart, vol. ii. obs. 31.

"I knew a noble virgin, who being married before her menses, which had been expected for many years, appeared, was nevertheless very fruitful, and that we may be the less surprised thereat, the very same thing had likewise happened *to her mother*."—Morgagni, Epistle 47. Velpeau also mentions a case at Tours. Additional cases are quoted in Cyclopædia of Practical Medicine, art. *Pregnancy*, by Dr. Montgomery.

Dr. Dewees denies that impregnation can take place without menstruation.—P. 59. He attributes the rare cases noticed to some imperfection of the genital organs. The discharge may also in some instances have been colourless.

Cases of the absence of menstruation for several years previous to pregnancy are given by Professor James of Philadelphia.—Hosack's Medical and Philosophical Register, vol. iv. p. 222; by Dr. Hosack, Eclectic Repertory, vol. ii. p. 119; by Dr. Meriman, in Medico-Chirurgical Transactions, vol. xiii. p. 347; by Dr. Campbell, Midwifery, p. 49. He is acquainted with a female to whom eight children have been born at the full time "without having any monthly indisposition between any of the births."

3. Women often fancy themselves pregnant when the menses cease. This great change in the system often produces enlargement of the abdomen, nausea, and the breasts fill with a milky fluid. Caution is necessary in such cases, in giving a decided opinion; and Van Sweiten mentions two, which teach a valuable lesson. A female had a son when she was twenty-five years of age; twenty years after, she declared herself pregnant a second time. This was disbelieved by all, but it was verified in due season. Again, a female had been delivered of fourteen children, and might hence be supposed to be well acquainted with the signs of pregnancy. After the birth of the last child, the menses ceased for eight years; and at the end of this time, she supposed herself again pregnant; but a few months reduced her size, and shewed that she was mistaken. A torpid state of the uterus, combined with intestinal flatulence, appears to be the principal cause of these sensations. "At this time," says Dr. Gooch, "menstruation will often cease for several months, and the abdomen become distended with a flatulent tumour; the air moving about the bowels gives an inward sensation, which is mistaken for the child; there is often slight nausea, various nervous feelings and an anxiety to believe in pregnancy, as a test of youthfulness. About this age, also, the omentum and parietes of the abdomen often grow very fat, forming what Dr. Bailie once called "a double chin in the belly." This assemblage of symptoms at this age frequently leads to the supposition of pregnancy.* The case of Joanna Southcott is sufficient to shew the delusions that have happened, and undoubtedly will again happen.

4. There are various substances or fluids formed in the uterus, which cause the female to imagine that she is in this state. Of this description are moles and hydatids. The term *mole* does not appear to be very accurately defined. I shall understand by it, a fleshy substance contained within the cavity of the uterus—enveloped in a membrane, and generally filled with blood, although occasionally dry. On cutting into it, various parts, resembling an imperfect fœtus, will be observed. The symptoms produced, are at first very similar to those of pregnancy. The stomach is affected, and the breasts and belly enlarge. The latter, however, increases much faster, and is softer and more variable in size than in real pregnancy. It is sometimes as large at the second month, as in the fifth of perfect conception. The duration of this is uncertain; but the mole generally comes away at the third or fourth month, although in some cases it has not been evacuated until the sixth or seventh, and it is even said to have been retained for years.†

This term has also been applied to those coagula, which not unfrequently accompany the process of menstruation, and which appear to

* Gooch's Discourses of Women, p. 226. He adds, that he has met with similar cases in young women, owing probably to obstructed menstruation, but aggravated by mental agitation.

† A case came before the parliament of Paris in 1781, in which the female sued for damages for seduction. Twenty months after this was alleged to have been committed, she brought forth a mole. The parliament very properly decided against her, on the score of character; but they added, what may be questioned under the present acceptation of the term, *that unmarried females, and even nuns have discharged moles, without any previous criminal connexion.*—Foderé, vol. i. p. 477.

have remained so long in the uterus, as to have retained the fibrous part of the blood only. Many unmarried females discharge these, and they should be accurately distinguished from the former. The one is to be deemed the product of conception,* and the other not. And these

* "True moles are distinguished from the false, and other growths of the uterus, by their not deriving their origin from the substance of the womb, or its membrane; but by their being always the consequence of conception."—Voigtel's Pathological Anatomy in Edinburgh Medical and Surgical Journal, vol. xi. p. 99. "It is the opinion of many, that these substances are never formed in the virgin state, and no case that I have yet met with contradicts the supposition."—Burns, p. 79.

Madame Boivin divides all the species into three classes. 1. The false germ or blighted ovum. 2. The fleshy mole. 3. The vesicular mole (hydatids). Of fleshy moles, two kinds are described—one hollow in the centre, the other solid, in both cases a degeneration of the envelopes of the fœtus.—Edinburgh Medical and Surgical Journal, vol. xxxix. p. 217.

Dr. Ramsbotham is induced to believe that moles arise from a blighted ovum, which, though retaining its adhesion to the uterus, is in time converted into a solid inorganised mass, totally unlike any fœtal structure.—Med. Chirur. Review, vol. xxi. p. 314.

Fleshy moles. "Though *these substances are invariably the result of conception*, it is not certain that they are formed by the growth of the membranes subsequent to the death and expulsion of the embryo. In several cases of this description, no embryo was at any time discharged."—Cyclopædia of Practical Medicine, art. *Abortion*, by Dr. Robert Lee.

"Le developpement des masses d'hydatides," says Desormeaux, "est le plus souvent, sinon toujours, la suite de la conception."—Orfila, Leçons, 2d edition, vol. ii. p. 220. He says that Velpeau entertains a similar opinion. Candour, however, obliges me to add, that some observers believe that they may occur in chaste females.—Smith, p. 298.

Dr. Blundell thinks, that fleshy substances are formed in the uterus of pure females, which resemble in structure the placentar part of the ovum in the earlier months.—"To my knowledge, they form month after month in unmarried females of undoubted honour." In some instances, however, he allows that they are blighted ova, the result of intercourse.—Lancet, N. S. vol. iv. p. 225.

Murat, art. *Grossesse*, (Dictionnaire des Sciences Médicales) appears undecided; while in art. *Mole*, he advocates the prevailing idea.

The true distinction is, however, undoubtedly taken by Mahon, (vol. i. p. 274.) "The existence of moles, properly so called, (says he,) is extremely doubtful, since they may all be referred to some one or other of the substances of which we have spoken, viz. a placenta which had continued its growth, the fœtus having perished; the degenerated remains of the after-birth; coagulated blood; sarcomatous tumours or polypi of the uterus. The two first cannot exist, except after sexual intercourse; the other three may be found independently of it."

With Dr. Montgomery, to whom I am indebted for the reference, I entirely concur in this view, and add in his words, that no medical jurist would be justifiable in pronouncing any such mass expelled from the uterus, a proof of pregnancy, except he can detect in it either the fœtus or a part of it, or some other of the component parts of the ovum. But it must also be recollected, that in many of these cases no trace of a fœtus can be discovered, it having been completely destroyed, and only its membranes and the placenta continuing to grow for some time, and becoming thickened and fleshy, or filled with fluid.

Dr. Granville proposes a distinction in his work on Abortion in the following words: "What then is the distinction between a real mole and a coagulum, no matter of what species or variety the latter be? It is this: that the former has invariably a central cavity, wholly enclosed, *without any opening or aperture;* whereas the latter, let it be formed in any way you please, stratified, laminated, concentric, membranaceous, solid, hollow, or with a regular cavity lined with a membrane, no matter—will be found invariably to have at one of its extremities, an *aperture*, either leading straight into the inner cavity, where such an one exists, or simply passing from one membrane or stratum of coagulated blood to the next, until it

bloody coagula are wanting in the characteristics of a true mole, viz. the fleshy texture, and the enveloping membrane.

We have already remarked, that a true mole may be mistaken for real pregnancy during some months. By, however, attending to the following circumstances, the difficulty may, in some degree, be solved. The early and rapid increase in size of the uterus—the sensation of pressure, which often produces pain, and the want of motion when examining the uterus. This last, however, is seldom applicable, since the investigation is usually made in the early stages. Foderé adds, that the breasts are not filled with a milky, but with serous fluid, and that the female often experiences violent convulsive motions in her abdomen.* Occasional discharges of blood *per vaginam* during the gestation of the mole are not uncommon.

Hydatids, or *dropsy of the uterus*, which by many are considered as synonymous,† are generally supposed to proceed from coagula of blood, or from portions of the placenta, degenerated during the process of pregnancy.‡ There is, however, an opinion entertained by some

reaches the innermost, which is also perforated like the rest. This is a striking and important distinction, and I am not aware that it has been noticed or made public by any author before me."—P. 50.

* Foderé, vol. i. p. 469.

† See Denman, p. 148, and the opinions of Drs. Baillie and Sprengel there quoted in favour of this belief. Dr. James, Professor of Midwifery in the University of Pennsylvania has advocated a similar opinion.—Eclectic Repertory, vol. i. p. 499. See also Cyclopædia of Practical Medicine, art. *Hydatids*, by Dr. Kerr. vol. ii. p. 449.

"It is more than probable, that the cases described as dropsy of the uterus, have belonged to the class of hydatids; or if there be any such disease in fact as dropsy of the uterus, the author never has met with a case of it."—C. M. Clarke, part ii. p. 126. John Burns, however, considers them as distinct diseases; and the remarkable case of Dr. A. T. Thomson, (Medico-Chirur. Transactions, vol. xiii.) shews that hydrometra may occur, independent of hydatids. There is certainly one condition that is undoubtedly distinct from what we understand by *hydatids*. It consists in an enormous collection of the liquor amnii, to the amount sometimes of three or four gallons. Here a fluctuation may be felt as if the female were dropsical, and unless aware of the possibility of its occurrence, the operation might be rashly hazarded. Dr. Blundell suggests, as a discriminating circumstance, that the enlargement here is often very sudden. Its real nature, however, must be ascertained by an examination of the parts.

Dr. Haighton was sent for, to a case where, in the middle months of gestation, a female laboured under great swelling of the abdomen, which fluctuated distinctly. The surgeon associated with him proposed an operation. It was delayed, and during the night "the membranes which contained all this water burst of themselves, a flood of fluid was discharged, the abdomen rapidly collapsed, a fœtus issued not larger than the first joint of the finger, and the patient did well."—Blundell's Lectures, Lancet, N. S. vol. iii. p. 98.

Cases resembling the above, are related by Mr. Wildsmith, of Leeds. Lancet, N. S. vol. iv. p. 740; by Mr. Ingleby, in his work on Uterine Hæmorrhage. Medico-Chir. Review, vol. xxi. p. 218; by Dr. Ramsbotham, in his Observations on Midwifery; Ibid. pp. 312-314; by Mr. Fell, in Edin. Phys. and Literary Essays, vol. ii. p. 374.

‡ "As in other parts of the body, we find hydatids without there having been a connexion between the sexes, so in the uterus, I presume they may be formed without intercourse; *but in general, they are the result of impregnation.*—Blundell, Lancet, vol. iv. p. 226. It is probable that the existence of pregnancy is not necessary for the production of the disease.—C. M. Clarke, part ii. p. 115. Dewees (Diseases of Females, p. 298,) is of the same opinion.

writers, that they are occasionally an original production of the uterus. It is not necessary to proceed to a minute description of them; but we may observe, that usually these watery vesicles hang together in clusters, occupy a considerable space, and produce a corresponding distention. Their early symptoms are those of pregnancy.* The uterus enlarges—the breasts swell—milk is occasionally formed—sometimes there is an alternate discharge of serous fluid and blood from the vagina. Dr. C. M. Clarke considers the occasional and sudden discharge of an almost colourless and inodorous watery fluid as a diagnostic symptom, while Madame Boivin relies much on the want of the signs of a fluid in the uterus, or of a solid body floating in a fluid, when the patient is examined by the touch. At the accustomed time no motion is felt. There

Madame Boivin, however, in her Essay on the Vesicular Mole, opposes the idea of its consisting of hydatids, and deems it a degeneration of the impregnated ovum. In proof of this, she refers to the mass of vesicles being enveloped in a membranous sac, consisting of two layers, one resembling the decidua reflexa, and the other the amnios. Of course, she considers it invariably the result of sexual intercourse.—See her Nouvelle Recherches," &c. and Edinburgh Medical and Surg. Journal, vol. xxxiv. p. 382. To the question put in a former edition, *Whether there was any case in which an examination had been made on the virgin female labouring under this disease; and if so, whether the parietes of the uterus enlarged as in real pregnancy?* Madame Boivin at least gives an unequivocal answer: " En effet, il nous paraîtra toujours très difficile de déterminer d'une manière absolue l'état de virginité d'une fille, cloitrée ou non, chez laquelle s'est développé l'utérus comme dans une grossesse *fœtale de neuf mois.*" Not only the uterus, but all the organs sympathising with it, develope themselves; and whatever may have been the *antecedent* circumstances of the individual, these combined, say little in favour of her chastity.—Recherches, p. 20.

Velpeaux, in his recent work, observes, as the result of his numerous examinations, that " les hydatides en grappe de l'utérus n'étaient pas des vers vésiculaires, comme on croit généralement; mais bien le produit d'un œuf avorté, dont les petits corps gangliformes ont pris un accroissement qui ne leur est pas ordinaire."—Embryologie, p. 10.

To this testimony, I add the decided opinion of Dr. Montgomery, who, after quoting Baudelocque, Voigtel, Desormeaux, Velpeau, and Madame Boivin to the same effect, remarks, " Our own belief is, that uterine hydatids do not occur except after sexual intercourse, and as a consequence of impregnation. We never met or heard of a case in which their presence was not accompanied or preceded by the usual symptoms of pregnancy; and in every instance under our immediate observation, the women supposed themselves with child: and when the contents of the uterus were expelled, there was found either a blighted fœtus, or some other part of the ovum." To the argument from analogy, and which may be seen above in the observations of Dr. Blundell, he replies, that the hydatids in the respective cases greatly differ; and above all, that they are always formed in connexion with serous membranes, which do not exist in the uterus until the ovum is deposited there, whose membranes are essentially serous.

In the first number of Cruveilhier's Pathological Anatomy, are two plates illustrative of this disease, which strikingly elucidate its nature. The female had hæmorrhagic discharges, with pain, at the fourth month, which continued at irregular intervals until the seventh, when the placenta, transformed partly into a mass of hydatids, was discharged with severe pain. A fœtus of the size of the *fifth or sixth week*, was found by cutting into the chorion.

* Clarke, part ii. p. 118. Edinburgh Medical and Surgical Journal, vol. xxxiv. p. 382. Davis's Obstetric Medicine, p. 677. This author is also very decided in his opinion: " They are generally the accompaniments, as also probably the results, of blighted and other diseased forms of eventually unproductive gestations; or, if we admit the fact of their being ever produced independently of any connexion with a contemporaneous gestation, the author feels disposed to the opinion that they must be the results of conceptions of antecedent dates."

is no certain time for their discharge. Often, however, they do not come away until some period after real pregnancy would have been accomplished. Their expulsion is attended with pain, often of the severest kind, and generally with hæmorrhage.* An instructive case is related by Dr. Eights, where the female conceived herself pregnant, but felt no motion, and at the end of eight months, was seized with pain, and occasional watery discharges. This continued some time, and then ceased. A month after, she was attacked with labour-pains, and discharged about a gallon of hydatids. On the third day after this, there was a copious secretion of milk.† Mauriceau also states the case of the wife of President de Nemours, who was considered pregnant a whole year, and at last was relieved by a copious watery discharge.‡

5. It is proper to mention that *membranes* are sometimes expelled in *dysmenorrhœa*, which have given rise to a suspicion of pregnancy and early abortion. This is accompanied by severe pain, a red discharge, and the substance thrown off somewhat resembles the decidua. But the history of the case will enable us readily to decide. All the appearances of pregnancy are wanting—the discharge recurs at every menstrual period—the membrane is slight in its texture, wants the vascularity of the true decidua, and never contains any of the transparent membranes of the ovum. Many unmarried females are periodically subject to this severe disease.§

6. A collection of air in the womb has sometimes led to mistakes as to the presence of pregnancy. This has been variously styled *physometra*, *tympanites*, and *emphysema of the womb*. In 1798, a female

* Mr. Watson (Philosophical Transactions, vol. xli. p. 711,) relates a case of this description, in a female forty-eight years old. There was no enlargement of the abdomen or of the breasts; and she attributed her symptoms to a cessation of the menses. The hydatids were united, like a cluster of grapes, to a spongy substance.

† American Medical and Philosophical Register, vol. iv. p. 519. (Dr. Davis's reference to this case is incorrect: See p. 679 of his works.)

For additional instances, see Dr. William Moore, in New York Medical and Physical Journal, vol. i. p. 151.—Dr. James Clarke, in Edinburgh Med. and Surg. Journal, vol. v. p. 257; Ibid. vol. xxix. p. 217. (A case from Rust's Magazine.)—Mr. Wildsmith, in Lancet, N. S vol. iv. p. 739.—Mr. Cussack, in Dublin Hospital Reports, vol. v.—Madame Boivin's Essay.

Several instances are also related in Dr. Rutter's valuable essay on the case of Miss Burns, which I shall notice hereafter.

When the question relative to the origin of moles and hydatids shall be settled, we shall be better enabled to answer the question lately put in the Boston Medical and Surgical Journal, vol. viii. pp. 71, 124, *Whether hæmorrhage from the unimpregnated uterus ever occurs?* The first discharge of blood in several cases collected by Madame Boivin, is as follows:

2 at 45 days,	1 at 6 months,
1 at 2 months,	1 at 7 months,
4 at 3 months,	1 at 8 months,
2 at 4 months,	1 at 11 months,
1 at 5 months,	1 at 14 months.

The length of time in the last of these cases should be remembered, as it may occur in a widowed female, and unjustly impugn her chastity.

‡ Foderé, vol. i. p. 473. This author suggests, that if water be contained in the uterus, by raising it on the point of the finger, a fluctuation more or less distinct will be perceived.

§ Cyclopædia Pract. Med. vol. iii. p. 488.

in the Royal Infirmary at Edinburgh stated that she was in labour. According to custom, a house pupil was sent to attend her, which he did very faithfully for two days and two nights. At the end of that period, he sent for Dr. Hamilton, the professor of midwifery, who examined her, and much to the mortification of both the student and the woman, declared that she must become pregnant before she could be delivered. She was labouring under this disease.

An interesting case is related by Dr. Ray of Eastport, Maine. It made its first appearance during a second pregnancy seventeen years ago, and from that time to this, the patient has never been free from it—whether impregnated or not. In the latter state, however, no inconvenience is experienced—in the former, there is always severe pain. Sometimes, but not always, the air is discharged with a crepitus—and as often as twice or thrice a week. This, however, varies, and she has never observed it to accumulate, so as to produce any perceptible enlargement of the abdomen. The most intense pain occurs after quickening.*

Cases of pretended pregnancy have occasionally excited considerable attention, from peculiar circumstances attendant on them. Of this nature was the instance of Bianca Capello, the mistress of the Prince of Tuscany, who, in order to gratify his wish of having an heir, feigned herself pregnant, and at the expected period, introduced the child of another as her own. And in more modern times, Joanna Southcott, at the age of sixty-five, declared herself pregnant, and was believed by her followers in England—nay more, she even found medical men who attested to it, although she stated at the same time that she was a virgin. Her death, however, occurred previous to the expected delivery, and on dissection, no traces of pregnancy could be discovered.†

The laws on the punishment for concealed pregnancy will be introduced with most propriety in the chapter on Infanticide.

* Boston Med. Magazine, vol. i. p. 233. See on this disease, Burns, p. 82; Denman, p. 148; Gooch, Diseases of Women, p. 242; a case by Mr. Wray, in Lancet, vol. xii. p. 396; Medico-Chir. Review, vol. xix. p. 512; two cases from an Italian Journal: one of these imitated pregnancy in some respects; but at the sixth month it dissipated.—Ibid. vol. xxii. p. 418; Review of Madame Boivin, Lee, in Cyclopædia Pract. Med. vol. iv. p. 383.

There are some diseases to which the uterus is liable, that may occasionally be mistaken for pregnancy. Of these, Dr. C. M. Clarke mentions the *fleshy tubercle*. All, however, are slow in their progress, soon become painful, and are generally unaccompanied with affections of the stomach and breasts. They arrive at their height long after pregnancy should have been completed. The very fact of enlargement continuing more than five months, is, according to Gooch, a strong argument against its presence.

Let us also not forget, that some morbid conditions of the uterus, are compatible with pregnancy. Thus carcinoma, particularly of the cervix uteri, and even in the ulcerative stage, has occurred to Drs. Clarke, Kennedy, and others; and so also cauliflower excrescence of the uterus.—Kennedy, p. 144.

† Edinburgh Review, No. xlviii. Art. 11. In the stormy period that preceded the abdication of James II., it seems to have been a favourite opinion among the protestants, that the pretender (as he is now styled in history) was a supposititious child. The proof in favour of this may be found in Burnet's History of his own Times, London, 1753, vol. i. pp. 473—524. And the whole testimony in favour and against the opinion, is collected in Howell's State Trials, vol. xii. p. 123.

III. *Of Superfœtation.*

By superfœtation is understood the conception of a second embryo, during the gestation of the first, or that a woman, who has advanced to any period of one pregnancy, is capable of conceiving another child.

This doctrine was very current among the ancient physicians,* and it still has adherents, although the majority of the medical profession at the present day are sceptics with respect to it. Its bearing in legal medicine, is on the question of legitimacy, as I shall hereafter shew.

It will conduce to a better understanding of the subject, if the cases which are deemed instances of superfœtation, be first stated; and afterwards the objections to them, and the mode in which the opponents of this doctrine explain their peculiarities.

1. The following is taken from the *Consilia* of Zacchias. J. N. Sobrejus lost his life in a quarrel, leaving his wife pregnant. Eight months after his death, she was delivered of a deformed child, which died in the birth. Her abdomen remained large, and it was suspected that a second infant was contained in it, but all efforts to procure its delivery proved fruitless. One month and a day thereafter, the widow was again taken in labour, and brought forth a perfect living child. The relations of the husband contested its legitimacy, on the ground that it was the fruit of a superfœtation, and Zacchias was consulted on the subject. He agreed that the two infants could not have been the product of one conception, since the interval between their birth was so great; but advanced it as his opinion, that the *first* was the product of a superfœtation, and conceived a month after the other. This he strengthened by the fact, that the husband died suddenly, while in a state of perfect health. His opinion preserved the character of the mother, and also gave her those legal rights to which her situation entitled her.†

Dr. Denman, in his work on Midwifery, quotes a letter addressed to the lady of Sir Walter Farquhar, by the patient herself, which contains a case belonging to the subject before us. The female went to the ninth month of pregnancy; but between the fifth and sixth, she met with a great fright, which affected her severely, and diminished her size. On the 11th of February, she was delivered of a healthy child, but continued in pain; and it was not until the morning of the 25th, that she was relieved. "On that day, there was born the head and parts of a child that had just the appearance of a miscarriage of four months."‡

* So common was the belief in it, that Brassavolus observes that he has seen superfœtation epidemic ! !

† Zacchias Consilia, No. 66. Foderé observes, that he is assured that a female in Turin, in 1797, was successively delivered of three children, at an interval of fifteen days between each.— Foderé, vol. i. p. 484.

‡ Cases resembling the above, are mentioned in most works on midwifery, and in many of the periodical Journals. I will refer to some that I have noted.

Philosophical Transactions, vol. lx. p. 453. (Case by Mr. Warner.)

Medico-Chirurgical Transactions, vol. ix. p. 194. Case by Mr Chapman, where blighted fœtus and placenta were expelled at seven months, and a living child remained to the full period of utero-gestation.

2. A case mentioned by Buffon, has been often quoted by the enemies and advocates of superfœtation. "A female at Charleston, in South Carolina, was delivered, in 1714, of twins within a very short time of each other. One was found to be black, and the other white. This variety of colour led to an investigation; and the female confessed, that on a particular day, immediately after her husband had left his bed, a negro entered her room, and, by threatening to murder her if she did not consent, had connexion with her."*

It has been insinuated against the credibility of this case, that one of the offspring was white. Instances can, however, be adduced, where this objection does not apply. Dr. Moseley mentions the following as occuring within his time at Shortwood estate, in the Island of Jamaica. "A negro woman brought forth two children at a birth, both of a size; *one of which was a negro, and the other a mulatto.* On being interrogated upon the occasion of their dissimilitude, she said she perfectly well knew the cause of it, which was, that a white man belonging to the estate came to her hut one morning before she was up, and she suffered his embraces almost instantly after her black husband had quitted her."†

Eclectic Repertory, vol. ix. p. 531. Dr. Mease on cases of blighted fœtus.

London Medical and Physical Journal, vol. xxii. p. 47, and vol. xxiv. p. 232. In one of these (case by Mr. Farrell), a healthy child was first expelled, and in about four hours afterwards, a dead fœtus of the size of a five months' conception. In the other (case by Mr. Rolfe), the dead fœtus, apparently of six months, was first delivered, and the full grown child shortly after.

Three cases are respectively related by Messrs. Newnham, Hayes, and Powell, in the Transactions of the associated apothecaries of England and Wales. Each of these had separate placentas; one of the blighted ova was putrid, and the other not. — New England Journal, vol. xiii. p. 241.

Case by Baron Percy, in London Medical Repository, vol. xx. p. 110.

Case by F. W. Norton, in New York Medical Repository, vol. xxiii. p. 110.

Case from Dr. John Clarke, in London Med. and Physical Journal, vol. xvi. p. 219.

Case by Dr. Fithian, in Chapman's Journal, N. S. vol. ii. p. 367.

Case by Dr. O. H. Taylor, in North American Med. and Sur. Journal, vol. iv. p. 81.

Case by Dr. Fahrenhorst of Lithuania. — New York Medical and Physical Journal, vol. viii. p. 393.

Case by Dr. Colombe. — American Journal of Medical Sciences, vol. v. p. 483.

* Foderé, vol. i. p. 482.

† Moseley on Tropical Diseases, &c. p. 111. For additional cases, see Quarterly Journal of Foreign Medicine and Surgery, vol. iii. p. 350. Case by M. De Bouillon, from the Bulletin de la Faculté et de la Societé de Médecine, 1821. A negress delivered of twins, as in Dr. Moseley's case, and who made a similar confession.

Case by Dr. Dewees — A white woman near Philadelphia; twins: one white, and one black. — Coxe's Medical Museum, vol. i. p. 174.

Case by Dr. Trotti — A negress in South Carolina, in 1815; three children: two white, and one black. — N. Amer. Med. and Sur. Journal, vol. i. p. 466.

Case by Dr. Guerarde — A negress in South Carolina; twins: a black and a mulatto. — Chapman's Journal, N. S. vol. v. p. 412.

Case by Dr. Delmas of Rouen — A woman in a public hospital of that city; twins: one white, and the other tawny. — Dictionnaire des Sciences Médicales, vol. iv. p. 181. *Cas rares.*

Dr. Blundell, in his Lectures, refers to a case of this description, by Mr. Blackaller of Weybridge. — Lancet, N. S. vol. iii. p. 262.

A case at the Lying-in Hospital Berlin, (January 25, 1832), of twins: one white, and the other half caste. Connexion with a negro was proved. From Hecker's Annals. — American Journal of Medical Sciences, vol. xiv. p. 220.

"One of the author's pupils (says Prof. Dunglison), Mr. N. J. Huston of Virginia, has communicated the particulars of the case of a female, who was delivered, in March 1827, of a negro child and a mulatto on the same night. Where negro-slavery exists, such cases are sufficiently numerous."*

3. Dr. Maton of London published the following as a case of superfœtation: Mrs. T——, an Italian lady, but married to an Englishman who was attached to the commissariat of the British army in Sicily, was delivered, on the twelfth of November, 1807, of a male child, which had every appearance of health. It was brought forth under circumstances very distressing to the parents, being dropped in a bundle of straw at midnight in an uninhabited room; and it survived nine days only. On the second of February, 1808 (not quite three calendar months from the preceding *accouchement*), Mrs. T. was delivered of another male infant, completely formed, and apparently in good health. He was sent away to be nursed; but the nurse's milk being deficient, he was removed soon after to another foster-mother. When about three months old, however, he fell a victim to the measles, and died. From November 1807 to February 1808, Mrs. T. had not left Palermo, except on short excursions in her own carriage; and her husband had been constantly with her since the year 1805. He communicated this narrative to Dr. Maton, with a certificate pledging himself to its truth.†

The last instance I shall mention in detail, is one communicated to Foderé by Dr. Desgranges of Lyons, and it is certainly a very extraordinary one.

The wife of Raymond Villard of Lyons married at the age of twenty-two, and became pregnant five years thereafter, but had an abortion at the seventh month, on the twentieth of May, 1779. She conceived again within a month; and on the twentieth of January, 1780, eight months after her delivery, and seven months from her second conception, she brought forth a living child. This delivery was not, however, accompanied with the usual symptoms—no milk appeared, the lochia were wanting, and the abdomen did not diminish in size. It was accordingly found necessary to procure a nurse for the child.

Two surgeons visited the female, and were at a loss with respect to

The following is, I believe, the most remarkable case yet recorded: "It was communicated to me by the Sargenté Mor of the St. Jose gold-district (Brazil). A creole woman, with whom he was acquainted, in the neighbourhood, had three children at a birth, of three different colours, white, brown, and black, with all the features of the respective classes."—Rev. Dr. Walsh's Notices of Brazil, vol. ii. p. 90.

* Dunglison's Physiology, vol. ii. p. 324.

† Transactions of the London College of Physicians, vol. iv. p. 161. Dr. Granville, in a criticism on this case in the Philosophical Transactions for 1818, supposed that they were twins, whose ova were distinct and separate; and that one was born at the sixth, and the other at the ninth month of pregnancy. Dr. Paris was in consequence led to make further inquiries of Dr. Maton, and he found that *both children were born perfect*. The labour, though quick, was not sudden; since the accoucheur was present. All the distressing circumstances noticed, and on which Dr. Granville appears to rely, referred merely to the inability of obtaining proper accommodations.—Paris's Medical Jurisprudence, vol. i. p. 264.

her situation. They called Dr. Desgranges in consultation, who declared that she had a second child in the womb. Although this was strongly doubted, yet three weeks after her delivery, she felt the motion of the fœtus; and on the sixth of July, 1780 (five months and sixteen days after the first birth), she was again delivered of another living daughter. The milk now appeared, and she was enabled to nurse her offspring.

It is not possible, adds Dr. Desgranges, that this second child could have been conceived after the dilivery of the first. "Car le mari ne lui avait renouvelé ses caresses que vingt jours après, ce qui n'aurait donné au second enfant que quatre mois vingt-sept jours."

The narrative of this case was accompanied with a legal attestation of it under the oath of the mother; and on the nineteenth of January, 1782, both children were still living.*

These instances will give a full idea of what is understood by superfœtation in the human species. The advocates for this doctrine consider them as conclusive testimony, while the opponents explain their peculiarities in various ways, and also endeavour to prove, that this kind of conception is impossible.

In the first place, it is urged that, shortly after conception, the os tincæ, as well as the internal apertures of the fallopian tubes, are closed by the deposition of a thick tenacious mucus. The membrana decidua is also formed early, and lines the uterus, and thus co-operates with the mucus, in obliterating the openings into its cavity.†

When the gravid uterus enlarges, the fallopian tubes lie parallel to its sides, instead of running in a transverse direction to the ovaria, as in the unimpregnated state. If then an embryo be generated, the tubes could not embrace the ovum, and it would remain in the ovarium, or fall into the abdomen, and thus constitute an extra uterine conception.

But again, it is said that, even if we allow the practicability of the new embryo reaching the uterus, its arrival would be destructive to

* Foderé, vol. i. pp. 484–5–6. Cases resembling these, but not so remarkable, are related by Dr. Farquhar—this occurred in the Island of Jamaica, in 1805; interval four weeks.—Coxe's Medical Museum, vol. ii. p. 316.

By Dr. Levrat—reported to the Medical Society of Lyons in 1827; interval of four months. Annales de la Médecine Physiol. April, 1827.—American Journal of Medical Sciences, vol. i. p. 193.

Three cases in the Dictionnaire des Sciences Médicales, Art. *Superfœtation.*

One by Madame Boivin—an interval of two months. The first was born March 15, 1810, anp weighed four pounds; the second, on the twelfth of May—weighed three pounds—weak, and breathing with difficulty. The female confessed that she had not lived with her husband for a long time; and that the two children were the result of only three connexions with another man, on the fifteenth and twentieth of July, and the sixteenth of September.—See Pendleton on Superfœtation and Bipartite Uteri, in American Journal of Medical Sciences, vol. i. p. 307.

A case of several successive deliveries at various periods, at intervals of two months, and another of one month, by Prof. Wendt of Breslau. This is, however, a very doubtful case.—From Journal des Progres, in Monthly Journal of Foreign Medicine, vol. iii. p. 90.

† The advocates of superfœtation deny that this mucus closes the os tincæ completely; and they conceive that the absorption of new fecundating matter through it, is possible. Capuron, p. 110. Foderé, vol. i. p. 483.

the fœtus already present. The functions which have already been performed for the first conception have now to be repeated, and an additional decidua and placenta are to be formed.

These are, briefly, the arguments urged against the possibility of superfœtation. An appeal, however, is made to cases, where, as we have already stated, two or more children of different sizes, and *apparently of different ages*, are born nearly at the same time, or at a longer interval.*

It will be observed that, in one class of instances, the lesser child is represented as dead and decayed, and its size is much smaller than the accompanying birth. Now, in these, it is suggested that twins have been conceived, and that the embarrassed situation of one child in the uterus may have prevented its developement, checked its nutrition, and thus caused its death. The other, on the contrary, lives and grows, presses on the dead one, which becomes flattened, or wholly or partly putrefied; and in this condition, both may be expelled at the same time, or one may be detained for some time after the other.†

It is evident that this explanation puts aside the idea of superfœtation.‡

The second class of cases, where a twin birth of various colours, takes place, is now universally considered as examples of contemporaneous conception. This is evidently shewn by the circumstances attendant on each. Hence they cannot aid the doctrine of superfœtation.

But if we thus explain the great mass of instances that were formerly referred to it, and grant, which indeed can hardly be denied, that superfœtation is impossible in a single impregnated uterus, there yet remain some cases like those of Drs. Maton and Desgranges, which require explanation. It has been attempted to do this, by supposing that a *double uterus* was present. This is far from being as rare as was at one time supposed. "The human uterus," says Dr. William Hunter, "in the impregnated state, commonly has one triangular cavity. In many instances, it is found subdivided, at its upper part, into two lateral cavities, so as to resemble the two horns of a uterus in a quadruped. Several specimens of such uteri are preserved in my collection."§ Not only has the uterus been found double, but occasionally the vagina also. In the Museum at Heidelberg, Dr. Tiedemann informs us, is the uterus of a female who died nineteen days after

* An engraving illustrative of this occurrence, is given in Cruveilhier's Pathological Anatomy, No. 6. One fœtus is about six months advanced—the term, indeed, of the pregnancy—while the other has about the size of one of three months. A large portion of the placenta was diseased, and to this the chord of the smaller is attached, while that of the other proceeds from the healthy portion.

† In noticing the objections to this doctrine, I have made a free use of Professor Chapman's able Essay on it, in the Eclectic Repertory, vol. i. p. 369.

‡ G. St. Hilaire advanced the idea, some years since, that in every case of acephalous monsters, there is a twin born perfect, and with a common placenta. He considers the acephalous as the imperfect twin of another, whose developement has been completed. Lancet, vol. x. p. 748.

§ Hunter's Anatomy of the Human Gravid Uterus. London, 1794, p. 6. I am indebted for this reference to my colleague, Professor Willoughby.

delivery. It is divided; the left is in the state to be expected after the removal of the fœtus, while the uterus on the right side is characterised by the absence of all appearances of impregnation. Two vaginæ are also present.* This female was seen by two physicians during her labour. One declared that the neck was in a natural state—while

* Quarterly Journal Foreign M. and S., vol. v. p. 438. All the cases related by authors, of double uteri, have been collected by Dr. Cassan, in his "Recherches sur les cas d'uterus double et de superfœtation," 1826. He enumerates no less than forty-one, among which are those of Haller, Purcel, Canestrini, Eisenmann, Polé, Dupuytren, West, Ollivier, and one examined by himself, Dumeril and Madame Boivin, in which both uterus and vagina were double. See also Martin, on a variety of the Human Uterus (from the Revue Médicale of 1826), for a list of cases. Lancet, vol. x. p. 780.

The instances that have been recorded since the publication of Cassan, are one by Dr. Geiss of Traffurth, near Erfert. The labour pains were confined to the right side. On that, the uterus was as high as the thorax; on the left, it did not extend above the navel, and inclined forward and laterally. The operation of turning was performed, and a healthy female infant born—the right side subsided—the left continued prominent. In one hour labour pains returned, when Dr. G. found membranes protruding through an opening in the left side, which extended upwards into a cavity. A second child presented and was safely delivered by turning. The right placenta came away first, and the right womb contracted; then the left placenta, but its womb contracted slowly, and she lost a good deal of blood. Dr. G. satisfied himself by examination, that this was a case of double uterus. Two years afterwards, she was again delivered of a single child. From Rust's Magazine. —Edin. M. and S. J. vol. xxix. p. 254.

Case by Dr. Duges. From Journal des Progres, in American Journal of Medical Sciences, vol. iv. p. 447.

Case of double uterus and vagina at the Hotel Dieu in 1827. The uterus was unimpregnated. The female died of hæmatemesis.—New York Medical and Physical Journal, vol. ix. p. 191.

A case from Meckel, quoted by Carus, Gynæcology.—American Journal of Medical Sciences, vol. vi. p. 432.

Dr. Moreau recently exhibited to the French Academy of Medicine (Jan. 15, 1833) a bilobed uterus, divided into two equal lateral halves, each provided with a tube and an ovary; each separated from the other by a double partition, and each having distinct necks and mouths into a single vagina. The mother died after delivery —the fœtus was a male, and had been developed in the left cavity.—Medico-Chir. Review, vol. xxiii. p. 234.

Mr. Adams, a student in Guy's Hospital, relates a case of double uterus found in a body brought in for dissection. The subject was unimpregnated. The superior two-thirds of the uterus were divided by a septum into two equal parts, the neck was natural, with an opening common to both canals. Length of the septum $1\frac{3}{4}$ inch—whole length of the uterus $3\frac{1}{4}$.—London Medical Gazette, vol. xiii p. 898.

Another recent instance is given by M. Le Roy, in Journal des Connoissances Médicales.—Boston Medical and Surgical Journal, vol. xii. 217.

Davis's Obstetric Medicine, p. 514, &c. contains an account of the cases collected by Voigtel.

Cases are also figured by Cruveilhier in his Pathological Anatomy, Nos. 4 and 13. In one instance, communicated by M. Berard, the uterus and vagina were each double. This female had been thrice married, but had only one child, which arrived to the full time and died during delivery. The labour was extremely difficult. In another, the uterus alone was bifid. The female had been delivered about six weeks previous of a living child, and the lobe in which it had been contained bore all of the marks of this, while the other had not the slightest indications of developement. Where the uterus is merely divided into two chambers (*cloisonné*) and not bilobed, the empty portion appears to sympathise in the progress of pregnancy.—See Plate 5 of No. 13.

the other found it dilated, and said that the head of the child was engaged; a second examination convinced both that the neck was double, and the investigation after death verified it.*

But although this variety in the organisation of the uterus may explain several of these cases, and in particular that of Desgranges, as is done by Velpeau and Cassan, yet there are intrinsic difficulties attending the solution. It has been inquired whether menstruation goes on in the unimpregnated half? If it does, it will account, as is supposed, for the occasional presence of that discharge, or something much resembling it, during pregnancy. In Canestrini's case, however, it is distinctly stated that it had not taken place during that process.† The others give us no information on the subject.

A more formidable objection, founded on anatomical observation, has been recently presented by Dr. Robert Lee. He examined, in 1831, a female who died eight days after parturition. She had had several children. The uterus was double from the fundus to the cervix, and thus divided into lateral halves. The fœtus had been in the right half, which had one ovarium and one fallopian tube connected with it. The left was furnished with similar appendages. Both ovaria were enlarged, but the right most so, and it contained a corpus luteum; the left had none. The internal surface of the left *was coated every where with a deciduous membrane;* and at its opening into the cervix, it formed a shut sac. Now, such a disposition, remarks Dr. Lee, if it always exists, which he deems probable, must render superfœtation impossible.‡

We must also recollect, that in the remarkable cases of children born several months from each other, no examination has yet been made to prove that *there* double uteri existed. "They are ascribed," says Richerand, "to septa dividing the uterus into two cavities, merely because such an arrangement would explain to a certain degree how two conceptions might take place at some interval from each other; for it has never been ascertained by actual dissection, that any woman in whom such superfœtation took place, had a double uterus."§

Should the doctrine of superfœtation ever be pleaded in medico-legal cases, we must be guided by the laws of legitimacy, both as to premature and to protracted births. The latest born should fall within the legal term, or be excluded from the privileges attendant on it; and this is more particularly necessary, from the obscurity that invests the subject.

* Velpeau's Midwifery, p. 79; Cassan, p. 28. † Cassan, p. 39.

‡ London Med. Gazette, vol. ii. p. 176, from Med. Chir. Transactions. vol. xvii.

§ Richerand's Physiology, p. 357. The only cases in which Cassan considers superfœtation possible, are, 1. Where there is a perfect double uterus; 2. Where there is a pre-existing extra-uterine pregnancy; and 3. When there is a new conception before the fecundating germ has occupied the cavity of the uterus. The experiments of Haller, Hunter, and Haighton, and more recently of Home, John Burns, and Magendie, prove that the ovum sometimes does not descend into the womb until eight, fifteen, or even twenty days after fecundation.

IV. *Of some medico-legal questions connected with this subject.*

Two questions relating to pregnancy have been suggested, which deserve some notice.

1. *Can a woman become pregnant, and be ignorant of it until the time of labour?* I cannot better preface an examination of this, than by observing, that with women, certain appearances are often referred to the cause from which they wish them to originate. Thus, married females attribute their indisposition and ailments to the presence of pregnancy; while those who, from being unmarried, and enjoying guilty pleasure, dislike that idea, charge any alteration that may occur, to disease. Of this nature is the case related by Mauriceau, where a female, who had been secretly married, took every precaution to avoid pregnancy, and not only deceived herself, but also an old physician, who prescribed for her, as having a schirrous womb, until the night before her delivery. In another instance, a female, aged thirty-five, who had made the most solemn vows of chastity, deceived many physicians, who treated her for dropsy of the womb.* Foderé himself relates an instance which happened to an acquaintance, who was sent for to a nun labouring under a violent colic, and who continued to deny her being with child, until the cries of the infant silenced her.†

We may smile at these narratives; but the subject assumes a grave importance, when the question is asked judicially. A case in which it was made the matter of investigation, is related in the *Causes Célèbres*, and an abstract of it may prove useful.

In 1770, a female aged twenty-five, and named Louisa Bunel, residing in the bishopric of Avranches in France, was seduced, and became pregnant. It was in the month of August, when field labour is the most severe, that she experienced a cessation of the menses. She attributed this to the fatigue she had undergone; and, feigning ignorance of her situation, declared herself dropsical. She applied to several monks for medical aid, and took diuretics, but without effect. Finally, at the sixth month she married, but not to her seducer; and after that repeatedly took an infusion of savin in wine. At the end of three months, being alone, she was delivered of a child, which she afterwards declared was born dead, and which she covered with linen, carried to a neighbouring field, and put under some leaves. Eight days after, a dog discovered the body, and brought some rags from it to the house of a neighbour. Judicial search was now made. Louisa was discovered to be the mother, and was condemned to death for committing infanticide. Her plea was, 1. That she was perfectly ignorant of her pregnancy; and that the remedies she had taken were solely with a view to remove her supposed dropsy. 2. That the child was born dead; and, 3. That at the time of delivery, she was so extremely weak for four hours, that she could not call for assistance; and on reviving, preferred burying her shame, since it was useless to expose herself by shewing a dead child. An appeal was made to the superior court at Bayeux, who, after taking the opinions of sixteen

* Mauriceau, vol. ii. p. 111, 205. † Foderé, vol. i. p. 491.

physicians at Paris on the case, reversed the sentence on the 11th of November, 1772, and discharged the prisoner.*

The case, in the opinion of these physicians, turned on the following points:—1. Could the accused be ignorant of her pregnancy, and confound it with another complaint? 2. Could she innocently make use of the remedies that she confessed she had taken? and 3. Is it certain that the child was born dead; and if so, what occasioned its death? The two first only relate to our subject, as the third belongs to infanticide. Our medical judges answered both in the affirmative, on the ground of the uncertainty of the signs of pregnancy, and the ease with which it might be confounded with other diseases. They adduced in favour of this the authority of Astruc, Zacchias, Senac, and Hebenstreit. This last observes, that a female might be impregnated when intoxicated, and might go to the full time without knowing it; and on being seized with pain, might mistake it for colic or painful menstruation.†

Foderé, in remarking on this case, very justly observes that, although instances have occasionally occurred where married women have mistaken their situation, yet the sex generally ridicule the idea of this pretended ignorance. And in those which usually will come before a court of justice, the reply to such a plea should be—*Have you not exposed yourself to become pregnant; and on what account, then, were you so confident of the usual consequences not following it?*‡

The following are laid down by our author, and I think correctly, as the only cases in which ignorance is possible.

Where the female is an idiot. An instance of this kind occurred to

* Foderé, i. p. 491, quoted from the Causes Célèbres.

† Hebenstreit, p. 386. There appears to me to be an intentional misrepresentation of our author in this instance. He evidently only refers to an extreme case. On the main question he observes, "His tamen non obstantibus, et quamvis vera, nec ex catameniorum defectu, nec ex tumore abdominis, aut lactis in mammis presentia, de graviditate convictio nasci possit; impossibile tamen est, gravidam, quæ vegetum, fortemve embryonem, et talem qui ad usque partus legitimum terminum sine morbo pervenit, matrice tulit, motus istos magnos, qui prope finem sanæ et commodæ graviditatis sunt, non percepisse."—Page 385.

‡ A reviewer in the Edinburgh Medical and Surgical Journal, who I presume is Dr. Christison, speaks thus on this point: "*Can a female be ignorant of her pregnancy, till the child is brought forth?* There are manifestly three conditions required, before we can believe such a thing possible, viz. that impregnation took place without her knowledge—that her pregnancy imitate some natural disease,—and that her delivery be accomplished either suddenly or without her knowledge." As to the first, he concedes that it may take place, if she be not a virgin, and in every circumstance during the profound sleep induced by narcotics. It may also be deemed to be hydrometra or dropsy of the uterus, and thus deceive during the whole progress of pregnancy, not only the female, but the most accomplished accoucheurs. The last, we know, does sometimes occur. Thus, he remarks, "It is obvious that a person may be delivered without being previously aware of her pregnancy; but since each of the three requisite conditions is exceedingly rare, we may justly pronounce it barely within the bounds of possibility, and only to be credited, in individual cases, when the female gives sufficient evidence that the conditions in question did actually exist. Further, as the third condition can exist only in the case of those who have borne children, the plea of ignorance must necessarily be excluded from the greater number of trials, *which too generally concern those who have erred for the first time.*"—Vol. xix. pp. 452–4.

Dr. Desgranges, in a young woman in France, who, having been long tempted, was at last prevailed on to have connexion in the bath, as this, it was stated, would prevent conception. In a short time, however, the menses ceased. She became alarmed for her health, and consulted several physicians, who administered medicines; and in this state she continued without suspicion, until the approach of labour. Dr. Desgranges states it as his opinion, that the assurances of her lover had banished all ideas of the possibility of pregnancy. The female made this assertion herself to him, and her conduct previous to delivery was calculated to strengthen it, as there were no attempts to conceal herself.*

Where a female has conceived when in a state of stupor, either from spirituous liquors or narcotics, or when in a state of coma or asphyxia. A virtuous young woman was thus violated at Lyons, during the period when the horrors of the French revolution were at their height. A powerful dose of opium was administered; the crime was completed; and in a short time she found herself pregnant, without knowing by whom.

In all other cases the female may indeed entertain doubts concerning her situation; but doubt presupposes something to be suspected, while ignorance is not aware of any thing.†

Can a female become impregnated during sleep, without her knowledge? This question has already been incidentally noticed, and it is not necessary to enlarge on it in this place. In females habituated to sexual connexion, or where sleep is unnaturally produced, there is no doubt of its occurring; whereas in the opposite cases the probability is greatly lessened. Authors, in remarking on this question, run into copious disquisitions on what is necessary to cause conception; but on this I have already intimated an opinion, which it is not necessary to repeat.‡

* This and the succeeding case were communicated to Foderé by Dr. Desgranges. —Foderé, vol. i. pp. 496, 497.

† I find the following case mentioned in Dr. Gooch's Lectures on Midwifery, p. 81. As he seems to have credited it, it is probably an exception to the rule I have before quoted from him. "A maid at an inn, who was always thought to be virtuous, and bore a good character, began to enlarge in a way which excited suspicions of pregnancy. She solemnly declared that she never had connexion with any man. At length she was delivered, and was afterwards brought before a magistrate to swear to the father; but she repeated her former declaration. Not long afterwards a postboy related the following circumstance: That one night he came late to this inn, put his horses in the stable, and went into the house, and found all gone to bed except this girl, who was lying asleep on the hearth-rug; and, without waking her, he found means to gratify his desires. This shews that impregnation may take place without the knowledge of the female, or any excitation of the sexual passion."

‡ The following case may be added to those already related: A pregnant female, in her last moments, solemnly declared that, to her knowledge, she never had connexion; but that a person in the family, some time previous, had given her some wine to drink, after which she fell into a profound sleep. She was not, however, conscious of any thing having occurred to her during that state; but mentioned the circumstance, as probably explaining her situation.—Meierius in Brendel, p. 99.

CHAPTER VII.

DELIVERY.

PART I.—1. Signs of delivery—period within which the examination should be made. Concealed delivery. Pretended delivery—modes in which it may present itself—where there has been no pregnancy—where there has been previous delivery—where there has been an actual delivery, but a living child has been substituted for a dead one. Appearances on dissection, indicative of a recent delivery. Case of Mr. Angus. Corpora lutea—their value as a proof of impregnation. Case shewing the necessity of ascertaining the birth of an infant. 2. Possibility of delivery without the female being conscious of it. Whether a female, if alone and unassisted, can prevent her child from perishing after delivery—application of this in cases of infanticide—instances in which this plea should be received.

PART II.—1. Signs of the death of the child before and during delivery. 2. Signs of its maturity or immaturity—its appearance, size, length, and weight at various periods during pregnancy. Weight of infants born at the full time—length. Other characters which mark the maturity of the child. 3. The state necessary to enable the new-born infant to inherit—its capability of living—the time when it is generally deemed capable. Laws of various countries as to what constitutes life in the infant, and thus enables it to inherit—Roman, French, English, and Scotch laws. Medico-legal cases, in Italy—State of New York. Infants extracted by the Cæsarean operation—their capability of inheriting: laws on this subject. First born of twins. How far deformity incapacitates from inheriting. Monsters: laws on this subject.

DELIVERY may be considered, 1, as it respects the mother; and, 2, as it respects the child. We shall accordingly divide the chapter into two parts; and, with respect to the mother, we shall notice,

1. Concealed and pretended delivery.
2. Some medico-legal questions connected with the subject.

The second part will comprise a view of,

1. The signs of the death of the child before or during delivery.
2. The signs of maturity or immaturity; and,
3. The state necessary to enable the new-born infant to inherit.

PART I.

I. *Of concealed or pretended delivery.*

Delivery, whether concealed or pretended, can alone be elucidated by referring to its real signs; and it will, therefore, be proper to commence with a notice of them.

If the female be examined within three or four days after the occurrence of delivery, the following circumstances will generally be observed: Greater or less weakness, a slight paleness of the face, the

eye a little sunken, and surrounded by a purplish or dark-brown coloured ring, and a whiteness of the skin, like a person convalescing from disease. The belly is soft, the skin of the abdomen is lax, lies in folds, and is traversed in various directions by shining reddish and whitish lines, which especially extend from the groins and pubis to the navel. These lines have sometimes been termed *lineæ albicantes*, and are particularly observed near the umbilical region, where the abdomen has experienced the greatest distension. The breasts become tumid and hard, and on pressure emit a fluid, which at first is serous, and afterwards gradually becomes whiter; and the presence of this secretion is generally accompanied with a full pulse and soft skin, covered with a moisture of a peculiar and somewhat acid odour. The areolæ round the nipples are dark coloured. The external genital organs and vagina are dilated and tumefied throughout the whole of their extent, from the pressure of the fœtus. The uterus may be felt through the abdominal parietes, voluminous, firm, and globular, and rising nearly as high as the umbilicus. Its orifice is soft and tumid, and dilated so as to admit two or more fingers. The fourchette or anterior margin of the perinæum is sometimes torn, or it is lax, and appears to have suffered considerable distension.* A discharge (termed the lochial) commences from the uterus, which is distinguished from the menses by its pale colour, its peculiar and well-known smell, and its duration. The lochia are at first of a red colour, and gradually become lighter until they cease.†

These are the signs enumerated by the best writers on the subject; and where they are all present no doubt can be entertained that delivery has taken place. Several of them, however, require further notice, for the purpose of indicating the mistakes which observers may experience concerning them.

1. The lochial discharge might be mistaken for menstruation, or fluor albus, were it not for its peculiar smell; and this it has been found impossible, by any artifice, to destroy.

2. The soft parts are frequently relaxed as much from menstruation as from delivery; but in these cases the os uteri and vagina are not so much tumefied, nor is there that tenderness and swelling. And, again, when all signs of contusion disappear after delivery, the female parts are found pale and flabby. This circumstance does not follow menstruation.

3. The presence of milk. This must be an uncertain sign, for the reasons stated in the chapter on Pregnancy. "*It is possible for this secretion to take place independently of pregnancy.*"‡ The most unequivocal form in which it can appear is when the breasts are tense and

* "With the birth of the first child the commissure is generally torn through, and the fossa disappears with it, though not always; so that the existence of these parts is no disproof of previous child-birth. And I remember myself a case in which, though I had delivered the patient not without difficulty, with the forceps, the commissure and the fossa existed afterwards in all their perfection."—Blundell's Lectures, Lancet, N.S. vol, 4, p. 641.

† Foderé, vol. ii. sec. 1; Mahon, vol. i, p. 166 to 170; Capuron, p. 124; Hutchinson on Infanticide, p. 90; Burns, p. 326.

‡ Burns, p. 326.

painful, and filled with the fluid of its usual nature—not serous or watery, as is observed in pretended cases. It is also to be remarked that this secretion goes on during the presence of the lochia; while, on the contrary, the breasts become flaccid, and almost empty, if the menses supervene, and fill again when they disappear.* Should, therefore, a case occur where doubt is entertained, it would be proper to notice the state of the breasts while the discharge (of whatever nature it may be) is present.

4. The wrinkles and relaxation of the abdomen which follow delivery may be the consequence of dropsy, or of lankness following great obesity. This state of the parts is also seldom very striking after the birth of a first child, as they shortly resume their original state.

5. The lineæ albicantes will often remain for life, and hence should not be depended upon in cases where females have had several children.†

It is hence the duty of the medical examiner to view all the signs enumerated in connexion; and where all or most of them are present, it is his duty to declare that they are the consequence of SEXUAL CONNEXION.‡ So far he can pronounce with safety. But if the question has a bearing on the charge of infanticide, the existence of the child should be proved. I make this remark out of its place, but it cannot be too often repeated in a treatise on legal medicine. To prevent mistakes, inquiry should also be made, whether the individual has laboured under dropsy, menorrhagia, or fluor albus; or whether any external violence has been applied to the genital organs.

The next subject of inquiry is, *within what time should this examination be made?*

An astonishing difference occurs among females in the period of recovering from the effects of delivery. Some have been known to proceed to their occupation on the day that the child is born, while others remain enfeebled for weeks. Much in this respect depends on the constitution and habits of life. There is, however, a term in all, when the signs of delivery disappear, and the parts return to their natural state; and a general rule ought to be established in legal medicine, beyond which an examination should be deemed inconclusive and void. A majority of writers have fixed on the term of eight or ten days for this purpose; and it is probably a correct one. After that period, the signs become equivocal, and may lead to error, particularly if the delivery has been natural.§

* Fodere, vol. ii. p. 15.

† They are sometimes wanting in females who have had several children; and Dr. Montgomery saw them very marked in a male labouring under general dropsy. — Cyclopædia of Practical Medicine.

‡ "All the recent continental writers agree, that if the signs related be all, or nearly all, found in the person of the prisoner, the conclusion is infallible; and that whatever a few obstinate accoucheurs may have been urged by the spirit of contradiction to allege, they are never imitated conjointly by any disease whatever. At the same time, a just and necessary caution is added, against placing reliance on any one sign, or even on several of these together, since frequent experience has shewn that, though never found conjointly but after delivery, they are often produced individually by other causes."—Edin. Med. and Surg. Journal, vol. xix. p. 454.

§ Farr (p. 50 and 51) enumerates certain signs that a woman has *formerly* been

Zacchias remarks expressly, that the proofs of delivery become uncertain after the tenth day; and this uncertainty increases until the fortieth, when the abdomen, with the exception of the white lines, returns to its natural state, particularly if the female be healthy. Michael Alberti, a celebrated professor of his day, and Bohn, professor at Leipsic, both recommend the visit to be made within the week; and in a case before the parliament at Paris, in 1767, Petit and Louis reported in favour of acquitting a female suspected of infanticide, on the ground that the investigation had been made at too late a period.* The following case, which came before the criminal court of the department of the Seine, in 1809, presents a most striking instance, in which the delay alone seems to have prevented the detection of the crime.

On the 11th of June, 1809, a female named Aimée Perdriat went to the house of a friend called Rosine, who resided in the fifth story of a house in Paris. She requested leave to remain, as she felt ill with a headach and a violent colic. Shortly after her being shewn to a room, a lodger in the third story heard a noise in the water-pipe, as if a heavy body passed through it. She was not visited by any one, except Rosine and another female, for the purpose of inquiring whether she wanted any thing. About five hours after the arrival of Aimée, Rosine observed blood on the stairs and on the floor of the chamber; and Aimée remarked that her menses flowed very profusely.

Suspicions appear to have been excited; and on the 17th, the privy was searched. A fœtus, placenta, and bloody clothes were found; and two surgeons, who examined the body, deposed that no marks of violence were present, except that the umbilical cord was torn off; that it was a full-grown child; and that from their experiments it certainly had breathed after birth, and there were proofs of this having continued even in the filthy place from which it was drawn.

She was arrested on the suspicion of having been the mother of this child; and the suspicion was fortified by a previous refusal to admit the examination of a midwife. On the 15th, 17th, and 27th of July, being more than a month after the supposed delivery, she was examined by Baudelocque, Dubois, Ané, Dupuytren, and Lafarge. They unanimously declared that there was no sign present which indicated the delivery of the female at the time in question. She was accordingly acquitted.†

It is impossible, I conceive, to reflect on this case, without coming to the conclusion, that this woman was guilty. But if the physical

delivered of a child, which it may be proper to mention. The loss of all the signs of virginity. The orifice of the uterus wanting its conical figure, and its lips unequal. An expanded and pensile abdomen. The lineæ albicantes. The frænum of the labia obliterated: the breasts flaccid and pendulous; the nipples prominent, and the areolæ of a brown colour.

"The most precise criterions of the date of delivery are derived from the date of the milk fever, the gradual alterations of the lochia, and especially the appearances assumed by the genital organs in their return to the ordinary healthy condition."—Edin. Med. and Surg. Journal, vol. xix. p. 458.

* Foderé, vol. i. p. 17. "Hæc primis post partum diebus a medicis dijudicari possunt, si vero suspicio tardius oriatur, nec in matre, nec in infante, signa rei recte definiendæ supersunt."—Ludwig, p. 44.

† Foderé, vol. ii. p. 18.

signs of the crime are so slowly attended to, judges are certainly justified in leaning to the side of mercy.*

Delivery is most commonly CONCEALED under the idea of destroying the offspring immediately after birth. In suspected cases, therefore, the examining physician should attend, 1. To the proofs of previous pregnancy. On these I have already dilated; and will only add, that ordinarily no investigation has taken place at the time when this was advancing. Circumstantial evidence is not to be trusted; but it is proper to inquire whether an enlargement of the abdomen has been observed, whether this was connected with any apparent disease, and whether any precautions as to dress were used to conceal it. 2. The proofs of recent delivery;† and 3. To the connexion between the supposed period of parturition, and the state of the child that is found. An infant recently born is indicated by the redness of the skin, and by the attachment of the umbilical cord to the navel; and the female, if the mother, will be found to have the marks of a late delivery on her. The question whether it was living after birth belongs to infanticide.

In PRETENDED DELIVERY, the female declares herself a mother without being so in reality. This is not so revolting to our feelings as the former, but it is, notwithstanding, improper, and should be guarded against. Its most common origin is cupidity, or a weak desire to produce an heir to large estates; and hence, we hear most of it in Europe, where property is entailed, and families anxiously desire the birth of a son to perpetuate their honours.

* A case of an opposite nature, where the female was evidently accused wrongfully, with the reasoning of Zacchias in her favour, is contained in his *Consilia*, No. 69. There was no milk present—the breasts flaccid—no lochial odour—the parts very slightly tumefied, and her strength not affected. He deemed it nothing more than a profuse menstruation, following a retention which had caused the enlargement of the abdomen.

† The following case, which I find in a recent Journal, is a most unequivocal one, and we can only explain the decision by supposing that some *superior influence* intervened to quash the investigation.

A female, in June and July, 1827, complained of dysmenorrhœa and its accompanying symptoms. Her abdomen enlarged and there was a suspicion of pregnancy. But she denied its correctness, and attributed her illness to wet feet. She was dismissed from service, and returned to her parents. On the 14th of March, 1828, she was understood to have had so severe a hæmorrhage as to be confined for several days to her bed. The abdomen was reduced in bulk. These circumstances led to a legal inquiry. Drs. Millet and Giraudet examined her on the 25th. They found her skin warm, countenance slightly flushed, pulse full and frequent, and tongue natural; the breasts tumefied and its veins enlarged, and on continued pressure, a thick milky fluid was obtained in abundance. The abdomen was a little swelled, umbilicus projecting (*saillant*), lineæ albicantes present, and the skin wrinkled and contused. The insides of the thighs had also red spots. On examination per vaginam, the uterus was found heavy and more voluminous than in the unimpregnated state. Its orifice was soft, irregular, and readily admitted two fingers. A thick yellowish matter, of the odour of fish oil, issued from the genital organs, and these externally were much dilated, flaccid, and as if recently swollen. Le frein de la vulve était déchiré.

The medical examiners could do no less than to declare that a delivery had very recently taken place. The criminal tribunal, however, refused to pursue the subject, on the ground of the irreproachable manners of the female, and the appearances noticed arising from some other cause! Well might Leuret, the reporter of this case, ask, whether hæmorrhage alone would produce all these signs.—Annales D'Hygiène, vol. iii. p. 221.

In France, pretended delivery was formerly punished with infamy and banishment. In 1772, a female in Paris, who was sterile, resolved to gain the favour of her husband by pretending pregnancy, and, at the end of the proper period, obtained an infant from one of the hospitals. She effected this by the aid of a midwife who attended during the assumed labour. Unfortunately, however, the parents of the child repented of having put it in the hospital, and endeavoured again to obtain it. Failing in this, they took steps to discover where it was, and, ascertaining, a full disclosure took place. The woman was sentenced to make the *amende honorable* with a writing on her breasts containing these words: "A woman who stole a child in order to pretend being a mother;" and was afterwards banished during her life from Paris. The midwife bore a similar writing which purported that she was one who, abusing her station, had assisted and favoured the pretending of maternity; and she was condemned to perpetual imprisonment. The parliament, however, on an appeal, lightened the punishment, and ordered her to be admonished and fined.*

The penal code now in force in France (sect. 345) prescribes imprisonment as the punishment for concealing an infant—for substituting one child for another—and for pretending that a child has been born.†

Pretended delivery may present itself under three points of view. 1. *Where the female, who feigns, has never been pregnant.* This, if thoroughly investigated, may always be detected. There are signs which must be present, and cannot be feigned. An enlargement of the orifice of the uterus, and a tumefaction of the organs of generation, should always be present; and if wanting, are conclusive against the fact. Dr. Male mentions a case which happened to a surgeon in Birmingham not long since. "Being called to a pretended labour, a dead child was presented to him; but there was no placenta. He proceeded immediately to examine the woman, and found the os tincæ in its natural state, nearly closed, and the vagina so much contracted as not to admit the hand. Astonished at this appearance, he went to consult a medical friend; but before any further steps were taken, it was discovered that he had been imposed upon. The woman, in fact, had never been pregnant; and the dead child was the borrowed offspring of another. She was induced to practise the artifice, to

* Foderé, vol. iv. p. 406, from the *Causes Célèbres*. "A case worthy of record occurred lately in the north of Scotland. A fœtus was found in a sink, and notice of this occurrence was immediately given to the clergyman of the parish, just as he was going to church. The worthy pastor was aware that a very few days' delay might render all inquiry fruitless, so at the conclusion of the service he informed the congregation of what had happened; adding, that as the child was found within the bounds of the parish, an imputation would necessarily lie against the young women of the parish, and jealousies, doubts, and suspicions, would arise, to the total subversion of Christian charity and good neighbourhood throughout his cure, and inviting all the young women who wished to maintain their reputation to exhibit themselves next morning before the kirk-session. Accordingly, on the following day, the minister and elders, with a midwife and the village surgeon, as assessors, held a *grande reconnaissance*, by means of which the unfortunate mother was detected. She was found guilty of concealment of pregnancy."—DUNLOP.

† Capuron, p. 18.

appease the wrath of her husband, who frequently reproached her for her sterility."*

Dr. Billard, of Angers, in France, relates the following: A farmer, aged seventy-two, had been married four years to a female aged forty-two, when she declared herself pregnant. Her abdomen gradually enlarged. On the 27th of July, 1829, she stated that, when alone, at break of day, she had been delivered of a female infant. She had cut the cord and made the ligature, and the after-birth, which could not be found, she had left at the door of the house. In proof of her narrative, was her bloody linen, and a child, which when placed at her breast, could obtain no milk. The husband was at first elated with the circumstance, but soon became suspicious through the remarks of his relatives, and he delayed to register the child.

A legal inquiry was instituted, and Dr. Billard was appointed the medical examiner. The infant, from her account, was fifty-three hours old. It was seventeen or eighteen inches long. The epidermic exfoliation was in full activity, and the skin red. The cord had fallen off that morning. It was buried, but he caused it to be disinterred. It was wrinkled, dry, slightly sanguinolent at one end, and brown and neatly cut at the other. A proper ligature was also found on it. The infant had thick hair—it cried lustily, moved and drank with perfect freedom; the nails were formed, and none of the sebaceous matter, common to new-born infants, was found on it, nor was any meconium observed.

Dr. Billard decided from these circumstances, and particularly from the state of the cord, and its falling off spontaneously—from the colour of the skin, and the exfoliation—that, instead of two, the infant was probably from five to seven days old. And further, that from the state of the cord, it had evidently been secured by an expert, and not by a solitary female labouring under the effects of present delivery.

Dr. B. now examined the pretended mother. The breasts were not enlarged, nor were there any marks of the secretion of milk present. The abdomen presented no lineæ. There was no discharge from the vagina; and, indeed, that part was contracted, and the labia perfectly natural. The uterus was light and easily raised, and had the feel of perfect contraction. Its mouth was neither tumefied nor irregular. The result was unavoidable. Dr. Billard denied her previous pregnancy and delivery, and she was forced to confess the fraud.†

* Male, p. 212. A case of a somewhat similar nature is mentioned by Capuron, p. 110.

† Annales d'Hygiène, vol. ii. p. 227. "March 21, 1775, a very extraordinary affair happened at a certain hospital. Two women, one of whom having the appearance of a nurse, the other of a maid servant, applied to the committee to let them have a male child, the youngest in the hospital, for their lady, who wanted to adopt one as her own. These women, on the committee's closely examining them, confessed that the lady's husband was gone abroad, and as she told him before he went that she believed she was pregnant, it was necessary to shew him a child; they likewise acknowledged the lady came from the Isle of Wight to London, to lie in. As it appeared that the adoption of this child was calculated to deprive some heir-at-law of an estate, or for some unlawful purpose, the intention of this

2. *Where the pretended pregnancy and delivery have been preceded by one or more deliveries.* The facility of counterfeiting in this case is certainly greater than in the former, particularly if the examination be not made within eight or ten days. Attention should be given to the following circumstances: The mystery (if any) that has been affected respecting the situation of the female; her age, and particularly whether she had been previously barren; and the condition of the husband, whether aged or decrepid. All these would be corroborating evidence against the actual occurrence of delivery.

3. *Where the female has been actually delivered, and substitutes a living for a dead child.* This cannot be elucidated by physical proofs, unless some persons have been present at the delivery. And in this, as well as in the former case, a strict examination should be instituted of the witnesses who have attended. Zacchias and Mahon* lay considerable stress on the resemblance that may exist between the parent and child; but this is of little value.

It sometimes happens, that the female dies shortly after the supposed or pretended labour; and it is necessary to examine the body, in order to ascertain the truth. We are to examine both the uterus and its appendages—as it is evident that the former may have been enlarged from causes independent of actual pregnancy.

The appearances that are considered to indicate delivery are the following:—"The uterus being found like a large flattened pouch, from nine to twelve inches long. Its cavity contains coagula or a bloody fluid, and its surface is covered by the remains of a decidua.† Often the marks of the attachment of the placenta are very visible; and this part is of a dark colour, so that the uterus is thought to be gangrenous by those who are not aware of the circumstance. The surface being cleaned, the sound substance of the womb is seen, and the vessels are observed to be extremely large and numerous. The fallopian tubes, round ligaments, and surface of the ovaria, are so vascular, that they have a purple colour; and the spot where the ovum escaped is more vascular than the rest of the ovarian surface. This state of the uterine appendages continues until the womb returns to its unimpregnated state. A week after delivery, the womb is as large as two fists. At the end of a fortnight, it will be found almost six inches long, generally lying obliquely to one side. The inner surface is still bloody, and covered partially with a pulpy substance, like decidua. The muscularity is distinct, and the orbicular direction of

paragraph is to caution those persons whom it may concern, to be on their guard against such infernal practices."—Dodsley's Annual Register, 1775. Chronicle, p. 101.

* Zacchias, lib. i. tit. 5. quest. 4; and lib. viii. tit. 2. quest. 8. Mahon, i. p. 209.

† The decidua is sometimes produced in cases of difficult menstruation; and it is important to remember, that it may be mistaken for abortion. It resembles it in the pains, discharge of blood, &c. But the one presents an embryo, at various stages of increase—while in the other, that is altogether wanting. It seems now agreed, that the discharge of this membrane (recognised by Dr. Baillie to be similar in structure to the decidua), occurs frequently in unmarried females. It would appear to be generated spontaneously by the inner membrane lining the uterus.—Blundell's Lectures, Lancet, N.S. vol. iv. p. 577. Ashwell on Parturition, p. 119.

the fibres round the orifice of the tubes very evident. The substance is whitish. The intestines have not yet assumed the same order as usual; but the distended cæcum is often more prominent than the rest. It is a month, at least, before the uterus returns to its natural state; but the os uteri rarely, if ever, closes to the same degree as in the virgin state."*

* Burns's Midwifery, p. 326. The dissections of Mr. Mayo (quoted in London Medical Repository, vol. xxi. p. 343) and of Dr. Hewson (North American Medical and Surgical Journal, vol. ix. p. 371), of females dying immediately after delivery, corroborate the above statement. In both, the os tincæ was much dilated; being, in the former, when disposed in a circular form, about two inches in diameter. In Dr. Hewson's case, the uterus was about the size of a man's fist.

In a uterus at the sixth month, examined by Dr. J. B. S. Jackson of Boston, the long axis measured nine and a half inches, and transversely, at its broadest part, it was six inches. It was, on an average, three lines in thickness. The cord was eleven and a half inches long. The child, a female, measured eleven and a half inches—with fine down on the head, but the nails not formed.—Boston Med. Mag. vol. iii. p. 580.

Dr. Donald Munro (Edinburgh Physical and Literary Essays, vol. i. p. 459) examined the uterus of a female *six months* advanced.

Dr. Robert Lee (Medico-Chirurgical Transactions, vol. xvii.), of one *two months* advanced. It was double the size of one unimpregnated, and was five inches long, three and a half in the greatest lateral direction, and two in the antero-posterior diameter.

John Hunter (Trans. Soc. promoting Medical and Chirurgical Knowledge, vol. ii. p. 66), one of a female who poisoned herself about *one month* after impregnation. It was highly vascular, and covered on its internal surface with a pulpy substance, which was evidently coagulated blood. The cervix and os uteri natural; but the body, near the fundus, a little enlarged. Nothing like an embryo could be detected.

The following measurements from Velpeau and Madame Boivin may be useful in some cases:—

Length of the unimpregnated uterus from the most salient point of the fundus to the end of the anterior lip of the neck, 26 lines, and from that to 28 (Velpeau.)
Length of neck, 13 lines.
Uterine walls, 5 lines in thickness.
Cervical walls, 3½ to 4 lines, (2 to 3, Velpeau.)
Weight without appendages, 4.9 drachms (Boivin), 8 to 12 drachms (Velpeau.)
Breadth of neck, 9½ lines—thickness, 7 lines.

After several pregnancies.

Total length	2½ to 3 inches.
Length of neck	13 to 15 lines.
Length of body	2 inches.
Breadth of neck	18 lines.
Thickness of neck	8 to 10 lines.
Thickness of uterine walls	6 lines.
Weight	1½ to 2 ounces.

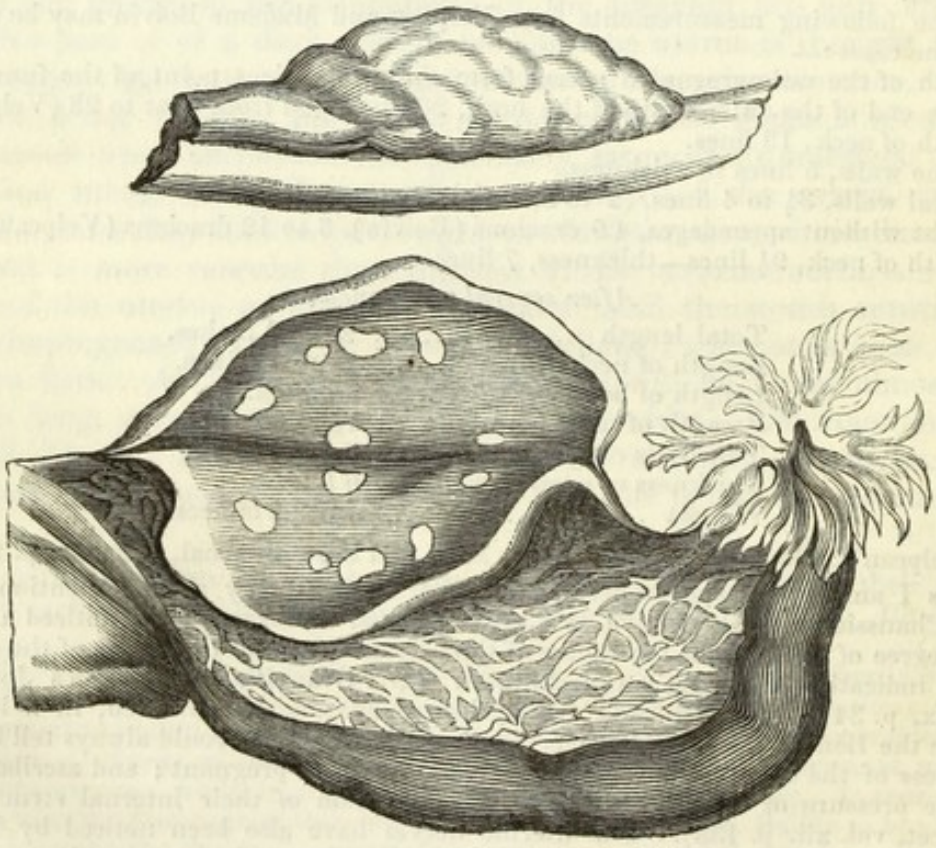
(Velpeau's Midwifery, p. 61. Edin. Med. and Surg. Journal, v. xxxix. p. 210.)

As I am on the appearances found after death, I may as well mention here, that Chaussier and others have, in a great number of observations, noticed a peculiar degree of thinning in the centre of the osseous plates of the bones of the ilium, as an indication of having borne children. (Dr. Granville, in Brande's Journal, vol. xx. p. 341). Mr. Brookes, the celebrated anatomist, remarked, in a lecture before the London Zoological Society, that "an anatomist could always tell by the thinness of the ossa illii, if the woman had ever been pregnant; and ascribed this to the pressure of the uterus producing absorption of their internal structure." (Lancet, vol. xii. p. 133). The uterine nerves have also been noticed by Tiedemann, Chaussier, and Dr. Wm. Hunter, to become larger during gestation. — London Med. Rep. vol xxi. p. 167.

To these it has been customary to add, with great confidence, the presence of a *corpus luteum* in the ovarium. As we shall have frequent occasion to refer to this peculiar body, it may be proper briefly to describe what is understood by it. The corpora lutea are oblong glandular bodies, of a dusky yellow colour. In the earlier stages of pregnancy, and for some time after delivery, they are extremely vascular, except at their centre, which is whitish; and in the middle of this white part is a cavity, from which the impregnated ovum is supposed to have proceeded. They gradually fade and wither: but there is no regularity as to the time of their disappearance.*

* Burns, Denman. In the article on the Signs of Pregnancy and Delivery, by Dr. Montgomery (Cyclopædia Practical Medicine), he states that he has found the corpus luteum distinctly visible five months after delivery at the full time, but not beyond that period; "and the corpus luteum of a preceding conception is never to be found along with that of a more recent, when gestation has arrived at its full term; but in cases of miscarriage, repeated at short intervals, it may. At the time of delivery the corpus luteum is neither so large nor so vascular as at the earlier periods of pregnancy, except the woman should happen, at the time of her death, to be labouring under inflammation of the uterine system." In a case of death five weeks after delivery, it was diminished about one-half in size, was closer in its texture, and its colour becoming indistinct; but the radiated central cicatrix was quite obvious. Dr. Montgomery describes the corpora lutea as almost always *oval* in form.

The accompanying plates, from Davis's Obstetric Medicine, will give an idea of the appearance of these bodies. The first represents the external appearance of the ovarium; the second, the corpora lutea.



From the experiments of De Graaf and Haighton,* it seemed to be decidedly established, that their existence was a certain indication of previous impregnation; and such was the general belief of the profession. The causes of a more minute investigation on this point, and of the invalidity of this proof, will be best understood by the introduction of an important medico-legal case. I make no apology for its length, since it reviews, as it were, all that we have stated on the subject of delivery, and points out the difficulties that may occur in judicial investigations.

Charles Angus, Esq. of Liverpool, was, in September 1808, tried at Lancaster for the murder of Miss Burns, a female residing in his house. The symptoms previous to her death, and the appearances observed on dissection, were such as to warrant a suspicion that she was poisoned. The medical examiners also found the uterine organs in such a state as to lead them to declare, that in their opinion the deceased had been delivered, a short time before her death, of a fœtus, which had nearly arrived at maturity. Accordingly, on the trial, the medico-legal questions agitated were,—1. Whether Miss Burns had died from the effects of poison; and 2. *Whether she had been delivered of a child recently before death?*† I shall notice the first question in its proper place, and here confine myself to the second.

The testimony respecting her situation while living, appears to be contradictory. Before the coroner, the servants swore that for some time previous to her death she had increased very much in bulk, and had the appearance of a pregnant woman. Shortly before her death, the pain in her body was so severe that she could not put her feet to the ground, and could scarcely bear to be touched; and she was occasionally observed to hold fast with her hands to the end of a sofa, on which she sat. These pains continued during the whole of Wednesday and Thursday, but on Friday morning (the day she died) they had gone off; she appeared to be lighter, and was able to walk across the floor. She was also distressed during her illness with retention of urine. On the trial, the witnesses for the prosecution swore that she had every appearance of being pregnant; while those for the prisoner swore that for twelve months before her death she had been very poorly, and had been irregular for some years; that she had a great difficulty in breathing, and complained that she was much puffed and swelled, and was afraid of dropsy; that some weeks before her death she was observed to be uncommonly flat-bosomed, and not half so plump as she used to be in health, but swelled at the stomach, and that she had no appearance of being pregnant. Nothing satisfactory or conclusive can be drawn from these conflicting statements.

The appearances on dissection. The uterus was found so enlarged as to be capable of containing nearly a quart of fluid. Before it was removed from the body, Mr. Hay, the surgeon, placed his left hand

* Philosophical Transactions, vol. lxxxvii. p. 159.

† Mr. Angus was indicted on two counts — 1. For poisoning Miss Burns; and 2. For administering poison (oil of savin) in order to procure an abortion.

upon the fundus uteri, and introduced his right hand with the greatest ease into it, until the fingers of his right hand could be felt by those of the left through the fundus. The uterus being taken out of the body, an incision was made along its whole length, and its cavity laid open. The whole internal surface was bloody, and near the fundus there was a well-defined circular space of a deeper colour than the rest, and about four inches and a half in diameter. This space was rough and rugged, and a small fragment of what appeared to be the placenta, still adhered to it; and the blood-vessels opening upon it were distinctly visible, and as large as a crow-quill, whilst every other part of the internal surface was smooth. The walls of the uterus were about half an inch in thickness. There was no coagulum in it. The os uteri remained in so dilated a state, that the four fingers of a hand drawn together in the form of a cone would pass through without in the slightest degree distending it. *Vagina ipsa admodum dilatata. Labia ejus fuerunt livida, et undique sanguine fœdata.*

The medical witnesses for the crown, (Drs. Gerard, Rutter, and Bostock, and Mr. Hay), considered these appearances as conclusive in favour of her recent delivery; and they remark, that the enlargement of the uterine vessels within the boundaries of the placental mark and the mark itself, were to them decisive, that mere enlargement of the cavity of the uterus, and dilatation of the os uteri, and even hæmorrhage might have been occasioned by other causes than pregnancy, as by dropsy; but no form of dropsy would occasion that mark, and no dropsy would explain the extraordinary enlargement and dilatation of the uterine vessels within that mark.

On the trial, however, Dr. Carson of Liverpool, being examined as a witness, objected to the above conclusions for several reasons. *The great dilated state of the uterus* was such, according to him, that if the mother had parted with a placenta, she must either have flooded to death, or the womb must have been gorged with coagulated blood. To this opinion the testimony of Sir Charles M. Clarke, lecturer on midwifery in London, to whom the uterus was shewn after the trial, may be opposed. "I have seen," says he, "uteri after the death of patients lately delivered, in whom, however, there was no hæmorrhage, which have been contracted in no greater degree than the uterus which is in the possession of Mr. Hay." Besides, it is evident that the uterus had contracted, and was not at its maximum of dilatation; for, if it could not contain more than a quart of fluid, it certainly could not, in that state, have contained a fœtus with its placenta and membranes.

Dr. Carson next intimated that the appearances which were supposed to indicate the recent expulsion of a fœtus, might be explained on the supposition that *dropsy of the hydatids* was the disease under which Miss Burns laboured. These hydatids, he observed, are attached by pediculi to the internal surface of the womb, and the action necessary to expel them would cause a dilatation of the os uteri. He supposed, also, that the vessels nourishing the hydatids might be so much smaller than those nourishing a fœtus, that in a state of undue

dilatation, a flooding might not take place on their expulsion. When pressed with respect to the placental mark, he replied, that the attachment of these dropsical hydatids might have caused it.

I have already adverted to this subject in a previous chapter. I will add, that Dr. Baillie never saw an example of hydatids of the uterus;* and Dr. Denman, although he admits their occasional occurrence, yet observes, that the other species is what is generally observed. A MS. extract from notes of Dr. William Hunter's lectures on the gravid uterus, delivered in 1765, gives the most minute account of these extraordinary productions. "I have seen," said he, "a placenta in the fourth month, all degenerating into hydatids. There are two kinds, one where the little hydatids are distinct and detached; the other, where they hang together in strings, like bunches of currants. This last sort is the most common in the uterus. They are most common in the placenta, but they may be in other parts of the uterus. Sometimes there are vast heaps of them in the cavity of the uterus, and no remains of the placenta. I ventured, from seeing hydatids coming away from the uterus, to say that the woman was with child, because they most commonly attend the placenta. I have seen pailsful of hydatids come away from the uterus with pains, the placenta and fœtus being thus converted."

There is little doubt but that hydatids generally hang together like a bunch of currants, and are united by a common peduncle or footstalk. Should, however, the reverse be considered probable, it is difficult to conceive where the hydatids could have been placed, as in this case, when the bases of the common footstalks alone extended over a space of four inches and a half in diameter. Three cases are related by Dr. Bostock, to whom they were communicated by Mr. Kendrick, surgeon at Warrington, of the disease under consideration, and in each of them the medium of attachment to the uterus was a placenta, about *the size of half-a-crown*. I will repeat again in this place, what I have before endeavoured to prove, by a reference to the best authorities, that there is no case on record where *hydatids of the uterus* have been formed *independent of sexual connexion*;† and again, should there be such a case, were the parieties of the uterus increased, or the os uteri enlarged, as in this instance?

The difference of opinion that was thus expressed by the medical witnesses, not only on this question, whether Miss Burns had been recently delivered, but also on the main accusation of poisoning, led to an acquittal. But, I believe few can review this case, and not come to the conclusion, that she had really been pregnant. The charge of infanticide does not appear to have been made, and, of course, ought not, without the previous finding of an infant; but in every thing that relates to the verifying of sexual connexion and its consequences, and which in this instance must have been criminal, the proof seems to be complete. Even hydatids, as we have sufficiently shewn, are to be considered, in a vast majority of cases, as indications of impregnation.

* Morbid Anatomy, 3d. ed. p. 376. † Page 189

If present in this instance, they should have been produced, or at least seen by some medical person.

It was not until after the trial that the ovaria were examined. They were then divided in the presence of a number of physicians, and a *corpus luteum* distinctly perceived in one of them. Mr. Hay took the uterus and its appendages to London, and shewed it to the most eminent practitioners there. He received certificates from Drs. Denman and Haighton; Messrs. Henry Cline, Charles M. Clarke, Astley Cooper, and Abernethy,—all stating, that it exhibited appearances that could alone be explained on the idea of an advanced state of pregnancy. And it appears to have been universally allowed, that the discovery of the *corpus luteum* proved the fact beyond a doubt.*

Subsequently, however, to this time, Sir Everard Home investigated the subject, and appears to have shewn that the corpora lutea may be present without impregnation. He examined the ovaria of several women who had died virgins, and in whom the hymen was too perfect to admit of the possibility of impregnation; and found that there were not only distinct corpora lutea, but also small cavities round the edge of the ovarium, left by the ova that had passed out at some former period. It is therefore supposed that the excitement of the ovaries, from passion alone, may be sufficient to rupture the vessels, and produce corpora lutea; and this is strengthened by the corpora lutea having been found in the female quadruped, after a state of periodical lasciviousness, where no copulation had taken place.†

Dr. Blundell, in his experiments and observations, supports this opinion. He states that there are two kinds of bodies found in the ovaries: one fabiform, and the other spheroid. The first, when divided, have a shallow cavity; and it is these alone which constitute what we call *corpora lutea*. "The latter *may* be produced by impregnation; but at present, to some it may appear that they are rather the consequences of incipient disease than of fruitful intercourse." And, again, of the fabiform bodies, the larger only deserve notice; they should be as large as a split pea. In the case of a female aged seventeen, who died of chorea, and in whom the hymen, which nearly closed

* The facts from which the above case has been prepared, are drawn from a review of the trial of Mr. Angus, and the pamphlets to which it gave rise, in the Edinburgh Medical and Surgical Journal, vol. v. p. 220; also a pamphlet entitled, "A Vindication of the Opinions delivered in Evidence by the Medical Witnesses for the Crown, on a late Trial at Lancaster for Murder; Liverpool, 1808." This masterly production is from the pen of Dr Rutter, to whom I must apologise for having attributed it to another. The quotation from Dr. Hunter's Lectures, and the cases of Mr. Kendrick, are taken from it. I am also indebted for some hints to the London Medical and Physical Journal, vol. xxi.; and the Edinburgh Annual Register, vol. i. part ii. p. 188. I may add in this place, that a rude, but instructive plate of hydatids, formed like bunches of currants, is contained in Stalpart, vol i. p. 302.

† Denman, p. 119. Smith, p. 489. Blumembach would, however, seem to have been the first who decidedly maintained that, under certain circumstances, a corpus luteum may be produced without sexual connexion.—Bostock's Physiology, vol. iii. p. 29.; Elliotson's Blumenbach, p. 468.

the entrance of the vagina, was unbroken, there were no less than four corpora lutea; the largest, however, was little bigger than a mustard-seed. Dr. Blundell hence concludes, that "the fabiform corpus luteum with asterical cavity, of a yellow colour, large as a pea, or larger, and seated beneath a cicatrix formed on the corresponding surface of the ovary, may be looked upon, in the present state of our knowledge, as a strong presumptive proof of impregnation; adding, however, at the same time, that, I conceive a jury ought to be cautious of giving too much weight even to this evidence, when human life is at stake."*

It is proper here to add, that Sir Everard Home supposed that impregnation was necessary to the *expulsion of the ova;* and Mr. Stanley corroborates this idea, hy expressing a doubt whether the effect of the excitement on the ovary of the virgin can extend beyond the rupture of the vesicle, and the production of the corpus luteum. It seems to be conceded that it is smaller, and not marked by the extensive vascularity of the contiguous parts of the ovarium.†

A late writer, however (Professor Montgomery of Dublin), decidedly controverts the observations and experiments both of Dr. Blundell and Mr. Stanley. After noticing the remarks of Blumenbach and Meckel, and endeavouring to shew that it is merely an opinion on their part, that corpora lutea may occur independent of conception, and that they do not seem to have seen any instances, he refers to the decisive experiments and opinions of Dr. Haighton, who observed, in his paper read before the Royal Society, that "no corpora lutea exist in virgin animals; and that whenever they are found, they furnish incontestible proof, that impregnation either does exist, or has preceded." He adds, that he has seen several of these *virgin lutea*, as they are unhappily called, and has preserved several specimens of them. They differ, according to him, from those of impregnation, in the following particulars: 1. There is no prominence or enlargement of the ovary over them. 2. The external cicatrix is wanting. 3. There are often several of them in both ovaries, especially in patients who have died of tubercular diseases. 4. They are not vascular, and cannot be injected. 5. Their texture is feeble — never presenting the soft and glandular appearance so characteristic of the real. And,

* Blundell's Lectures, Lancet, N.S., vol. iv. p. 229. Medico-Chirurgical Transactions, vol. x. p. 263. Dr. B. divided the uterus in rabbits, and allowed it to heal, so that at the line of division, the canal of the uterus became shut up: in other instances, he made an incision through the vagina. The rabbits admitted the male: in both cases the wombs were evolved; *corpora lutea* were formed, but no fœtuses. —Lectures, ibid. vol. iii. p. 258.

Dr. John K. Mitchell, in his experiments on rabbits, obtained similar results, although he suggests the possibility of corpora lutea being a proof of intercourse merely.—Chapman's Journal, N.S., vol. v. p. 256.

† Transactions of the College of Physicians of London, vol. vi. p. 425. Sir E. Home dissected a female who had been impregnated a week before death. The ovum was found in the uterus, enveloped in coagulated lymph. Two corpora lutea were observable, and there were several cavities from which ova had previously made their escape. The os tincæ was closed with a thick jelly; but the opening to the fallopian tubes was pervious.—Annals, vol. ix. p. 463; and vol. xi. p. 54.

6. They have neither the central cavity, nor the radiated cicatrix which results from its closure.*

It is hardly necessary to add, that Dr. Montgomery is a firm believer in the presence of a true corpus luteum being the product of conception only.†

I have endeavoured, in several parts of this chapter, to inculcate the idea, that medical examiners should, in disputed cases, limit their opinion to the fact, *whether evidences of conception are present or not.* The law is so constituted, that nothing further is required of them on this point. *An infant must be found, in order to bring the charge of infanticide;* and in all other instances, it will be sufficient if we prove previous sexual connexion, whether the product has been an organised fœtus or not. The following case is calculated to enforce the necessity of confining our opinion to this fact.

Mrs. Cunningham, aged twenty-four, and the mother of three children, considered herself nearly four months advanced in pregnancy, when the rudeness of a licentious person required her to make a violent exertion. On the succeeding day she perceived a slight discharge of blood from the vagina, which ceased in about twenty-four hours. A day thereafter it returned with increase, and continued (gradually diminishing) for three days. All this time she suffered no pain, nor was she prevented from managing her domestic affairs. There was a slight tenderness of the abdomen only. At the conclusion of the time last mentioned she was seized with pains resembling those of parturition, and accompanied with a profuse hæmorrhage. Mr. Lemon, a surgeon, was called, and on examining *per vaginam*, he found the os uteri dilated to the extent of half-a-crown, and a bag protruding through it. A fleshy cake, three inches in diameter, possessing every character of a natural placenta, and having a membranous bag connected with it, was shortly thereafter expelled. The shape of this mass was oblong. On cutting into the bag, which was flaccid, the contents gave an appearance similar to what is presented on the exposure of the abdominal and thoracic viscera of a very young fœtus. But the expansion of the placenta rendered the nature of the appearance evident. Its whole surface was covered with tumours. There were about twenty-two distinct, besides many inconsiderable ones, of

* Cyclopædia of Practical Medicine, *ut antea.* It is evident that the common opinion is incorrect, that the number of children which a female has had can be ascertained by the number of corpora lutea in the ovary.

† The following note of Dr. Dunlop, published in the second edition, — "A recent case has, in my opinion, completely overthrown the theory, that even strong passions are necessary to the formation of the corpora lutea. My friend Dr. Mackintosh, lecturer on midwifery in Edinburgh, has in his museum a preparation taken from the body of a child, which he, in company with Dr. John Scott, dissected at Pierceshill Barracks. The subject was not above five years old, and the hymen, of course, was entire. She died of tubercular disease in the lungs; yet in her ovaries were numerous *corpora lutea*, as distinct as I ever saw them in the adult unimpregnated female." DUNLOP. — is thus dismissed by Dr. Montgomery: "The only comment necessary to make on this statement is simply to remark, that *one* real corpus luteum, as it is found in the 'adult impregnated female,' is fully as large, or even larger, than the ovary of a child five years old; therefore, it is *impossible* that there could, in such a case, be several of them."

various size, shape, and colour, and some in clusters,—all seemingly connected together by veins. The largest tumour was equal in magnitude to a small walnut. Some were of a livid colour, others fleshy brown, and two or three light yellow. The livid ones had generally condensed fat at the extremity; and they, as well as the brownish, contained coagulated blood.

The woman, during the growth of this mass in the womb, had every symptom of pregnancy—nausea, capricious appetite, enlargement of the breasts, prominent firmness of the abdomen, and a cessation of the menses. She had not, however, felt any actual motion.

Mr. Lemon remarks, that, if this female had died from hæmorrhage, and her death been made a subject of legal investigation, the womb would probably have exhibited all the proofs of impregnation. Even the *placental mark* would have been present, and yet no fœtus or umbilical cord was formed in this instance.

The observations of the editors of the journal from which this case is taken, are a satisfactory commentary on it. This mass was evidently the product of conception and impregnation. The whole catalogue of symptoms tends to prove it, and the only circumstance against it, is the absence of a fœtus and umbilical cord. "But this furnishes no conclusive argument, as there are innumerable instances of fœtuses so exceedingly imperfect that their nature can scarcely be recognised; and with a still more imperfect organisation, they degenerate into a mass like the present."* The *placental mark*, then, in this instance, would have been a satisfactory proof of conception.

II. *Of some medico-legal questions connected with the subject of delivery.*

1. *Can a woman be delivered without being conscious of it?* This question must be answered in the negative; with, however, some exceptions. Delivery is, undoubtedly, to a certain degree independent of the will, and there may hence be certain situations in which it will take place without the female's knowledge. The administration of narcotic substances may cause such a state; as in the instance, in 1641, of the Countess de Saint Geran, who was plunged into a deep sleep by a narcotic beverage, and, during it, was delivered of a boy. In the morning she awoke, and found herself bathed in blood, and the infant gone. Her relations had suborned individuals to remove it, in order to deprive her of the pecuniary advantages of her situation.† There is also a class of diseases commonly called comatose, and accompanied either with or without fever, during the operation of which, delivery may take place without the female's knowledge. Hippocrates mentions a case, in a woman eight months advanced, who, on the fifth day of a typhoid fever, accompanied with coma, fell into labour, and was deli-

* Edinburgh Medical and Surgical Journal, vol. xi. p. 96. "Case in which a mass, resembling a placenta without a fœtus, was discharged from the womb. By M. Lemon, member of the Royal College of Surgeons, London." With observations by the Editor.

† Foderé, vol. ii. p. 10, from the *Causes Célèbres*. The authors of this crime were discovered, and the child was restored to its rights, in June 1666.

vered without being conscious of it. I will only add to these, the account given by Dr. Hoyer, of Mulhausen, of a female dying in labour, who was put on the bier for interment, and while there, an infant was suddenly born.*

These examples prove that it is possible for a woman to be delivered without being conscious of it, but they at the same time shew, that if some extraordinary and striking cause do not intervene, the assertion is to be disbelieved. The early pains of pregnancy may be mistaken for those of colic †—flooding may commence during sleep; but it is hardly credible that the whole process of labour and delivery may be gone through, by a healthy woman, and of sound mind, without her being aware of it.‡

2. *Can a woman, if alone and without assistance, prevent her child from perishing after delivery?* This is a most important question, and deserves our serious consideration, from its bearing on the subject of infanticide.

There are undoubtedly many cases, in which an unassisted female will be unable to prevent the death of her infant. Among these may

* Foderé, vol. ii. p. 11. Mr. Shaw, in his Essay on Partial Paralysis, quotes the following case from Dr. Cheyne's Essay on Apoplexy. "A woman was attacked with apoplexy, and lay hemiplegic for two days—at the end of which time, she was delivered of a living child, the uterus contracting in the most perfect manner, so as to expel the fœtus and secundines, and then contracting regularly, so that the flooding which might have been anticipated did not take place."—Journal of Foreign Medicine, vol. iii. p. 20.

Dr. Montgomery cites several cases of delivery occurring during sleep. They are all cases of females who had had children previously, and in whom it is probable that a single pain was sufficient.

† "While lecturing on the subject of concealment of pregnancy, in the winter of 1823–24, I received the following extraordinary case, from my friend, Mr. M'Intosh. 'I was consulted about a married lady, in the spring of 1822, who was supposed to be in a very bad state of health. She had been attended by Dr. ——, and treated for an affection of the spine and dropsy. The husband of the lady grew impatient, as she became daily worse, and the abdomen more and more distended. He sent for the family surgeon, who suspected it might be pregnancy, attended with peculiar nervous irritability, and recommended that I should be called in to examine more particularly. Accordingly, I waited on her, and as she sat on her chair, the nature of the case became perfectly clear, as I distinctly perceived the motion of the fœtus. This I mentioned, but the lady scouted the idea. I warned her to get baby linen and dresses ready, which she did not do, so convinced was she that she was not pregnant. In six weeks afterwards, I was suddenly called and found the patient in labour; and to demonstrate, in the clearest point of view, that she had not believed that she was in the family way, no nurse was engaged, nor had any thing in the shape of dress been prepared for the child. I told her she was now in labour, but she would not believe me. Upon examination, I found the os uteri open, the membranes protruding, and I distinctly felt the head of the child. The waters broke; still she would not believe. The pains increased, the head of the child was born, but she would not credit her actual situation, till she heard the child cry and it was put into her arms. Both mother and child did well; and I am engaged to attend the mother a second time in November, 1823.'—Dunlop.

‡ Foderé, vol. ii. p. 10. Capuron, p. 129. Dr. Asa B. Brown, of Somerset, Niagara county, kindly transmitted to me a case which occurred to him in 1830. The female was in labour with her first child, and was seized with puerperal convulsions. It was deemed absolutely necessary to deliver her, and this was accordingly done. After her recovery, she stated to Dr. Brown, that she had not any knowledge of the birth of her child.

be mentioned very rapid and early delivery. Instances of this nature occur to all accoucheurs, and Foderé relates of his own wife, that a single pain brought forth the child. Such is the confirmation of the pelvis, and so powerful the action of the womb, that the membranes and fœtus are expelled together. Now a female taken thus, might be unable to prevent the child from falling, and its death would ensue, if she remained unassisted.* Such a state of the parts is, however, very uncommon in a first delivery;† and this is the one that commonly is considered in cases of infanticide. If a woman has, in a previous labour, experienced so rapid a parturition, it is her duty to guard against its consequences, when a second is impending. Another possible circumstance is, that a woman may be taken in labour and delivered while passing her fæces. The pressure of the uterus, in the latter days of pregnancy, produces an inclination of this kind, and even during labour it is very common.‡ But delivery in this position may not only be

* Dr. Hunter mentions a case where the female was seized during the night, and the child was born before he arrived. She held herself in one posture, to prevent the child from being stifled, but although it had cried, yet, on the arrival of Dr. Hunter, it was found dead, lying on its face and covered with blood.

Dr. Ramsbotham (Lectures in London Medical Gazette, vol. xiii.) also mentions cases of rapid delivery, and where the child was with great difficulty saved.

The following are fortunate cases:

"The following case I had from Dr. Marshall. The wife of a bombardier of artillery, while stepping out of her bed, in the ninth month of her pregnancy, dropped the child on the floor. She had no warning of her approaching labour, and luckily the child was unhurt.

Another case I should be afraid to state, but that I had it from a gentleman of unquestionable veracity. "The wife of an officer of a Scotch militia regiment had long been married without having a child. One day, while bathing her feet in her bedroom, her servant heard the cries of a child; she rushed into the room, and found her mistress lying back in her chair in a swoon, and a new-born infant struggling in the tub at her feet. She raised the child, and both it and the mother did well. In this case neither the lady nor her husband had the slightest suspicion that she was pregnant."—DUNLOP.

† Mahon, vol. ii. p. 381.

‡ I apprehend that it is as frequent with cases of this description to furnish matter for keen discussion as to the guilt or innocence of the female, as with any that I have mentioned. An anonymous correspondent of the London Medical and Physical Journal (vol. viii. p. 448.), mentions the instance of a lady, who being attacked with diarrhœa toward the close of pregnancy, was one day seized on the night-stool with a labour pain, and in a short time brought forth a child, before she was able to rise and give the alarm. He was immediately sent for, and rescued both mother and child from their perilous situation. He adds, that if the female had gone to the common privy, it would have been fatal to the child. But in this case, the lady was above suspicion—not so with an unmarried, seduced female. The remark of the Editors of the Edinburgh Medical and Surgical Journal answers the argument to be drawn from such unexpected occurrences. "So sudden a delivery can only happen to a person who has borne children before." (Vol. xix. p. 454.) But *is it not possible* for a similar case to happen with a first child? If so, it must have its full weight in cases of infanticide.

Dr. Davis gives us the following narrative:

Dr. Haighton, in his Lectures on Midwifery, related the case of a female at the full period of gestation, who was seized with a sudden and pressing call. Living in the country, she hastened to the garden. The pit or cess-pool of the vault was large and deep. On being seated, a violent parturient effort took place, and the child was suddenly expelled. It fell, and was swallowed up by the filth below. "Circumstances immediately transpired which led to the arrest of the unhappy young woman,

fatal to the child, but very injurious to the mother, by tearing off the umbilical cord, or inverting the uterus. Delivery may also be attended with hæmorrhage, and consequent debility, or with fainting or convulsions, and the female be unable to assist her offspring. These are cases which do not often occur, and when they do, they leave traces sufficiently evident—paleness, swoonings, the state of the pulse, and of the infant.* A fourth case, is when the mother being alone, and the child having its face to the sacrum, is delivered with it downwards. In this position it cannot breathe, unless it be turned; and it is well known that the slightest substances impeding respiration in a new-born infant, such, indeed, as a portion of the bed-clothes, or a piece of wet linen, will destroy it.

There are, also, some infants so weak at birth, that they require the warm bath, rubbing with stimulant applications, &c. in order to preserve their life. An unassisted mother cannot, of course, save these. It has also been suggested, that the female may be suddenly delivered while in a standing posture, and the infant falling, may be found with a fractured skull. In such a case, however, we should look for a rupture of the cord, and a violent hæmorrhage, consequent on a forcing away of the placenta.† The cord may, also, be wound round the neck, and thus prevent respiration.

Lastly, the infant may perish, and the mother not be able to prevent it, when the umbilical cord has not been tied after being cut, broken, or torn. The first of these, however, is such a proof of presence of mind, that we may justly be distrustful, if she denies being afterwards unable to tie it.‡ It may be broken and torn, as we have already stated, by the weight of the infant, and the mother be unable to save it. There are, however, instances in which the mother and the heroine are admirably combined. The wife of a goldsmith at Marseilles was seized in labour while walking her room. The infant fell,

and she was sent to York Castle to take her trial. The medical practitioner of the family in which she was servant, was subpœnaed as a witness, and swore that it was perfectly possible for women in labour to distinguish, and that in fact they always did know, the difference between the bearing down pains of parturition and the calls of nature, however pressing or painful, to empty the contents of the rectum. On this most incompetent and criminally ignorant evidence the unfortunate prisoner was found guilty of the crime of infanticide, and executed."—Davis's Obstetric Medicine, p. 24.

* Mahon, vol ii. p. 383. † Smith, p. 370.

‡ The following remarkable case shews that it is possible for the division of the funis to "occur in such circumstances as to imitate precisely the effects of criminal violence inflicted after delivery." Mr. Chamberlayne of London relates of a patient of his, who was taken so suddenly in labour, that the child shot forth from her with such force as to separate the funis, which broke exactly in the right place, and as even as if it had been cut with scissors; not so much as one drop of blood followed, although the child was strong and very lively.—London Medical and Physical Journal, vol. vii. p. 284.

M. Meirieu relates the case of a female walking in her room, who was suddenly seized with labour pains. She took firm hold of the bed-post, brought herself nearer to the ground, retained the infant by means of her clothes, and placed it on the floor. The whole was the affair of an instant. On examining the child no trace of contusion could be found, but the umbilical cord was broken at about four inches from the ring, and the end drawn out to a point.—Quarterly Journal of Foreign Medicine and Surgery, vol. v. p. 634.

and the cord broke. She took it up and called for assistance, but was not head. Finding that it was losing blood by the cord, she compressed it with her fingers, and held it so for two hours, when she was found fainting. Her life, however, and that of the child, were both preserved.*

These are the exceptions to the general doctrine that may be laid down in such cases, viz: *That every woman is more or less acquainted with the time when she is to be in labour, and that it is her duty never to be so far alone as to render assistance accidental.* Even during labour, the vast majority of females make known their situation by their pains; and they will only be suppressed by those in whom shame and the fear of dishonour are predominant passions. And it is a question of moment, whether we should feel that sympathy for this sense of shame, which some authors, and particularly Dr. William Hunter, have inculcated in their writings. It is, at all events, misplaced as to time; and the female who destroys a human being, and her own offspring, to escape its effects, should have felt its influence at an earlier period. "To the moral and political philosopher, Dr. Hunter may appear to have exalted *the sense of shame into the principle of virtue*, and to have mistaken the great end of penal law, which is not vengeance, but the prevention of crimes."† It is not necessary, however, to enlarge on this point. Circumstantial evidence generally guides in the preliminary decision of it, when accusations of infanticide are made; and great stress is properly laid, in disputed cases, on the incidents of time and place, and of situation and character.‡

PART II.

Delivery, as it respects the child, may become a subject of importance, both in civil and criminal cases; and instances are frequently occurring

* Foderé, vol. ii. p. 31. The following extract, from a late writer on law, is directly applicable to the question considered above. "One thing is very remarkable, and occurs in most cases of concealment and child-murder, viz. the strength and capability for exertion evinced by women in the inferior ranks shortly after child-birth —appearances so totally different from those exhibited in the higher orders, that to persons acquainted only with cases among the latter, they would appear incredible. A mother, two or three days after delivery, walked twenty-eight miles in a single day, with her child on her back. In the case of A. Macdougal, 1823, it appeared that she was sleeping in bed with two other servants, but rose, was delivered, and returned to bed without any of them being conscious of what occurred. Many respectable medical practitioners, judging from what they have observed among the higher ranks, would pronounce such facts impossible, but they occur so frequently among the labouring classes as to form a point worthy of knowledge in criminal jurisprudence."—Alison's Principles of Criminal Law of Scotland, p. 161.

† Percival's Medical Ethics, p. 84.

‡ On this question, see Foderé, vol. ii. p. 25; Capuron, p. 131; Smith, p. 365 to 377; Mahon, vol. iii. p. 381, &c. Cases of sudden delivery are noticed by most obstetrical writers, and in many periodicals. I will only add a few to those already cited. Two cases by Mr. Tatham (London Medical Repository, vol. xxi. p. 287.) One of these was with a second child, and *not with a first*, as it is incorrectly stated in the Medico-Chirurgical Review, vol. v. p. 237.

Cases by Mr. Thomas.—London Medical and Physical Journal, vol. lii. p. 353.

Blundell's Lectures.—Lancet, N. S. vol. i. p. 116.—Davis, Ryan, &c. &c.

in which the utility of properly understanding its phenomena is clearly manifested. The arrangement proposed was to notice,

I. *The signs of the death of the child before or during delivery.*

This subject may be agitated in civil cases where the succession to an inheritance is questioned; or in criminal ones, as when a pregnant woman is maltreated, and her offspring is supposed to have died from the injury.* It is, however, of the greatest importance, from its bearing on the two great medico-legal subjects of Abortion and Infanticide: and I shall notice it at this time as an introduction to them.

During pregnancy, the life of the fœtus is inferred from the good health of the mother; the progressive increase of the abdomen in size, and the motion of the fœtus being experienced. These form strong presumptive evidence, but there are exceptions to all of them. Healthy females may bring forth dead children, while sickly ones have produced living children. The increase of the abdomen, also, may be owing to a mole, or to dropsy; while the irregularities that are experienced respecting the motion of the fœtus are sufficient to render it very uncertain. In many cases the mother has imagined that she felt life to the moment of the delivery of a dead child; while, on the contrary, I need hardly add, no motion, or a very slight one, has been experienced for a considerable time previous to the most favourable labours.

The same uncertainty attends the proofs of life during delivery. The limpidity of the waters—the regularity of the pains, and their gradual increase in strength—the pulsation of the heart and umbilical cord of the fœtus; or, if it is not practicable to ascertain these last, the pulsation at the interior fontanelle—and the swelling, tension, and elasticity of the presenting part, together form an incontestible chain of evidence in favour of its presence. Separately, however, they are susceptible of doubt. The two first are uncertain; it may be impracticable to ascertain the third; the occurrence of the fourth is denied by some authors; and it may be wanting in children who are apoplectic or feeble, and who, notwithstanding, have recovered after birth.† The last is a very favourable sign; but death may ensue during delivery, and the congestion induced by the detention in utero preserve it.

In investigating, on the other hand, the signs of the death of the fœtus, we must refer, in the first place, to the causes that may have induced it. As to the mother these are numerous. The unhealthiness of her habitation; the mode of dress; the want of food, or improper use of it; violent exercise; too great labour; violent passions of the mind, either of the exciting or depressing kind; venereal excess; intem-

* As in the following case given by Dr. Kennedy (p. 208). A woman in the seventh month was sent to the Lying-in Hospital, Dublin, to be examined whether her child was, as she asserted, killed in the womb by certain blows and injuries inflicted upon her by a female with whom she had a scuffle. She described very accurately all the reputed proofs of the child's death as being present. When, however, the stethoscope was applied, the fœtal heart's action was distinctly audible; and the announcement of the child's being alive dissipated all her hopes of legal vengeance, as she appeared to calculate upon hanging her antagonist, at least.

† It can, of course, only be ascertained when there is a natural presentation, and hence is not always applicable.

perance; diseases, such as hæmorrhage or convulsions; contagious disorders, such as syphilis or small-pox; falls, wounds, and accidents generally; any inordinate evacuation—and, indeed, all the causes of abortion, as enumerated by authors, may have produced the death of the infant.

The child may also be destroyed during labour from that process being long protracted; from its being so difficult as to require instruments, or complicated with syncope, convulsions, or hæmorrhage; from a morbid state of the placenta, or a twisting of the umbilical cord around its neck.

It is hardly necessary to add, that, fatal as each of these causes have respectively been at various times, yet children have often survived in spite of them.

The signs experienced during pregnancy of the death of the fœtus are a want of motion in the child—the womb feels as if it contained a dead weight, which follows the direction of the body as it moves to one side or the other; the navel is less prominent; the milk recedes, and the breasts become flaccid; the mother feels a sense of lassitude and coldness, accompanied with headach and nausea. As equivocal signs may be added, a paleness of the face; the eyelids having a livid circle around them; the presence of a slow fever and melancholy, and a fœtid breath.

These, if all present, form a strong presumption in favour of the destruction of the offspring. Individually, however, they are liable to be mistaken or confounded. Subsidence of the tumour is one of the natural changes that in all cases precede labour. The breasts, also, do not enlarge in some until advanced pregnancy, and, of course, we cannot draw an inference from their state. But particularly as to the motion of the child may error arise. The want of it cannot be regarded as a certain proof of death; and the mother may mistake, and, indeed, often has mistaken action of the abdominal muscles, spasm of the uterus, and even hysteria, for it.*

Again, the fœtus may die, and be retained in the uterus without exciting any general or local disturbance. The health will be good, and there is nothing on which to found a suspicion, except the suspension of the ordinary proofs of progressive pregnancy.†

Under such circumstances the importance of AUSCULTATION in proving the life of the fœtus is strikingly shewn. If we can detect by it a distinct fœtal heart, with or without the placental sound, there can be no doubt. It is to be regretted that the reverse is not so certain. It requires familiarity with the stethoscope, frequent examination during the child's life, and attention to the various doubtful circumstances to which we have alluded in a previous chapter, to authorise a decisive opinion. The cases, however, are multiplying where those who are acquainted practically with auscultation have predicted correctly; and in proof of this, I need only refer to the work of Dr. Kennedy which I have repeatedly quoted. I will only add, that in some cases the placental *soufflet* continues after the fœtus is dead; but it is described to

* Kennedy, p. 210.

† Ramsbotham.—Medico-Chirurgical Review, vol. xxi. p. 309.

be more abrupt, of a shorter continuance, wanting its protracted terminating whiz, and generally confined to a circumscribed spot.

If actually dead, and long detained in the uterus, putrefaction takes place; the membranes lose their vitality, and blackish fœtid discharges shortly occur. This is also a rule subject to exceptions. We have seen, when noticing the subject of superfœtation, that the dead ovum may remain for months without exhibiting any marks of putrefaction. It is much rarer to notice this when the uterus contains only a single fœtus.*

The signs during the progress of delivery of the death of the fœtus are similar in some respects to those already mentioned; such as the absence of motion and fœtid discharges. Writers have also mentioned the state of the presenting part. When the fœtus is dead it has an œdematous or emphysematous feel; the skin is soft and easily torn; and the bones of the cranium lose their natural connexion, and vacillate on one another. The umbilical cord, also, if it can be examined, is found without pulsation, and in some advanced cases withered and rotten.

Although these are proofs, yet the practitioner should not hastily pronounce on them. The fœtid discharges or odour may be owing to the premature passage of the meconium, or to the mixture of a small quantity of blood with the uterine discharge. The former of these was at one time supposed to indicate death with certainty; but it is now ascertained, that although it portends danger, yet children have, notwithstanding, been born strong and healthy.† The state of the skin and bones may be the effect of weakness, as also the looseness of the epidermis. Even its livid colour is not infallible. Vicq-D'Azyr mentions a case that occurred at Breslaw, where the arm of the infant protruded from the uterus, and was so cold and livid that it was deemed gangrenous, and was amputated. Notwithstanding this, the infant was born alive three days after.‡

* The length of time during which a dead fœtus may be retained in utero is uncertain: the usual period is from one to three weeks. Dr. Blundell says, "When the ovum dies in the earlier months it may be retained till the close of pregnancy."—Medico-Chirurgical Review, vol. xxi. p. 343.

† "We may, however, in general conclude, when the meconium does come away in a natural presentation, that the state of the child is not without danger; and for many years, I never saw a child, presenting with the head, born living, when the meconium had come away more than seven hours before its birth. But at length I met with a case, in which the meconium was discharged for more than thirty hours, at the end of which time, though the woman was delivered with the forceps, the child was born healthy and strong. And since that time, I have had many equally convincing proofs, that the coming away of the meconium is a very doubtful sign of the death or dangerous state of the infant, whatever may be the presentation." (Denman, p. 395.) See also Belloc, p. 91. Capuron, p. 247. Burns's Mid. Note to chap. 7.

‡ Foderé, vol. ii. p. 91. Baudelocque (vol. iii. p. 161) relates a case, where the woman was two days in labour: the scalp of the child was loose, pendant, and in a manner rotten; the cuticle and hair came away, and adhered to the finger. No motion had been felt for twenty-four hours; and yet on delivery with the forceps, the child was living and healthy, except a superficial gangrenous scalp on the crown of the head, which soon healed.—A case strongly indicative of the fœtus being in a putrid state previous to birth, but where it was born alive and survived, is related by Prof. Nagele, Lancet, N.S. vol. ii. p. 70.

Dr. Blundell, a very eminent man in his particular branch of medicine, after reviewing the various signs, conceives that none should be relied on, except the three following:—*The cuticle coming away from the head in large flakes*, desquamating, as from dead bodies in the lecture-room. This is very strong presumptive proof of death, although even not demonstrative, for cases have been related, and, among the rest, one by Dr. Orme, in which the cuticle had separated, in consequence of cutaneous disease, and the child was notwithstanding alive. "So rare, however," he adds, "are these cases, that I should feel disposed in practice to look upon them as of no account, were it not that human life is at stake." *The bones of the cranium being detached from each other, and floating, as it were, in the mollified brain.* Let it be recollected, that mere displacement and solution of union is insufficient. They must be detached and afloat. Thirdly, *the umbilical cord* (if it can be felt) cold, brown, flaccid, and destitute of pulsation for half an hour or an hour. This last discriminates between the temporary loss of pulsation, occurring in a recent descent.*

We must recollect, also, that the pressure occasioned by a long and tedious delivery may extinguish life. The proofs, now enumerated, indicative of putrefaction, will, in that case, generally be wanting. The motion of the fœtus, which has lately been felt, will suddenly cease, and tumefaction and redness of the presenting part will be observed. Ecchymosis sometimes occurs, owing to a rupture of the vessels, and an effusion of blood into the adjacent cellular tissue.

The application of the stethoscope will tend to diminish the number of doubtful cases. It is, evidently, as valuable here as in any inquiry in which we have before recommended it.†

If the medical examiner be called immediately after birth, he can have no difficulty in deciding on this question. The body will be found to have lost its firmness and consistence—the flesh will be soft, and the muscles easily torn—the skin will exhibit marks of putrefaction, and will be of a purplish or brownish red colour—the epidermis is raised, and may be easily separated—a bloody serum is often effused in the cellular tissue and beneath the skin, especially about the cranium, and sometimes a similar effusion is observed in the cavities of the chest and abdomen, and their viscera are of a deep reddish hue. The umbilical cord is livid, soft, and easily torn. The cranium and thorax are flattened, and the membranes uniting the bones of the head are much relaxed, so that the bones are somewhat disunited—the brain also is almost fluid, and has a fœtid odour.

It will readily occur, from a review of the remarks contained in this section, that the fact of the death of the fœtus before or during delivery, can be ascertained with considerable facility, if the practitioner be called at the proper season. Unfortunately, however, in most cases which come before a court of justice, the delivery has been secret, and a greater or less space of time has elapsed since its occurrence. The infant is found dead. The proofs which we have now enumerated

* Blundell's Lectures on Midwifery, Lancet, N.S. vol. 2, p. 161.

† See Dr. Kennedy's Work, p. 242 to 253.

are inapplicable or inconclusive, and a further investigation is required to ascertain the truth. We hence come to the examination of the question of INFANTICIDE.*

II. *Of the signs of the maturity or immaturity of the child.*

A knowledge of these is no less necessary than of those noticed in the preceding section. The medical examiner, in all cases, should be well acquainted with the indications that mark the various epochs of fœtal life, as well as those which prove its arrival at maturity. A sketch, therefore, of the gradual developement of the fœtus, from the era of its first formation, will be proper in this place. And I will premise, that the following summary is drawn from the observations of Aristotle, Hippocrates, Riolan, Haller, Roederer, Meckel, Burton, Baudelocque, William Hunter, Burns, Chaussier, Beclard, Capuron, Clarke, Merriman, Soemmering, and Tiedemann. There are some recent anthorities, which I regret that I have not been able to examine; and I would also remark, that in many cases, the observations are to be taken as means deduced from extremes, and they are, therefore, liable to some variation.†

From the time of the first evidence of impregnation to the fifteenth day, the product of conception appears only as a gelatinous, semi-transparent, flocculent mass, of a grayish colour, liquefying promptly, and presenting no distinct formation, even by the aid of the microscope.‡ It measures, at fourteen days, one-twelfth of an inch in length (Pockels);

* The authorities on this section which deserve attention, are, Denman, p. 391 to 399; Capuron, p. 234, &c.; Hutchinson, p. 17; Foderé, vol. 2, p. 81; Smith, p. 315; Belloc, p. 91. Dr. Jaeger's Dissertation on this subject (in Schlegel, vol. 5, p. 23) may be consulted with great advantage. Several cases are related by the author, where he examined infants dead before birth, with a direct view to the question now noticed.

† Dr. Pockels of Brunswick has given "a contribution to the history of the developement of the human embryo, in the first three weeks after conception."—See Medico Chir. Review, vol. 8, p. 575.

‡ The general statement is, "that the ovum cannot be discovered with the naked eye, or by the microscope, in less than twenty-one days after conception. On the other hand, Sir E. Home has very lately examined the uterus of a female who had been impregnated only eight days previous, and in which he found an ovum of a very minute size."—Gooch's Midwifery, p. 88. "The embryo may be perceived with the naked eye, at the fourteenth day after conception."—Granville on Abortion, p. 10.

Velpeau (Embryologie, p. 50), and, I believe, some other authors, doubt the possibility of the first of these statements, and question whether it was actually an ovum that was seen by Sir E. Home. The best opinion, however, would seem to be in its favour. See Edinburgh Medical and Surgical Journal, vol. 41, p. 407, and Ryan's Midwifery, p. 67, who quotes Meckel's assertion, that the embryo can be observed on the fifth day after conception. Velpeau (Embryologie, p. 51) says, that he has seen three ova, which did not exceed twelve days. They were all of the same form, and of the size of a large pea—and this is the earliest period, so far as his experience goes, at which the ovum can be discerned.

I cannot omit in this place referring to a very curious case, in which the appearances of an apparently impregnated uterus, with its appendages, were examined immediately after the first coition. The female poisoned herself the next morning. The dissection is given by Dr. Bond of Philadelphia.—American Jour. Med. Sciences, vol. 13, p. 403.

and at three weeks, one-tenth of an inch: at thirty days, it has the size of a large ant, according to Aristotle; of a barley-corn, according to Burton; and of a house-fly, according to Granville. Baudelocque, however, observes, that it is not larger than the malleus of the tympanum. Its length varies from three to five lines. At six or seven weeks, its length is almost ten lines. The form and lineaments of the principal organs, and the place from which the members are to arise, can now be observed, and it is equal in size to a small bee. At this time, also, the fluid contained in the membranes is much heavier than the embryo. At two months, the length is about two inches, and its weight, nearly two ounces.* All the parts are perfectly distinct, and many points of ossification are observed in the head, trunk, and members. Sometimes the male sex may be distinguished. At the third month, it is about three ounces in weight. (Dr. Hamilton says, that at twelve weeks it is three inches long.) The nose and mouth are formed, and the features of the face become more distinct. The eyes are shut, and the eyelids adhere together; the head is longer and heavier than the rest of the body; the umbilical cord is formed; the genitals are distinct; the penis and clitoris are relatively very large; the nymphæ are projecting, and the labia very thick.† At the fourth month, the fœtus is from five to six inches long, and weighs from four to five ounces. The external parts all develope themselves, with the exception of the hair and nails. The great relative proportion of the fluid of the membranes disappears, and the fœtus nearly fills the cavity of the uterus.‡ During the fifth month, the motions of the fœtus are felt by the mother. The length is from seven to nine inches, and the weight nine or ten ounces. The brain

* As an illustration of the diversity to which I have referred, I quote the following from Dr. Granville's recent work on Abortion (p. 11). "At two weeks, it weighs twenty grains, and is one inch long. It weighs an ounce and a half at three weeks, and measures three inches, between which and the sixth month, it increases in dimensions from three to six or nine inches, and in weight, from one ounce and a half to one pound." Dr. G. states these to be averages of minute and accurate observations made by Autenrieth, Soemmering, Bichat, Pockels, and Carus, and confirmed by his own observations.

† Velpeau asserts, that the umbilical cord begins to be formed during the first month of gestation.—American Journal of Medical Sciences, vol. xiv. p. 402.

‡ This is the period which demanded investigation in the recent trial for the murder of Sarah M. Cornell. "The alleged date of the conception was the 30th of August; the last appearance of the menses on the 21st of August, and death took place on the 20th of December. The fœtus weighed five ounces, and measured eight inches in length. The question arising upon these facts was, whether it was most probable that a fœtus of three months and twenty days should have attained the above size and weight, or that menstruation could continue after conception had taken place."—Boston Medical and Surgical Journal, vol. viii. p. 340.

I have already noticed the latter in its bearing on this subject, and need only add, that if it be deemed most probable, it would go to prove that the conception did not take place at the time alleged, and thus tend to relieve the prisoner from the imputation of paternity. In addition to the circumstances mentioned, it must be added, that neither nails nor hair were found on the fœtus.

On the trial, Dr. Parsons stated that he had examined twelve authors on this subject, and that the average deduced from them was, that at three months the length of the fœtus was between three to four inches; at four months, five inches; and at five months, eight inches. Beclard was the only one who gives eight inches at four months.

is pulpy, and is *destitute of circumvolutions or furrows.* The external ear is completed about this time, although its shape, which is like that of a gently depressed circle, differs from the ear after birth.*

In the sixth month, we begin to find some traces of fat under the integuments, where previously nothing but a mass of gelatine had been observed. The head, also, which before had been proportionably large, becomes smaller in comparison of the body. It is now, however, large and soft, and the fontanelles are much expanded. The brain acquires rather more consistence, but is still easily dissolved; and the pia mater seems only to lie over its surface, being separated with great facility. The skin is very fine, pliant, thin, and of a purple colour, especially in the palms of the hands, the soles of the feet, the face, lips, ears, and breasts. In males, the scrotum is slightly developed, and of a bright red colour; and the testicles are still in the abdomen. In females, the vulva is projecting, and the labia separated by the protuberance of the clitoris. The hair on the head is very thinly dispersed, short, and of a white or silvery colour; the eyelids are closed; the hair on the eyebrows and eyelashes but thinly scattered, and the pupil is closed by a membrane. The nails are wanting, or scarcely apparent. The lungs are very small, white, and compact. The heart is large, and the liver very large, and situated near the um-

As this subject has thus become peculiarly interesting, I will here quote from individual authors.

	Weight.		Length.
Capuron	4 to 6 oz.		5 to 6 inches.
Orfila	5 to 7		6 to 7 —
Ramsbotham	———	end of 4th month	5 —
Maygrier	7 to 8		8 —
Hamilton	———	above	5 —
Velpeau	———		5 to 6 —
Gardien	———		4 —
Burns	———		5 —

The last observes (James's Burns, 1823, vol. i. p. 175), that in the twelfth week the fœtus weighs nearly two ounces, and measures, when stretched, about three inches. Brian (second edition, p. 128) says, that at four and a half months it is six or seven inches long, and weighs from five to seven ounces.

See also Dunglison's Physiology, vol. i. p. 356.

* The length of an embryo at the end of the fifth month is, according to Soemmering, ten inches; while Dr. Burns and Dr. Hamilton do not allow that it is more than six or seven.—Supplement to Encyclopædia Brittanica, vol. i. p. 256, article, *Anatomy*, by Dr. Gordon. Craigie's Anatomy, p. 76. Dr. Dewees agrees with Burns as to the length, and also observes, that the above weight is too great. —Midwifery, third edition, p. 93. Lecieux, however, whose opportunities for examination have been very extensive, says (p. 12), " D'après un grand nombre de recherches, d'observations recueillies à l'Hospice de la Maternité, et comparées à celles que l'on trouve dans plusieurs écrivains, on peut régarder les resultats suivans comme le terme moyen et le plus ordinaire de la grandeur des fœtus depuis la fin du cinquième mois jusqu'à la fin du neuvième :

	Longueur.		
A 5 mois	255 millimètres, ou	9½ pouces.	
6 —	325	———	12 —
7 —	380	———	14 —
8 —	440	———	16 —
9 —	488	———	18 —"

bilicus; the gall-bladder contains only a small quantity of a nearly colourless fluid; and the meconium is small in quantity, and is found only in a part of the large intestines. The bladder is hard and pyriform, and has a very small cavity. The ordinary weight of the fœtus at this time is from one to two pounds, and its length from nine to twelve inches *—*the middle of which is at the abdominal extremity of the sternum.*†

At the seventh month, all the parts, both external and internal, are still more developed. The skin assumes a rosy hue, and becomes more dense; and it is covered with a sebaceous fluid, so as to form a whitish, unctuous covering. The eyelids are no longer united, and the membrana pupillaris separates, so as to form the pupil.‡ The cerebral pulp becomes more consistent, and its surface is a little furrowed, and adheres somewhat to the meninges. The meconium increases in quantity; the hair on the head is longer, and takes a deeper hue. The nails acquire more firmness. Weight, from two to three pounds; length, from twelve to fourteen inches. (From two to four pounds, and twelve inches. *Granville.* Between eleven and twelve inches. *Hamilton.*) *The middle of the body is nearer to the sternum than to the navel.*

At the eighth month, the skin has acquired more density, and becomes whiter; it is covered with very fine and short hairs, and its sebaceous covering is more apparent. The nails are firmer; the hair of the head longer and more coloured. The breasts are often projecting, and a lactiform fluid may be pressed from them. The testicles in males are frequently engaged in the abdominal ring. In females, the vagina is covered with a transparent mucus. The grooves in the cerebral substances gradually become more marked; and the spinal marrow, pons varolii, and medulla oblongata, acquire a remarkable

* Eight or nine inches, and about one pound.—Burns, Hamilton. The various quotations from Dr. Hamilton are copied from Blundell's Midwifery.

† In the quarterly reports of the New Town Dispensary (Edinburgh), there are two cases mentioned, which it will be proper to add in this place. A child, supposed to be advanced six and a half months, lived eleven days. On the fifth day after its birth it weighed two pounds nine ounces and three quarters avoirdupois. Another, probably at the sixth month, lived fourteen hours; weighed two pounds four and a half ounces English, and measured thirteen and seven-eighths inches.—Edinburgh Medical and Surgical Journal, vol. xii. pp. 249, 526.

‡ There is considerable diversity of opinion concerning the constancy of this phenomenon. Cloquet says, that in the fœtus of the ninth month the little arterial circle of the iris, which is formed after the rupture of the membrana pupillaris, and at the cost of its vessels, is seen placed on the very edge of the pupil; and often, even in the new-born child, some of its vessels still advance beyond the circumference of this opening. He has seen it ruptured even at the sixth month, and adds, that it is seldom found entire at the eighth. On only one occasion did he discover it in a full grown fœtus, and then it was broken in the middle.—Quarterly Journal of Foreign Medicine and Surgery, vol. i. p. 64; and Eclectic Repertory, vol. ix. p. 190.

Dr. Jacob, of Dublin, on the other hand, rejects the above opinion, as he has usually found it present in most new-born infants. He says the vessels are at first obliterated, and then the membrane is absorbed. Professor Tiedemann is said to have repeated the experiments of Dr. Jacob (injecting the membrana pupillaris at the full time), and confirmed their accuracy. — Anderson's Journal, vol. i. p. 110; American Journal of Medical Sciences, vol. i. p. 192.

consistence, and even firmness. The lungs are of a reddish colour; the liver preserves nearly its former relative size, but it is more remote from the navel; the fluid in the gall-bladder is of a yellowish colour, and has a bitter taste. The weight at this time is from three to four, and sometimes even five pounds. Length, sixteen inches or more,—(From four to five pounds, and seventeen inches; *Granville.* From fourteen to fifteen inches; *Hamilton.*) *the middle of which is nearer to the navel than to the sternum.*

At the ninth month, ossification is more complete; the head is large, but it has a considerable degree of firmness. The bones of the cranium, although movable, touch each other with their membranous margins: the fontanelles are smaller; the hair is longer, thicker, and of a deeper colour; and the nails become more solid, and prolonged to the extremity of the fingers. The circumvolutions on the surface of the brain are more numerous: the cineritious portions begin to be distinguished by their colour; and although the lobes which compose the cerebrum retain their former softness, yet the cerebellum and the basis of the cerebrum have acquired a remarkable consistence. The head measures longitudinally, from the forehead to the occiput, four inches to four inches and a quarter; and, between the parietal protuberances, from three and a half to four inches. Of sixty male and sixty female infants born at the full time, whose heads were measured by Dr. Clarke, the circumference passing through the occipital process and the middle of the brow, was on an average, 13.8 inches, while the arch from ear to ear, over the crown, was 7.32 inches.* The abdomen is large and round: the lungs are redder, and more voluminous: the canalis arteriosus is large, and its coats are thicker and denser than formerly: the meconium fills nearly the whole of the intestines, and the bladder contains urine. In fact, the digestive apparatus, the heart and the lungs, are in a state fit to commence extra-uterine life. The length varies from nineteen to twenty inches, or more, *the middle of which is at the navel, or a very little below.*†

The recent observations made by Tiedemann, Serres, and the Wenzels, on the brain of the fœtus, may most conveniently be arranged together in this place. At the fourth week, the mass which corresponds to the head in the embryo, is quite transparent, and contains a limpid fluid. At the seventh and eighth weeks, the form and disposition of the brain and spinal cord can be distinguished; and the dura mater is also

* Craigie's Anatomy, p. 76. One measured fifteen inches in circumference, and one eight inches and a half from ear to ear; but none were under twelve inches in the one direction, or six inches and a quarter in the other.

† Hutchinson, pp. 6–14; Capuron, pp. 165–173; Foderé, vol. ii. p. 149; Burns, pp. 114–118. Maygrier (American edition) varies the length and weight somewhat; and I therefore add his numbers:

At 2	months,	weight	5 drachms, ...	length	4 inches.
3	—	.....	2½ ounces, ...	6	—
4	—	.. ..	7 to 8 ounces, ...	8	—
5	—	..... .	1 pound	10	—
6	—	.....	2 pounds	12	—
7	—	.....	2 to 3 pounds	14	—
8	—	.....	4 pounds	16	—

observed adhering to the inner surface of the skull. During the third month, the tubercula quadrigemina, the optic thalami and corpora striata are developed; and in the eleventh week, the cerebellum and the hemispheres were recognised. At the fourth month, the tuber annulare and the pituitary gland were observed. The corpus callosum, in the sixth month, is only half as long as the hemispheres of the brain. The choroid plexus is formed in the seventh month, and the corpora olivaria do not protrude till between the sixth and seventh, but the corpora pyramidalia are fully formed a month sooner; and in both the protrusion is owing to the developement of cineritious matter. It is not till near the termination of pregnancy that the cineritious substance is formed in the spine, or even very manifestly in the convolutions of the brain.*

The Wenzels found the following proportionate increase of the brain in their investigations: In an embryo of five months, they found the brain to weigh 720 grains, of which the cerebrum weighed 683 grains, and the cerebellum 37; being in the proportion of $18\frac{17}{37}$ to 1. At eight months, the respective numbers were 4960, 4610, 350, or, as $13\frac{6}{35}$ to 1. At the full time, ... 6150, 5700, 450, or, as $12\frac{2}{3}$ to 1.†

The observations of M. Béclard on the skeleton may also be stated, as its increase is more regular than that of the softer parts, and its appearance may afford important evidence in cases which vary from the ordinary state.

"After two months have elapsed from the period of conception, the skeleton is about four inches and three lines in length, that of the spine being two inches: At three months, the former is six inches, and the proportion of the spine as two and two-thirds to six: At four months and a half, it is nine inches, and the spine four: At six months, twelve inches, and the spine five: At seven and a half months, fifteen inches, the spine six and one-third: At nine months, or the period of birth, it is ordinarily from sixteen to twenty inches in length, or at a medium of eighteen inches; and the spine is in the proportion of seven and three-fourths to eighteen, to the whole length of the body. These calculations were made from observations on about fifty fœtuses at each of the periods above indicated.

"Each vertebra, consisting originally of a section of a solid cylinder, and a ring furnished with several apophyses, is in general formed by three primitive points of ossification; the one anterior, which, by its developement, forms the body or solid part of the bone, and two lateral ones which constitute the apophysarial masses, and which, uniting together with the former, constitute the annular structure. Besides these, each vertebra is completed by several secondary points of osseous developement.

"At about the sixth month of intra-uterine life, two points of ossification are found in the second cervical vertebra, one situated above the other. Towards the seventh month, the superior point, which

* Edinburgh Med. and Surg. Journal, vol. xix. p. 456; vol. xxiii. p. 81, &c.

† Lawrence's Lectures on Physiology, p. 170. See also Dr. Copland's Notes to Richerand's Physiology, Appendix, p. 56. "On the formation of the spinal marrow and brain."

answers to the odontoid process, is larger than the inferior, which relates to the body of the bone. At about the eighth month, the transverse processes have begun to ossify in the first of the lumber vertebræ. At the time of birth, ossification has commenced in the body of the first cervical vertebra, and also in the first bone of the coccyx. At this age the body of the fourth lumber vertebra, which is the most voluminous, is three lines in depth and six lines in breadth. At the same period, the lateral portions of the six superior dorsal vertebræ begin to unite together, so as to form a ring posteriorly to the bodies of those bones. The lateral arch of the second, which is the largest, forms a chord of seven or eight lines."*

The weight of the fœtus at the full term of uterogestation has been the subject of numerous observations, and as a preliminary remark, it must be noticed, that this differs according to the conformation and habits of the parent and the sex of the child. Healthy females residing in the country, or engaged in active occupations, have generally the largest children. Male children also generally weigh more than female ones. The diversity extends also, as we shall see, to various countries.

In Germany, Roederer found the weight, in one hundred and thirteen cases, to vary from seven to eight pounds, and he lays it down as a rule, drawn from his observations, that it is rarely less than six pounds.† Dr. Hunter states, that Dr. Macauley examined the bodies of several thousand new-born and perfect children at the British Lying-in Hospital, and found that the weight of the smallest was about four pounds, and the largest, eleven pounds two ounces; but by far the greater proportion was from five to eight pounds.‡ Dr. Joseph Clarke's inquiries furnished similar results. The greatest proportion of both sexes, according to him, weighed seven pounds; yet there were more males than females found above, and more females than males below, that standard. Thus, out of sixty males and sixty females, thirty-two of the former and twenty-five of the latter weighed seven pounds, and there were fourteen females, but only six males, who weighed six pounds. On the other hand, there were sixteen males, but only eight females, who weighed eight pounds. Taking then the average weight of both sexes, it will be found that twelve males are as heavy as thirteen females. The exact average weight of male children, according to Dr. Clarke, was seven pounds five ounces and seven drachms, and that of female, six pounds eleven ounces and six drachms.§

* Hutchinson on Infanticide, pages 12, 13, 14.

† Bose *de Diagnosi vitæ fœtus et neogeniti*, in Schlegel, vol. iii. p. 23. I have selected this as the most accurate account of Roederer's observations, as there is a discrepancy among the writers that notice him. Foderé (vol. ii. p. 153) says the weight, according to his table, is from six to seven and a half pounds, and Hutchinson (p. 15) from five to six and a half.

‡ Hunter's Anatomy of the Human Gravid Uterus, p. 68.

§ Phil. Transactions, vol. lxxvi. p. 349. Dr. Clarke also mentions the following observations as made by Roederer. The placenta of a male was found to weigh, on an average, one pound two ounces and a half, whilst that of a female weighs half an ounce less. Female children, who at the full time weigh under five pounds, rarely live: and few males who even weigh five pounds thrive. They are generally feeble in their actions, and die in a short time.

Dr. Clark of Dublin found the weight to vary from four to eleven pounds. Dr. Merriman states in his lectures, that he delivered one which weighed fourteen pounds (it was born dead); and Dr. Croft delivered one alive weighing fifteen pounds.*

In France the weight seems to be less than in England. Of 1541 examined by Camus, the greatest weight was nine pounds; and of this there were sixteen instances—the ordinary, from five to seven, and the average six pounds and about a quarter: there were thirty-one instances in which it was as low as three pounds. Baudelocque, however, states that he has seen two of nine pounds and three-quarters, one of twelve, and another of thirteen. The last, he adds, had several teeth well advanced and ready to cut. On the other hand, he had delivered some at the full time who weighed but five and four and a half pounds, and several indeed only three pounds and three-quarters. These were more common than those of nine pounds, and grew to as great a size after birth.† Subsequent observations on twenty thousand children, at the Hospice de la Maternité at Paris, shew that the average weight of the fœtus at the full time, is there about six and one-quarter pounds. The extremes varied from ten and a half pounds (which was the highest) to three pounds.‡ Capuron mentions that he has seen two instances where the children weighed twelve pounds.§

At the Lying-in Hospital at Florence, of 506 children born in

* Hutchinson, p. 15. At a meeting of the Westminster Medical Society in London, held Dec. 1830, Mr. Jewell related a case, in which the weight of the child was twenty pounds. He stated it on the "authority of an extremely intelligent midwife, of whose veracity no doubt could be entertained."—Lancet N. S. vol. vii. p. 410. Dr. Ramsbotham (the father) delivered a child weighing 16½ lbs. avoirdupois.—London Med. Gazette, vol. xiii. p. 551.

† Baudelocque's Midwifery, vol. i. p. 256.

‡ Lecieux, Considerations sur L'Infanticide, pp. 9, 12.

The following table, taken from Burns's Midwifery, edition of 1823, is somewhat different in its results from what is given in the text, and I do not know how to reconcile them, unless to suppose that they were taken at a later period. It purports to be the respective weights of 7077 new-born children, accurately ascertained at the Hospice de la Maternité:

34	weighed from	1 to 1½	pounds.
69	.....	2 ... 2¾	—
164	.....	3 ... 3¾	—
396	.....	4 ... 4¾	—
1317	.....	5 ... 5¾	—
2799	.....	6 ... 6¾	—
1750	.....	7 ... 7¾	—
463	.....	8 ... 8¾	—
82	....	9 ... 9½	—
3	.....	10 ——	—
7077			

The following, from Dunglison's Physiology, vol. i. p. 355, is important to be noticed in accurate investigations. "The Paris pound, *poids de marc*, of 16 ounces, contains 9216 Paris grains, whilst the avoirdupois contains only 8532.5 Paris grains. The English inch is 1·065977 Paris inch."

§ Capuron, p. 172. Cranzius says he had seen one fœtus weighing twenty-three, and another twenty-seven pounds!!

eight years (from 1816 to 1824), the heaviest weighed 16 pounds (the Tuscan weight of 12 ounces) and 4 ounces; the smallest, born at the full period, weighed five pounds; the majority, about ten pounds.* In the Obstetrical Institution at Pavia, of 116 children born in two years, 14 pounds 6 ounces was the greatest weight, and 5 pounds the least.† In the Royal Lying-in Institution at Dresden, Professor Carus reports 225 children, born during 1827. The weight varied from $4\frac{1}{2}$ pounds to $10\frac{1}{4}$ pounds.‡ At the Lying-in Hospital at Moscow, in 44 cases of both sexes, Richter found the mean weight to be $9\frac{1}{15}$ pounds: minimum 5 pounds, and maximum 11 pounds. At the Lying-in Hospital of St. Peter, in *Brussels* (I presume), Quetelet found the mean weight of 63 males born at the full time, to be $6\frac{1}{2}$ pounds (3-20 killog.), and of 56 females, to be $5\frac{15}{16}$ pounds! Mean, $6\frac{3}{16}$ pounds. The maximum in the male was $9\frac{3}{16}$ pounds: in the female, $8\frac{11}{16}$ pounds: the minimum in the male, $4\frac{12}{16}$ pounds; in the female, $2\frac{4}{16}$ pounds.§

In the first edition of this work, I stated the opinion of my colleague, Professor Willoughby, that the average weight in this country exceeds seven pounds. Professor Dewees decidedly agrees to this, as the result of his experience. He has met with two ascertained cases of fifteen pounds, and several which he believes to be of equal weight.‖ Dr. William Moore of New York had several cases, where the weight was twelve pounds each; and an instance occurred in that city, in 1821, where the fœtus (born dead) weighed sixteen pounds and a half.¶

The most correct deduction probably from these observations, is to allow the average to vary from five to eight pounds.**

When there are two children in utero, the weight of each individual is generally less than that of a single fœtus, but their united weight is greater. The average weight of twelve twins, examined by Dr. Clarke, was eleven pounds the pair, or five and a half each. Duges, from a review of the Registers at Paris, found that, out of 37,441 *accouchemens*, there had been 36,692 single births, 444 twins, and 5 triplets. The twins averaged four pounds each in weight, and the extremes are three and eight pounds.†† Respecting triplets, we have not sufficient data to form a general rule. Duges thinks that they have rarely less weight than twins. In a case that occurred to Dr. West, at Tiverton, Rhode-Island, the respective developements were as follows:

* Anderson's Quarterly Journal of Medical Sciences, vol. ii. p. 101.
† Ibid, vol. ii. p. 100; and Quarterly Journal Foreign Medicine, vol. v. p. 330.
‡ Lancet, N. S. vol. iii. p. 648. § Annales D'Hygiène, vol. x. pp. 12–13.
‖ Dewees' Midwifery, 3d. edition, p. 89.
¶ New York Medical and Physical Journal, vol. ii. p. 20.
** "There is a good deal of difference in the weight of the fœtus, being, I believe, about seven pounds—some, especially if born prematurely, weigh much less, some much more."—Blundell's Lectures, in Lancet, N. S. vol. iii. p. 133.
†† London Medical Repository, vol. xxv. p. 555, from Revue Médicale, March 1826. "Dr. Clarke had seen no case of twins weigh more than twelve pounds; now every year I see twins weigh fourteen pounds."—Notes of Prof. Hamilton's (of Edinburgh) Lectures, in Lyall's Gardner Peerage Case, Introduction, p. 28.

Length	*Weight.*	
15¾ in.	4 lb.	3 oz. Navel in the centre.
15⅜	3	8 Navel half an inch below centre.
17¾	4	9 Navel half an inch below centre.

They were all females.*

Dr. Hull of Manchester met with a delivery of five children, who did not weigh five pounds and a quarter. They measured from eight to nine inches in length, and two of them were born alive.† Dr. Bryan of Fairfield, in this state, had, however, a case of four children, which all lived a day; and their aggregate weight was eleven pounds, fourteen ounces. Their length varied from 14¾ inches to 17½ inches.‡ Dr. Hubbard of Glastonbury, in Connecticut, recently met with a case of triplets, in which the united weight was 18 pounds. Two were born alive, and remained so at the end of nine months—the third was still-born.§ In the Western Medical Gazette, (No. 16, August 1, 1833,) a practitioner gives an account of triplets born alive, and all surviving until the sixth day, when one died. On the eighth day, another died; but the third did well. Their united weight, exclusive of the placentas, was twenty-two and a fourth pounds—a boy of nine pounds, a boy of seven and a half, and a girl five and three fourths pounds. Lastly, I will mention a recent case at Boston, by Dr. Palmer—one child (a boy) weighed seven pounds, another (a girl) six pounds, a third (a lusus naturæ) five pounds, the placenta two pounds; total, twenty pounds.‖

The length of the fœtus, at the full time, varies much less than its weight. Roederer concludes, from his examinations, that the average length of a male is twenty inches and a third, while that of a female is nineteen inches and seventeen-eighteenths.¶ Petit assigns twenty-one inches as the usual length. Hutchinson says, it is ordinarily from nineteen to twenty-two inches, and seventeen and twenty-six inches will include the two extremes, excepting some very rare cases; while Foderé and Capuron place the extremes from sixteen to twenty-three.** This last author attaches great importance to the difference in the proportion between the length of the superior and inferior parts of the body, and he conceives that attention to this, is one of the best modes of verifying the age of the fœtus. As a general rule, there will be an equilibrium between the upper and lower parts of the body, at the ordinary term of gestation, and the navel will be at the middle of the body, or nearly so. Before that time, the middle will approach nearer

* Boston Medical Magazine,, vol. ii. p. 393.
† Philosophical Transactions, vol. 77. p. 344.
‡ New York Medical and Physical Journal, vol. i. p. 417.
§ Boston Medical and Surgical Journal, vol. v. p. 414.
‖ Boston Medical Magazine, vol. ii. p. 328.
¶ There is some discrepancy in Roederer's results. Dr. Craigie says, that he found the mean length of 16 male children, born at the full time, to be twenty and ten-twelfths inches, and of 8 females, only twenty and four-twelfths.—Anatomy, p. 77.
** Bose (in Schlegel, vol. iii. p. 25) says that he has met with two—"Viginti et quatuor pollices ulnæ Lipsicæ pene superasse, hos ultimos autem a rusticis matribus progenitos fuisse."

to the head, in the manner that I have mentioned in the preceding pages.*

In the institutions quoted above as to weight, the length was as follows: At Florence, the greatest length, 20 inches; the least, 15 inches—the common length, from 17 to 18. At Pavia, from 21 inches and 3 lines, to 15 inches and 9 lines. At Dresden, from 20 to 16½ inches. At Moscow, the mean length, ascertained by Richter, was 18½ Paris inches; maximum 21, and minimum 15. At Brussels, the mean length of 65 males, was 18 inches and 3 lines; of 56 females, 17 inches and 10 lines (Quetelet).

Dr. Dewees once delivered a child, that measured 27 inches.†

A reviewer in the Edinburgh Medical and Surgical Journal states, that of 64 children of both sexes, measured by him in the country (Scotland), the average was between 19 and 20 inches. Chaussier makes it 18 French inches; and Billard, from the measurement of 54 infants, concludes that from 16 to 17 French inches is the standard length.‡

It is evident, that the signs drawn from the structure, weight, and dimensions of the fœtus are liable to some variety; and this depends on various circumstances, such as the age and vigour of the mother, her mode of life, the diseases to which she may have been subject, and probably the climate in which she lives.

The characters which mark the maturity and perfection of the organs and functions of the child are thus stated by Foderé and Capuron: The ability to cry as soon as it reaches the atmospheric air, or shortly thereafter, and also to move its limbs with facility, and more or less strength; the body being of a clear red colour;§ the mouth, nostrils, eyelids, and ears perfectly open; the bones of the cranium possessing some solidity, and the fontanelles not far apart; the hair, eyebrows, and nails perfectly developed; the free discharge of the urine or meconium in a few hours after birth; and finally, the power of swallowing and digesting indicated by its seizing the nipple, or a finger placed in its mouth.

The child, on the contrary, is considered immature,‖ when its length and volume are much less than that of an infant at the full time;

* Capuron, p. 173. Chaussier appears to have been the first that noticed these proportions (see Ballard, p. 168); although Capuron does not acknowledge the obligation.

† The following curious case is taken from the Edinburgh Medical and Surgical Journal, vol. iv. p. 516. "The public newspapers recorded the following birth in the month of May, 1808. At the poor-house in Stoke-upon-Trent (Staffordshire), Hannah Bourne, a deformed dwarf, measuring only twenty-five inches in height, was, after a tedious and difficult labour, delivered of a female child of the ordinary size, measuring twenty-one and a half inches, being only three and a half less than the mother. The child was, in every respect, perfect, but still-born. The mother is likely to do well."

‡ Edinburgh Medical and Surgical Journal, vol. 40, p. 192.

§ This *generally* (according to Billard) disappears from the fifth to the eighth day, and is succeeded by various shades before it comes white.

‖ By this term is understood a birth before the full period of gestation. There is another division more generally adopted. A delivery before the seventh month is called an *abortion*; and at any time between the seventh and ninth month a *premature birth*.

when it does not move its members, and makes only feeble motions; when it seems unable to suck, and has to be fed artificially; when its skin is of an intense red colour, and traversed by numerous bluish vessels; when the head is covered with a down, and the nails are not formed; when the bones of the head are soft, and the fontanelles widely separated; the eyelids, mouth, and nostrils closed; when it sleeps continually, and an artificial heat is necessary to preserve it; and when it discharges its urine and the meconium imperfectly.*

Should the examiner be called on to decide this question after the death of the child, it will be his duty, after noticing such external circumstances as I have already indicated, to proceed to a dissection of the body. All those appearances which mark the presence of fœtal life, and which are distinctly explained in anatomical and obstetrical works, should be carefully noticed.† The navel, liver, heart, and particularly the lungs, should be examined; and the inquiry must be, whether the changes necessary for independent life have taken place.‡

III. *The state necessary to enable the new-born Infant to inherit.*

It frequently becomes a question of great importance in civil cases, and particularly in those relating to the disposition of property, to ascertain whether the infant is born alive. In this country the subject becomes very interesting, since our law is borrowed from that of England, which is peculiar in some of its provisions, and enables property to be held by a certain class of persons on the establishment of

* I insert the following extract from an English newspaper, which I accidentally met with, because it favours us with some information from an eminently experienced accoucheur. "In the evidence on Bailey's Divorce-bill, in the House of Lords, March 10, 1817, the point in dispute appeared to be, whether Mr. Bailey's child was full-grown at its birth? The nurse swore that it cried with a strong voice, and was fed three times in the course of the day when it was born. Dr. Gardiner, the attending physician, corroborated the testimony of the nurse as to the full growth of the child. Dr. Merriman was then called in, and examined as to the consequences of a premature birth on the offspring. He said he had known a child born in six months and eighteen days live to grow up, but never to become stout. A child born under such circumstances would be smaller than usual; the skin would be redder, and the face not so completely formed. As far as his experience went, he should conclude that it could not cry strongly, and would be oppressed by difficult respiration. The perfect conformation of the nails, strong voice, and usual size, were proofs of a full-grown child."—*Globe* newspaper, March 11, 1817.

† Burns's Midwifery, pp. 118–122.

‡ Chaussier, according to Quetelet, has remarked that the infant diminishes a little in weight immediately after birth. The latter made several observations (seven), in order to ascertain whether this does occur, and found it even so. He gives the mean deduced from these seven cases, as follows:

	Weight.	
Immediately after birth	3.126	killogrammes.
On the 2d day	3.057	——
3d —	3.017	——
4th —	3.035	——
5th —	3.039	——
6th —	3.035	——
7th —	3.060	——

3.059 killogrammes is equal (according to our author) to 6¼ pounds.—Annales D'Hygiène, vol. x. p. 15.

the above fact. For the sake of order, I shall, in the first place, briefly notice the period of gestation after which children are considered capable of living; secondly, mention the laws of various countries, and the decisions under them, as to what constitutes the life necessary for inheritance in the infant; and shall then conclude with some observations on the question how far deformity incapacitates from inheriting.

1. The French employ a very useful word in noticing this subject —the *viability* of the infant; and I shall take the liberty of using it, although aware that great caution is necessary in the introduction of foreign terms. As a general rule, it seems now to be generally conceded, that no infant can be born *viable*, or capable of living, until one hundred and fifty days, or five months after conception.* There are, however, cases mentioned to the contrary. A person named Fortunio Liceti, is said to have been born after a gestation of four months and a half, and to have lived to the age of eighty.† Dr. Rodman, of Paisley, relates the case of an infant surviving where the mother was confident that the period of her gestation was less than nineteen weeks. She had previously been the mother of five children. In such cases, however, we should recollect that females are liable to mistakes in their calculations; and that conception may take place at various times during the menstrual intervals, and thus vary the length of the gestation. Such early living births are, at the present day, very generally and very properly doubted.‡

* Dr. William Hunter, however, when asked what is the earliest time for a child's being born alive, answered, "A child may be born alive at three months; but we see none born with powers of coming to manhood, or of being reared, before seven calendar months, or near that time. At six months it cannot be."—Hargrave's Note 190* on Section 188 of Coke upon Littleton.

The Roman law, by one of its provisions, *de suis et legitimis hæredibus*, decided that a child might be born alive six months and two days after conception; and by another, *de statu hominum*, required seven months.—Foderé, vol. ii. p. 110.

At the Imperial Josephine Academy in Vienna, a six months' child, of two pounds' weight and twelve inches long, lived nearly three days.—Quarterly Journal of Foreign Medicine and Surgery, vol. ii. p. 100.

† Capuron, p. 157. I find the following French law case in Denizart's Collections, art. *Grossesse*, vol. 9, p. 522: A merchant arrived from St. Domingo at Bordeaux, June 5, and married the next day. His wife had an abortion on the 1st of October. He pretended that the child had lived; and, in consequence, demanded a revocation of a donation, *entre vifs*, which he had made to his nephew before marriage. It was opposed, on the ground that the delivery took place on the 118th day, and that it was impossible that the infant could have lived. It was contrary to reason, it was added, to allow him to prove a fact which we know to be physically impossible. The decision was in favour of the nephew.

‡ In the case by Dr. Rodman, the child was alive and healthy nine months after birth. At three weeks he measured thirteen inches in length, and weighed one pound thirteen ounces. He was so destitute of vital energy, that life was for some time preserved by keeping him constantly in bed with the mother, or other females. The length and weight just mentioned are those, according to the statement made in former pages, of an infant *advanced between the sixth and seventh month;* and although Dr. Rodman seems to question the accuracy of authors on this subject, yet the observations have been made in too many cases to be affected by this solitary exception. His object in publishing this case is certainly highly laudable; and no physician, however premature the birth may appear to him, should neglect doing every thing to support and invigorate the appearances of life that are present.—Edinburgh Medical and Surgical Journal, vol. xi. p. 455; vol. xii. pp. 126, 251.

The following are said to be extracts from the lectures of the eminent Professor Hamilton of Edinburgh: "All accounts of children living to maturity, who were brought forth at the fifth or sixth month, are fabulous,—at least I consider them so. I lately brought a child into the world a few days after the completion of the sixth month, which, to my surprise, was alive, and which lived nearly three days: this is the longest period that ever I knew so early a fœtus live. At the completion of, or a few days after the seventh month, a child may, and certainly often does, live to maturity. When I first began practice, I supposed that no child could live to maturity which weighed less than five pounds avoirdupois; but experience has convinced me to the contrary: and now I am confident that a child of four and a quarter pounds weight, may live to maturity. No child at the full period of pregnancy weighs less than five pounds avoirdupois, and the common weight of children at the full period is seven pounds."*

We may from these observations conclude that between five and seven months there have been instances of infants living, though most rare; and even at seven, the chance of surviving six hours after birth is much against the child.†

An opinion, which appears to be as old as the days of Hippocrates, has occupied the attention of many writers, concerning the viability of eight months' children. It seems to have been the prevalent idea that they are not so capable of living as those of seven months. Obstetrical writers of the present day adduce in its favour the argument of experience; and they also urge that the uterus has a greater power and disposition to contract at the earlier than the later period, while the cervix will also yield more easily. The head of the child being consequently not so much compressed, it has a better chance of surviving. But, on the other hand, it is argued that the nearer the child approaches the natural term of gestation the greater will be the probability of living. Dr. Samuel Merriman says, that the observations made by Madame De la Marche, the celebrated midwife of the Hôtel Dieu at Paris, convinced Mauriceau, that *more than one-half of those who are born at eight months will live, while of those born at seven months very few survive.* Dr. Merriman adds, from a list before him

* Lyall's Gardner Peerage Case. Introduction, p. 28.

† Belloc and Capuron, among modern authors, mention instances of children surviving at six and six and a half months. They were very feeble and small—the head covered only with a light down, and the nails scarcely formed. There are some recent cases related in the journals which may here be mentioned, but with the same caution as already offered. A supposed six and a half months' child, born near Calcutta, of European parents: at the time of the description it was a month and twenty days old, weighed one pound and thirteen ounces, was fourteen inches in length, and was then suckling well.—Case by Mr. Baker, in Transactions of Medical and Physical Society of Calcutta, vol. i. p. 364.

A case by Mr. Cribb, where the mother menstruated last on the 15th of April, and was taken in labour on the 2d of November, 1827. The child was very diminutive, but at ten months it weighed twelve pounds.—London Medical and Surgical Journal for November 1828.

A case by Mr. Greening of Worcester, in Midland Medical and Surgical Reporter, vol. ii. p. 362.

Sundry cases quoted from Meli, an Italian writer on viability, in Annales D'Hygiène, vol. viii. p. 466. Some of these are of five months.

of premature births, in which the period of uterogestation was distinctly marked, that out of thirty-six cases of eight months' children there died during the month of child-bed only eight; while out of thirty-four cases of seven months' children there died within the month twenty-one.*

2. If we proceed as far back as the Roman law we shall find provisions on the subject before us. To enable the infant to succeed to property, it was necessary that *it should be perfectly alive*, "*si vivus perfectè natus est, etsi vocem non emisit;*† and the decision of Zacchias is in accordance with it. *Non nasci, et natum mori, paria sunt.*

As to France, a capitulary of Dagobert ordained that, in order to succeed to property, the infant should live an hour, and be able to see the four walls and ceiling of the chamber. An ordinance of Louis IX. altered this law, and directed that it should cry, in order to enable it to succeed.‡

The present French law is contained in the 725th and 906th articles of the civil code. *In order to succeed, the infant must be born viable; and in order to receive by testament, it is sufficient to have been conceived at the time of the death of the testator; but neither donation or testament can have effect unless the child be born viable.*§ And the interpretation of the word *life*, or *being born alive*, is, according to the most distinguished lawyers and physicians of that nation, *complete and perfect respiration.*‖

The English law, so far as it has a bearing on the question before us, is contained in the provisions concerning a *tenant by the curtesy of England*, as it is called. By this is understood, "where a man marries a woman seized of an estate of inheritance, and has by her issue born alive which was capable of inheriting her estate. In this case he shall, on the death of his wife, hold the lands for his life, as tenant by the curtesy of England.¶ The exposition of commentators is as follows:—"It must be born alive. Some have had a notion that it must be heard to cry; but that is a mistake. Crying, indeed, is the *strongest* evidence of its being born alive; but it is not the *only* evi-

* Medico-Chirurgical Review, vol. iv. p. 739. Of this opinion are Capuron, p. 159; Foderé, vol. ii. p. 168; Mahon, vol. i. p. 157; Goelicke in Schlegel, vol. v. p. 139; Orfila, vol. i. p. 372; the Editor of the Annales D'Hygiène, vol. viii. p. 466. On the opposite side, see Dewees, in Coxe's Medical Museum, vol. ii. p. 274; Barlow in Medico-Chirurgical Review, vol. iii. p. 320; New England Journal, vol. xii. p. 52.

† Chaussier, Viabilité, p. 3. ‡ Capuron, p. 198. § Ibid. p. 9.

‖ "Enfin les jurisconsultes ont adopté l'opinion des médecins à cet egard, et ne font consister la vie ordinaire que dans la respiration complete. Le célèbre Merlin dit aussi très formellement qu'il n'y a que la respiration complete que constitute la vie."—Capuron, p. 199.

Dr. Locock of London has lately put this case. A child's head is born; it cries, and of course breathes; and yet before the rest of the body is expelled it dies. Can property be transmitted on such a life? I apprehend there can be no doubt of it, according to the English law.—See London Medical Gazette, vol. xii. p. 636, 677.

¶ An ancient provision in the laws of Ethelbert reverses the law as now in force. "If a *wife* brought forth children alive, and survived her husband, *she was to have half his property.*"—Edinburgh Encyclopædia, vol. ii. p. 102, art. Anglo-Saxon Laws.

dence."* Coke says, "If it be born alive it is sufficient, though it be not heard to cry,—for peradventure it may be born dumb. It must be proved that the issue was alive; for *mortuus exitus non est exitus;* so as the crying is but a proof that the child was born alive, and so is motion, stirring, and the like."† The cases to which both these authors refer certainly prove the doctrines stated by them to be the law of England;‡ but it is to be feared that the broad principle thus laid down may lead to practical injustice. I cannot better illustrate my ideas on this point than by stating the following case, which lately occurred in England.

In 1806, a cause entitled Fish or Fisher *v.* Palmer, was tried before the court of exchequer at Westminster Hall. It appears that an infant was born to Mr. Fish in 1796, which was supposed to be still-born; and on the death of his wife, he accordingly resigned her property to the legal heir. Some circumstances afterwards occurred, which induced him to bring the present action, and to attempt to prove that the child had not been born dead. Dr. Lyon (deceased at the time of the trial) had declared, an hour before the birth, that the child was alive; and having directed a warm bath to be prepared, gave the child, when born, to the nurse, to be immersed in the warm water. It did not cry, nor move, nor shew any symptoms of life; but while in the water (according to the testimony of two females, the nurse and the cook), there twice appeared a twitching and tremulous motion of the lips. Upon informing Dr. Lyon of this, he directed them to blow into its throat, but it never exhibited any other signs of life.

Several physicians were examined as to the deduction to be drawn from these symptoms. Drs. Babington and Haighton agreed that the muscular motion of the lips could not have happened if the vital principle had been quite extinct; and that therefore the child was alive. Dr. Denman, on the contrary, gave it as his opinion that the child was not alive. He considered that the motion of the lips did not prove the presence of the vital principle, and drew a distinction between uterine and extra-uterine life. The remains of the former, he thought, might have produced the twitching of the lips. The jury,

* Blackstone, vol. ii. p. 127. † Coke, Littleton, 30 a.

‡ Dyer's Reports, p. 25. "It was moved that a man shall be tenant by the curtesy, although the issue be not heard to cry, so as it can be known that it hath life; for it may be the issue is born dumb." So was the opinion of Fitzherbert. This was in the 28th of Henry VIII. The other case (Paine's in 8th Coke's Reports) is instructive, because it gives us the opinion of the old writers on this subject. Glanvill says that the husband inherits "*ex uxore sua hæred' habuerit filiam clamantem et auditum infra quatuor parietes.*" And Bracton, "Sive superst' fuerit liberi sive mortui, dum tamen semel aut vocem aut clamorem dismiserint, quod audiatur inter quatuor parietes, si hoc probet, et licet partus moriat' in ipso partu, vel vivus nascat, vel forte semi-mortuus, licet vocem non emiserit, solent obstetrices in fraud' veri hæred' protestari partum vivum nasci et legitim', et *ideo necesse et vocem probare*, et licet naturaliter mutus nascitur et surdus, *tamen clamorem emittere debet.*" The court, however (Common Pleas, 29th of Elizabeth), decided according to the dictum of Littleton, as adopted by the commentators in the text, that "*the crying is but a proof of the life. But in the case at bar, to remove all scruples, it was found that the issue was heard to cry.*"

however, found that the child was born alive; and the property, which he had surrendered ten years previous, returned again to Mr. Fish.*

It will readily be observed, that a very extensive latitude is given to juries by this decision; and that they may decide contrary to what is correct in physiology, on the opinions of men incompetent to guide on this subject. In the instance before us, indeed, they were justified in their verdict by the testimony of eminent physicians, but it must also be remarked, that the proofs of life relied on by them are equivocal. It has been suggested, and I think with truth, that these convulsive motions merely shew that the muscular fibre has not yet lost its contractility. Still-born infants, or those who die instantly on being delivered, are not unfrequently observed to open their mouth, and extend their arms or legs. May not these be merely the relaxation of a contracted muscle, or the stimulus of the atmospheric air on a body unaccustomed to it?† Foderé remarks, that in his youth he has frequently seen still-born children carried to a chapel of the Virgin, which was built on high ground. The cold air of the place produced such an excitement, that they appeared to raise their eyelids for an instant, and that instant was improved to administer the rite of baptism.‡ Chaussier also examined the bodies of several children, born at five, six, and even seven months, who were said to have lived one or two hours, and in whom a motion of the jaws and members had been observed, and indeed a slight respiration. He ascertained by dissection that not one of them had lived after birth, and concluded, that the proofs observed owed some of their strength to the wishes of friends, and were in fact nothing more than the feeble remains of fœtal life—resembling, in many respects, the appearances observed on the body of an animal recently decapitated.§

One of his latest productions (at the age of eighty-one) was an appeal to the Minister of Justice in France, relative to the looseness of the law on this subject. He notices the various signs, and shews their insufficiency. The pulsation at the umbilical cord, and the spouting of blood from it when cut, only prove that the blood has preserved its fluidity, and that there is some action left in the vessel. The evacuation of the meconium should not be deemed a sign of life, since it is sometimes discharged in the womb, and is often caused by a compression of the abdomen. Nor is the objection mentioned by Lord Coke, that the deaf and dumb cannot cry, and that therefore there

* Foderé, vol. ii. p. 160. Smith, p. 383.

† I am happy to add the opinion of so eminent a writer on Physiology as Professor Dunglison, in favour of the doctrine advocated above. "The irritability shewn," says he, "must be regarded simply as an evidence that the parts have previously and recently formed part of a living system."—Human Physiology, vol. i. p. 317.

‡ Foderé, vol. ii. p. 160. "Notwithstanding all this, I think that where there is a power of being affected by stimuli (other than galvanic or electric), this, in common sense, must be held to constitute vitality; and no practical good can result from nice metaphysical distinctions between fœtal and extra-uterine life, when the child is fairly in the open air."—DUNLOP.

§ Capuron, p. 198.

might be injustice done in some cases, correct; since experience and observation shew that they do cry when perfectly alive.* Chaussier insists that the proofs of life in these disputed cases should be positive and manifest—such as the high red colour and warmth of the skin; a free and full respiration; sharp and continued crying, and motion of the heart and limbs; and these continuing for a longer time than a few minutes.†

The Scotch law seems to be more precise in its provisions. Individuals there, as in England, are allowed to hold property as tenants by the curtesy; but it can only take place where the issue has been heard to cry. "Lord Stair, in his Institutes, lays it down that the children of the marriage must attain that maturity as to be heard to cry or weep; and adds, that the law hath well fixed the maturity of the children by their crying or weeping, and hath not left it to the conjecture of witnesses whether the child was ripe or not." A case, in conformity to this doctrine, was decided as late as 1765, in the Court of Session (*Dobie* v. *Richardson*). "Dobie's wife brought forth a child about nine months after marriage, which breathed, raised one eyelid, and expired in the usual convulsions about half an hour after its birth, *but was not heard to cry*. The mother died in childbed; and the question was, whether the *jus mariti* was not lost by the death of the wife within the year, without a child of the marriage *who had been heard to cry?* After much argument on both sides, the decree was, that as the wife did not live a year and a day after her marriage, and *as it was not proved* that the child or fœtus of which she was delivered *was heard to cry*, the husband was not entitled to any part of his deceased wife's effects."‡

The following is a continental case: "A lady of Turin, aged twenty, died intestate on the 28th of October, 1818, in the last stage of gestation, and on the tenth day of a putrid fever. Immediately after she had breathed her last gasp, at half past two, A.M. there was extracted from her, by the Cæsarean operation, a child which was still alive, but which died at the end of thirteen minutes, and which was not opened after death. The husband, who was witness of the opera-

* "It need scarcely be said, that the deaf and dumb cry at the moment of birth, the same as other children. The natural cry is effected by them, as well as by the infant that possesses all its senses. It is the *acquired* voice alone which they are incapable of attaining."—Dunglison's Physiology, vol. i. p. 317.

† Chaussier, Mémoire médico-légale sur la viabilité de l'enfant naissant. Paris, 1826. In 1828, Collard de Martigny, a French lawyer, also wrote on this subject, in consequence of the examination of a child, born alive at the full time, which breathed, cried, and moved, but died at the end of ten minutes; and on dissection, such marks of disease were found as precluded the possibility of its surviving. Was this a case to which the law applied? or, in other words, was it *viable* civilly, although it evidently was not *naturally* so? Our author justly decides in the affirmative. It is manifest that any discussions, beyond that of the proof of the existence of *perfect life* (no matter how short that may be), must lead to interminable disputes, and the benefit of a general rule will be lost in the consideration and adjustment of every individual case. This difficulty, however, can only occur in cases under the French law, and originates in the proper interpretation of the word *viable*.—Questions de Jurisprudence, &c.

‡ See a note to Dyer's Reports, 25, by the editor, John Vaillant, A.M., &c.

tion, along with the surgeon who performed it, declared himself the heir of the child, resting his claims upon the declaration of the surgeon, which bore that the child had all the characters of maturity, and that it was living, which he discovered by motions of the legs and feet, which had taken place before, during, and after the operation; by the circumstance of the child's opening its hands, which were closed; by the circumstance, that, on cutting the umbilical cord, blood sprung out, and that pulsations were felt in the cord, the carotid arteries, and the region of the heart; by the circumstance, that, on pouring water on the child's head in administering baptism to it, there resulted a motion of the lips and mouth, and an impression which produced an inspiration; and, lastly, by the circumstance that the natural heat remained; that after having lived about thirteen or fourteen minutes, some drops of blood came from the nose of the child; that it became pale, stretched its limbs, closed its eyes, and died. The brothers of the deceased opposed the husband in his claims; and during the procedure dependent before the Senate of Turin, some distinguished members of the medical faculty of that city proposed the following questions to the faculty of Strasburg: 1. If it be sufficiently proved, by the motions of which mention is made in the above declaration, that the child in question lived a life which rendered it capable of succeeding; that it had been born capable of living, in consequence of the operation performed upon its already dead mother, and that it had really breathed? 2. If the dissection of the child's body, which had been neglected, might not have been of great assistance in determining whether the child had actually lived, and in discovering the cause of its death, which had been so quick? The faculty named a commission, composed of Professors Lauth, Lobstein, Flamant, Tourdes, and Foderé; and it was unanimously decided that the first question should be answered affirmatively, and the second negatively."*

The only American case relating to this point that I can find, is that of Marsellis *v.* Thalhimer, which occurred in the Chancery Court of this State in 1830. The widow was delivered of a full-grown child two months after the death of the husband: it never breathed. On these facts, a dispute arose concerning the disposition of property. It was urged, that the child having been born, the presumption was that it was born alive, until the contrary was proved; and that a child *in ventre sa mere*, was a life in being to all intents and purposes, either as it regarded its own benefit, or that of other persons. The opposite doctrine was maintained by most of the arguments and legal enactments which I have already noticed, and the decision of the Chancellor (Walworth) was in conformity to this. "I am satisfied," says he, "from the opinion of the physician examined before the surrogate, that no court is authorised to decide affirmatively that the child was born alive. There is no legal presumption in favour of the fact; and as the mother claimed by descent from the child,

* From a Critical Notice of "*Anthropogenese*," by J. B. Demangeon, M.D. Paris, 1829, in Edinburgh Journal of Natural and Geographical Science, vol. ii. p. 198.

she held the affirmative, and was bound to establish her right by legal proof."*

The state of infants delivered by the CÆSAREAN OPERATION belongs also to this place; and I shall illustrate the laws of different countries respecting them, by mentioning various cases that have occurred.

A female, the wife of Matthew Braccius, died at the seventh month of pregnancy, of a violent illness; and a quarter of an hour thereafter, an infant was taken from her by the Cæsarean operation. The father claimed to be its heir; and it was asserted in proof of its life, that it had opened its eyes, and made some slight motions. Zacchias was consulted on this case; and in his Opinion, he asserts that these motions were mechanical, and the effect of the air on the body; and this was corroborated by the fact, that after its extraction the child was carried into a cold cellar. The decision was conformable to this opinion.† It appears, however, that the court of *Sancta Rosa* at Rome allowed an infant to inherit, who was delivered by the Cæsarean operation, and who lived for several weeks thereafter.‡

In France, a similar case has been made the subject of controversy. A female, residing in the department of the Loire, died in child-bed on the 2d of July, 1780, and after her death, an infant was extracted by the Cæsarean operation, which was baptised, as being alive. A law-suit was instituted on the case, and it was proved, that the infant had opened and shut its mouth for the space of half an hour—that one of its hands had been opened, and that it closed it again without assistance—that it vomited some froth—that it made several expirations like a person who is dying—and that it was perfectly well formed. It was objected that the infant was too immature, and consequently was not viable, and of course could not succeed to property. The testimony of the witnesses was also impeached. The court, however, decided that the infant had lived, and refused to consider the question of its viability.§

In England, a person cannot hold property as tenant by the curtesy, if the child has been delivered by the Cæsarean operation. "The issue must be born during the life of the mother; for if the mother dies in labour, and the Cæsarean operation is performed, the husband in this case, shall not be tenant by the curtesy: because at the instant of the mother's death, he was clearly not entitled, as having no issue born, but the land descended to the child, while he was yet in his mother's womb; and the estate, being once so vested, shall not afterwards be taken from him."‖ "One Reppes, of Northumberland, took

* 2 Paige's Chancery Reports, vol. ii. p. 35. I cannot be insensible to the flattering terms in which the Chancellor, in his learned opinion, was pleased to notice this work.

In 1833, the Solicitor General of England brought into Parliament "An act for the amendment of the law relative to the estate of a tenant by the curtesy of England." In this it was provided that the husband may enjoy the wife's estate as tenant by the curtesy, although actual possession of it in his lifetime may not be had, and although there may not have been issue of the marriage.—Companion to the Newspaper, p. 55. I cannot, however, find that the bill passed.

† Zacchias Consilium, No. 67. ‡ Foderé, vol. ii. p. 163.

§ Foderé, vol. ii. p. 164.

‖ Blackstone, vol. ii. p. 128. See also Coke Littleton, 29 b.

to wife an inheritrix, who was great with child by him, and died in her travail, and the issue was ripped out of her belly alive; and by reference out of the chancery to the justice, they resolved, that he should not be tenant by the curtesy, for it ought to begin by the birth of the issue, and be consummated by the death of the wife."*

3. The consideration of the subject, *how far deformity incapacitates from inheriting*, cannot be better introduced, than by stating the division of monsters proposed by Buffon. He separates them into three classes—monsters by excess, monsters by defect, and monsters by alteration or wrong position of parts.

Of the first class, a very remarkable instance is related in the case of twins, born at Tzoni, in Hungary, on the 16th of October, 1701. These two females were called Helen and Judith, and were separated from each other, except at the anus, where they were united, and the function pertaining to that part was performed in common. They lived to the age of twenty-two years. Judith first fell sick, but the health of Helen also became soon impaired, and the latter died three minutes after the former. They expired on the 23d of February, 1723, at Presburgh.† The case related by Sir Everard Home, in the Philosophical Transactions, belongs also to this division. A male child was born in Bengal, in 1793, with a well-formed body, but it had a second head, placed in an inverted position on the top of the proper one.

* Paine's Case, 8th Coke's Reports. I do not know that any thing can be said on the subject of the FIRST-BORN OF TWINS, except the following quotation: "When the question was, which of three sons, all born at a birth, was the eldest, the declaration of a female relation, that she was at the birth, and she tied a string round the arm of the second son, in order to distinguish him, was admitted in evidence."—Starkie on Evidence, vol. 3, p. 1115.

† See an account of this extraordinary case in the Philosophical Transactions, by J. J. Torkos, M.D. F.R.S. (vol. 50, p. 311.) A similar instance is mentioned in Piscottie's History of Scotland, p. 160. Cases of double births united at various parts, may also be found in the Philosophical Transactions, vol. v. p. 2096; vol. xxiii. p. 1416; vol. xxv. p. 2345; vol. xxxii. p. 346; vol. xlv. p. 526; vol. lxxii. p. 44; vol. lxxix. p. 157. A very interesting account of a person in China, named Ake, is contained in Chapman's Journal, vol. ii. p. 148, and vol. iii. p. 78; also in Edinburgh Philosophical Journal, vol. v. p. 133, and vol. vii. p. 126. He has a living parasite attached to him from the sternum to the umbilicus, and is, notwithstanding, able to do the work of a husbandman.

For references to numerous cases, see Lawrence's Essay on Monstrous Productions in Medico-Chirurgical Transactions, vol. v. p. 165. Dict. des Sciences Médicales, vol. xxxiv. Review of J. G. St. Hilaire on Monstrosities, in Edinburgh Medical and Surgical Journal, vol. xxxix. p. 165. Chapman's Journal, N.S. vol. iv. p. 289, and vol. v. p. 17. Andral's Patholog. Anatomy, vol. i. p. 110.

For the most recent cases, see Edinburgh Medico-Chir. Transactions, vol. ii. p. 35. Case by Dr. Berry of Calcutta. It occurred near that city; both were living, and they were then three years old.

A case at Turin. This monster survived some time, and was exhibited at Paris.—American Journal Medical Sciences, vol. v. p. 472. Jameson's New Edinburgh Philosophical Journal, vol. vii. p. 196. Lancet, N.S. vol. v. p. 194.

A living duplex child in Switzerland, seen, in 1829, by John Borland.—London Medical Gazette, vol. v. p. 51. Lancet, N.S. vol. xii. p. 620.

Case by Dr. Scoutetten, of Metz, one perfectly formed, and the other acephalous. They were both living a year after birth. This is a very curious case. Medico-Chirurgical Review, vol. xxiv. p. 231. And in America, Dr. Horner, in American Journal of Medical Sciences, vol. viii. p. 349. North-American Medical and Surgical Journal, vol. ii. p. 395. Dr. De Camp, in Boston Medical and Surgical Jour-

This was equally perfect, and at the age of six months, both were naturally covered with black hair. The child lived four years, and its death was owing to the bite of a *cobra de capello*. On dissection, no bone was found separating the two brains. The skulls are preserved in the Hunterian museum.*

It is barely necessary to remark, that frequent instances also occur of an increased number of organs, members, &c.

Of monsters by defect, the most remarkable are those which are born without a head, and are hence styled *acephalous*. These live in the womb, but do not survive after birth, since the function of respiration cannot be performed. To this class, also, belong those which are destitute of lungs, of one or more organs of sense, &c.†

The defects of the third class are seldom discovered until after death, as they are commonly internal. They are hence seldom the subject of inquiry in legal medicine. But the most remarkable instances of this nature are those in which the rudiments or parts of a fœtus have been discovered.‡

After this exposition of the condition in which monsters are generally born, we shall be enabled to apply the laws of various countries relating to them.

As monsters by excess are *viable*, or capable of living, so, by the law of France as already quoted, they are capable of inheriting. Those

nal, vol. ii. p. 518. Dr. Martin, in Ohio Western Medical and Physical Journal, vol. iii. p. 290.

The Siamese Twins belong to this division. In November 1833, two children were born at Newport, Kentucky, formed exactly like the Siamese Twins. The mother had never seen these, but they were exhibited in the town, about the time she was impregnated, and she had seen wood-cuts of them. These fœtuses are now in the Cabinet of the Medical College of Ohio.—Western Medical Gazette, vol. i. p. 289.

* Philosophical Transactions, vol. lxxx. p. 296, and vol. lxxxix. p. 28.

† Edinburgh Medico-Chirurgical Transactions, vol. ii. p. 39. Case by Dr. Hastings, in which the upper and lower extremities were entirely wanting. It lived six months. A curious case of deficiency in the fingers (apparently hereditary) in a whole family, is related in Edinburgh Medical and Surgical Journal, vol. iv. p. 252.

‡ The following are instances of this nature: A female named *Amidee Bissieu*, in France, at whose death, at the age of fourteen, a fœtus was found in the abdomen.—Edinburgh Medical and Surgical Journal, vol. i. p. 376. This case appears to have been recently revived, and is related by M. Breschet.—Medico-Chirurgical Review, vol. v. p. 180. A child aged nine months, examined by G. W. Young, Esq.—Medico-Chirurgical Transactions, vol. i. p. 194. A girl aged two years and a half, examined by Dr. Phillips of Andover.—Ibid, vol. vi. p. 124. In the London Medical Repository (vol. iv. p. 404) there is a reference to three other cases; and an account is also given of a fœtus found by Mr. Highmore, in the abdomen of a young man who died in 1814, aged sixteen years, at Sherborne, in Dorsetshire. A case is also mentioned as occurring in Austria in 1812. It is related by Prochaska. —London Medical Repository, vol. vi. p. 330. A child at Brannau in Austria, in 1825.—Chapman's Journal, N.S. vol. v. p. 142. A case in Hanover, from Graefe's Journal.—Lancet, vol. xii. p. 454.

Among American cases, I may mention that of Dr. Gaither, occurring in Kentucky. A female child died in 1809, at the age of two years and nine months. A fœtus was found in the abdomen.—New York Medical Repository, vol. xiii. p. 1. Coxe's Medical Museum, vol. vi. p. 193. New York Medical and Philosophical Journal and Review, vol. i. p. 170. A case by Dr. Curtis, in Tompkins county, New York. Child four years old.—New York Medical and Physical Journal, vol. v. p. 202. New-England Journal, vol. xv. p. 32.

by defect, and particularly the acephalous, are to be considered as still-born — incapable of living,* and this opinion must be enforced in proportion to the importance of the organs that are wanting. Concerning the last class, there can seldom be any controversy, as the malconformation is ordinarily not discovered until after death.

The English law is thus stated by Blackstone: — "A monster which hath not the shape of mankind, but in any part evidently bears the resemblance of the brute creation, hath no inheritable blood, and cannot be heir to any land, albeit it be brought forth in marriage; but although it hath deformity in any part of its body, yet if it hath human shape, it may be an heir." This he adds, is a very ancient rule in the law of England; and observes, that "the Roman law agrees with our own in excluding such births from succession, yet accounts them, however, children in some respects, where the parents, or at least the father, could reap any advantage thereby, esteeming them the misfortune, rather than the fault of that parent. But our law will not admit a birth of this kind to be such an issue as shall entitle the husband to be tenant by the curtesy, because it is not capable of inheriting."†

As there are instances in which the issue should be male, in order to inherit, it will be proper to repeat a caution already given — not to mistake the enlarged state of the clitoris, which is very common at birth, for male organs. Foderé mentions instances where females have, in consequence of this, been inscribed in the baptismal registers as males; and in one case, the individual was called out under the conscription law.‡

As EXTRA-UTERINE FŒTUSES have never been brought forth alive, there can, of course, no question arise concerning them.§

* There are, however, instances in which acephalous monsters have lived for a short time. Mr. Lawrence mentions one, which, although deficient in brain and cranium, was perfectly formed in all its other parts, and lived four days. Another is mentioned as occurring in Italy in 1831. It lived eleven hours.—Lancet, N.S. vol. xi. p. 570. Some valuable physiological remarks on these productions, may be found in the Edinburgh Medical and Surgical Journal, vol. xi. p. 351.

† Blackstone, vol. ii. p. 246. ‡ Foderé, vol. ii. p. 179.

§ When I wrote this, I had not seen the cases mentioned in the New-England Journal, vol. viii. pp. 118, 403; one by Dr. Delisle of Paris, and the other by Mr. King of South Carolina. In both instances, extra-uterine fœtuses *are said* to have been extracted, by cutting through the vagina. The first lived three quarters of an hour, and the second seems to have survived at the time when the narrative was written. Should a legal question ever occur concerning such, I presume the same provisions which are in force respecting those extracted by the Cæsarean operation would guide here.

CHAPTER VIII.

INFANTICIDE.

History of Infanticide as it has prevailed in various nations, ancient and modern. Fœticide, or criminal abortion. The period of gestation when a child ought to be considered as alive. Signs of fœticide deduced from an examination of the female. Where the death of the female follows the abortion. Anatomical examination of the parts after death. Hydatids and moles considered as occasioning all these signs. Signs of fœticide deduced from an examination of the substance expelled from the female. Modes in which fœticide is perpetrated. Involuntary causes of abortion—Circumstantial evidence. Murder of the child after it is born alive—Capability of its sustaining life after birth—Proofs of its having been born alive—Proofs drawn from the blood having circulated. Difference of the blood of the fœtus and the child after birth. Peculiarities of the organs circulating the blood in the fœtus — the foramen ovale — the ductus arteriosus—the ductus venosus—the umbilical vessels—the cord. Difference in the distribution of the blood—in the lungs. Ploucquet's test—in the liver. Ecchymosis. Proofs drawn from the child's having respired. Configuration and size of the thorax—Volume of the lungs—Relative situation of the lungs—Shape of the lungs—Colour of the lungs—Density of the lungs—Specific gravity of the lungs. Hydrostatic test. Consideration of objections to it. Rules for examining the lungs. State of the diaphragm — meconium — state of the bladder. General deductions. Modes of perpetrating infanticide. Accidental modes in which a child's life may be lost. Congenital malformations. Congenital diseases. Circumstantial evidence. Method of conducting examinations in cases of infanticide. Cases and illustrations. Prevention of infanticide—laws against it. Foundling hospitals. List of American and English cases.

PART I.

Of the History of Infanticide as it has prevailed in different nations, ancient and modern.

It is a fact no less melancholy than astonishing, that a practice so unnatural as that of infanticide should ever have prevailed to any extent. Its existence might have been supposed possible in those unhappy regions of our earth, where untutored passion and brutal sense reign triumphant over reason and morality; but that the fairest portions of society, where genius, science, and refinement had taken up their abode, should have been disgraced by a crime so disgusting, is one of those anomalies in the history of human feeling and conduct, which irresistibly prove how perfectly arbitrary and undefined are the laws of justice and humanity when unguided by the principles of true

religion. The fact, however, is not more astonishing than true. A slight review of its history will shew us that this practice prevailed in almost all the ancient nations, and that it is not even yet blotted from the list of human crimes.

The laws of Moses are silent on the subject of infanticide;* and from this circumstance we should be led to conclude that the crime was unknown among the Jews at that period of their history, and, therefore, that any positive prohibition of it was considered unnecessary. The penal code of the Jews is so very minute on the subject of murder in general — considers it so atrocious a crime, and denounces such terrible punishments against the perpetrators of it, that it is wholly incredible that the murder of infants would have been countenanced by their illustrious legislator. This conclusion is further confirmed by the considerations, that barrenness was esteemed one of the greatest misfortunes which could befall a Jewish woman, and that the Jews were all desirous of a progeny, because each cherished the hope that the Messiah might be numbered among his descendants. These facts would seem to prove, that every inducement was held out for the preservation of children, and none to countenance their destruction.† At a subsequent period, when they became contaminated by their intercourse with the Canaanites, we find the Jews imitating ‡ the example of their king, Manasseh, who sacrificed his son to the idol Molech.§ These horrid sacrifices were suppressed by King Josiah, who commanded, "that no man might make his son or his daughter to pass through the fire to Molech."‖ And Tacitus, in describing the manners of the Jews of his day, says, that they were not allowed to put their children to death.¶

The nations surrounding the Jews appear to have been addicted to the sacrifice of children. Of these, the *Canaanites* are described as "sacrificing their sons and their daughters unto devils, and shedding innocent blood, even the blood of their sons and their daughters, whom they sacrificed unto the idols of Canaan."**

Among the *Egyptians*, infants were treated with more humanity; yet instances are not wanting of the greatest cruelty towards them. A memorable one is found in the commission of Pharoah to the midwives, to murder all the male offspring of the Jews. Their own children, however, were treated with greater tenderness; and they are, accordingly, on this account, mentioned with honour by some of the writers of other countries. Strabo, in particular, speaks of them as an honourable exception to those nations who exercised the right of life and death over their infants.††

* Commentaries on the Laws of Moses, by J. D. Michaelis, F.R.S. Translated from the German, by Alexander Smith, D.D. vol. iv.

† "Abortion and infanticide were not specially forbidden, but unknown among the Jews. Josephus, appealing in honest pride to the practice of his countrymen, reproaches other nations with these cruelties."— Milman's History of the Jews, vol. i. p. 107. Harper's edition.

‡ Jeremiah, vii. 31, and xix. 5. § 2 Chronicles, xxxiii. 6; 2 Kings, xxi. 6.

‖ 2 Kings, xxiii. 10. ¶ Hist. Lib. v. cap. 5. ** Psalm cvi. 37, 38.

†† A History of Inventions and Discoveries, by John Beckmann. Translated by W. Johnson. Vol. iv. p. 435.

Among the *ancient Persians*, it was a common custom to bury children alive. Herodotus tells us of Amestris, the wife of Xerxes, who, at an advanced age, ordered fourteen Persian infants, of illustrious birth, to be interred alive, in honour of one of the deities of the country.*

In most of the *Grecian states*, infanticide was not merely permitted, but actually enforced by law. The Spartan lawgiver expressly ordained, that every child that was born should be examined by the ancient men of the tribe; and that if found weak or deformed, it should be thrown into a deep cavern at the foot of Mount Taygetus, called *Apothetæ*, "concluding, that its life could be of no advantage either to itself or to the public, since nature had not given it at first any strength or goodness of constitution." † This practice was not, however, upheld merely by the sanction of law: it was defended by the ablest men of Greece. Aristotle, in his work on government, enjoins the exposure of children that are naturally feeble and deformed, in order to prevent an excess of population. He adds, "if this idea be repugnant to the character of the nation, fix at least the number of children in each family; and if the parents transgress the law, let it be ordained, that the mother shall destroy the fruit of her body before it shall have received the principles of live and sensation." ‡ The mild Plato also justifies this practice. In his Republic, he directs that "children born with any deformity shall be removed and concealed in some obscure retreat." §

Of the existence of infanticide at *Athens*, we have the testimony of the comic poets, who, in describing the manners of that city, frequently allude to the exposure of children. ‖

Thebes, however, exhibited a noble contrast to the rest of Greece. By one of her laws, it was expressly forbidden to imitate the other Grecian cities, who exposed their children at their birth. ¶

Of all the nations of antiquity, the *Romans* were the most unrelenting in their treatment of infants. The Roman father was vested with an absolute authority over the lives and fortunes of his children, ** and we have abundance of testimony to shew that the right was commonly exercised. This barbarous prerogative was coeval with the existence of Rome, and continued to triumph over justice and humanity during the lapse of many ages, until Christianity wrested it from her. Romulus authorised the destruction of all children that were deformed. He, however, required the parents to exhibit them to their five nearest neighbours, and to obtain their consent to their

* Beloe's Herodotus, vol. iv. p. 37.

† Plutarch's Lives, translated by Langhorne, vol. i. p. 142.

‡ Travels of Anacharsis, vol. v. p. 270. § Ibid, vol. iv. p. 342.

‖ Vide Quarterly Review, vol. ii. p. 389, for quotations from Terence and Plautus.

¶ Travels of Anacharsis, vol. iii. p. 277.

** The right of parents over their children is thus stated in the Institutes of Justinian, Lib. i. Tit. ix. p. 22. Cooper's edition. Jus autem potestatis, quod in liberos habemus, proprium est civium Romanorum; nulli enim alii sunt homines, qui talem in liberos habeant potestatem, qualem nos habemus.

death.* The law of the Twelve Tables, enacted in the 301st year of Rome, sanctioned the same barbarous practice.† After this, even the slight restrictions which Romulus had imposed upon parents appear to have been removed, and an unqualified jurisdiction surrendered to the father over the lives of his children, even after they had arrived to years of maturity. Sallust mentions an instance of the latter. "Fuere tamen extra conjurationem complures, qui ad Catalinam initio profecti sunt: in his A. Fulvius, senatoris filius; quem retractum ex itinere, *parens jussit necari.*"—Sallust, Cat. xxxix.

The procuring of *abortion*, which can be considered no less than murder, was also notoriously prevalent among the Romans. Juvenal thus speaks of that nefarious practice:

> Hæ tamen et partûs subeunt discrimen et omnes
> Nutricis tolerant fortunâ urguente labores;
> Sed jacet aurato vix ulla puerpera lecto:
> Tantum artes hujus, tantum medicamina possunt.‡
>
> Juv. *Sat.* vi. 592.

Minucius Felix thus describes the barbarity of the Romans in this respect: "I see you exposing your infants to wild beasts and birds, or strangling them after the most miserable manner. Nay, some of you will not give them the liberty to be born, but by cruel potions procure abortion, and smother the hopeful beginning of what would come to be a man, in his mother's womb."§ Pliny, the elder, himself defends the right of parents to destroy their children, upon the ground of its being necessary to preserve the increase of population within proper bounds.

Such was the practice of ancient Rome from her first origin down to the time of Constantine the Great. During the days of her greatest political grandeur it was carried to the highest excess; and whilst she was boasting of her refinement, and casting the opprobrious epithet of barbarian on all around her, she was guilty of the basest profligacy and the most hardened cruelty. Christianity first opposed a barrier to the desolations of this crime; her mild and humane spirit could not but discountenance it; and, accordingly, it animated all who were arrayed under her peaceful banners, to exert their energies in arresting its progress. The Christian writers of that day are full on this point. Tertullian, in his Apology, expresses himself with heroic boldness on the subject: "How many of you (addressing himself to the Roman people, and to the governors of cities and provinces) might I deservedly charge with infant-murder; and not only so, but among the different kinds of death, for choosing some of the cruellest for their

* Montesquieu's Spirit of Laws, vol. i. p. 104. London.

† Cooper's Justinian, p. 659.

‡ "Yet these, though poor, the pain of childbed bear,
And without nurses their own infants rear.
You seldom hear of the rich mantle spread
For the babe born in the great lady's bed.
Such is the power of herbs: such arts they use
To make them barren, or their fruit to lose."

§ Octav. Minucii Felicis, ch. xxx.

own children, such as drowning or starving with cold or hunger, or exposing to the mercy of dogs,—dying by the sword being too sweet a death for children, and such as a man would choose to fall by, sooner than by any other ways of violence. But Christians now are so far from homicide, that with them it is utterly unlawful to make away a child in the womb, when nature is in deliberation about the man; for to kill a child before it is born, is to commit murder by way of advance; and there is no difference, whether you destroy a child in its formation, or after it is formed and delivered; for we Christians look upon him as a man who is one in embryo; for he is a being like the fruit in blossom, and in a little time would have been a perfect man, had nature met with no disturbance."* In A.D. 315, Constantine the Great enacted a law, providing for the maintenance and education of those children whose parents were too poor to do the same.† He also ordered a severe punishment to be inflicted on a cruel father. This was the first time that the authority of the government had interposed to arrest this crime; and it is not to be supposed, that a custom which had become so familiar to all the habits and feelings of the Roman people would be immediately suppressed; and, accordingly, we find that it still continued to prevail, though in a less degree, until the end of the fourth century, when it was finally exterminated by the Emperors Valentinian, Valens, and Gratian.‡

The *Phœnicians* and *Carthagenians* were in the habit of sacrificing infants to their gods. The latter had a law by which four children of noble birth were regularly immolated upon the altars of Saturn.§ History records a melancholy instance of the superstition and cruelty of these deluded people: it is related, that they attributed their defeat by Agathocles, king of Sicily, to an omission of these sacrifices; and, in order to atone for their past neglect, they offered up, at one time, two hundred of the sons of their nobility.

Silius Italicus notices this custom:

> "Mos fuit in populis, quos condidit Advena Dido,
> Poscere cæde deos veniam, ac flagrantibus aris
> (Infandum dictu) parvos imponere natos."—Lib. 4.

The *ancient Germans*, although in the habit of sacrificing prisoners taken in battle, do not appear to have been addicted to the crime of infanticide. Tacitus, in describing their manners, mentions a contrary

* Reeves's Apologies, &c. vol. ii. p. 190. † Anc. Univ. Hist. vol. xv. p. 576.

‡ Mr. Gibbon thus expresses himself in relation to this practice among the Romans: "But the exposition of children was the prevailing and stubborn vice of antiquity: it was sometimes practised, often permitted, almost always practised with impunity, by the nations who never entertained the Roman ideas of parental power; and the dramatic poets who appeal to the human heart, represent with indifference a popular custom which was palliated by the motives of economy and compassion. If the father could subdue his own feelings, he might escape, though not the censure, at least the chastisement of the laws. And the Roman empire was stained with the blood of infants, till such murders were included, by Valentinian and his colleagues, in the letter and spirit of the Cornelian law."—The History of the Decline and Fall of the Roman Empire, by Edward Gibbon, Esq., vol. iii. p. 186. London edition.

§ Anc. Univ. Hist. vol. xvii. p. 257.

practice as one of the peculiarities distinguishing their character: "Numerum liberorum finire, aut quenquam ex agnatis necare, flagitium habetur."*

Among the *Visigoths* the murder of infants was a common crime. Chindaswinthus, one of their kings, in his laws, describes the procuring of abortion, as well as the murder of children after they are born, as practices that were prevalent in the provinces, and denounced severe penalties on the perpetrators of those crimes.†

But *infanticide* was not confined to the ancients. It has descended to modern nations, and at the present day disgraces eastern and southern Asia by its enormities.

The *Chinese* are notorious for their cold indifference in the exposure and murder of their children. According to Mr. Barrow, the number of children exposed in Pekin alone amounts to 9000 annually. No law exists to prevent it: on the contrary, it appears rather to be encouraged; inasmuch as persons are employed by the police of the city to go through the different streets every morning in carts, to pick up all the children that may have been thrown out during the night. "No inquiries are made; but the bodies are carried to a common pit without the walls of the city, into which all, whether dead or living, are promiscuously thrown."‡ The practice is not confined to the capital; it prevails also in other parts of the country. It is calculated that the number of infants destroyed in Pekin, is about equal to that of all the rest of the empire.§ Almost all those that are exposed are females. The causes assigned for its prevalence, are extreme poverty, arising from an overgrowth of population; frequent and dreadful famines springing from the same cause; the natural coldness of affection in the Chinese, together with the sanction of custom, and the want of any law forbidding it. Mr. Ellis, who visited China with the British embassy in 1816, expresses some doubts with regard to the frequency of infanticide in China.‖ Whether the estimate of Barrow be too large or not, it is impossible to say. The general prevalence of the crime, however, is unquestionable; and recent travellers speak of it as still existing in all its horrid deformity. "At the beach of Amoy," says Mr. Gutzlaff, "we were shocked at the spectacle of a pretty new-born babe, which shortly before had been killed. We asked some of the bystanders what this meant; they answered with indifference, 'It is only a girl.'" This same traveller says, "It is a general custom among them to drown a large proportion of the new-born female children. This unnatural crime is so common among them, that it is perpetrated without any feeling, and even in a laughing mood; and to ask a man of any distinction whether he has daughters, is a mark of

* De Morib. Germ. xix.

† On the history of the effects of religion upon mankind. By Rev. Edward Ryan. P. 110.

‡ Travels in China, &c. By John Barrow, Esq. P. 113. (American edition.)

§ Ibid. p. 114. Also De Pauws' Philosophical Dissertation on the Egyptians and Chinese.—Quarterly Review, vol. ii. p. 255.

‖ Journal of the Proceedings of the late Embassy to China, &c. By Henry Ellis, third commissioner of the embassy. Vol. ii. p. 209. London, 1817.

great rudeness. Neither the government, nor the moral sayings of their sages, have put a stop to this nefarious custom."* The same writer, in another work, makes the following statement: "Infanticide, of which the husbands are the only perpetrators, is not uncommon; but female children only are murdered, and then immediately after their birth. This horrible crime meets with no punishment from the laws of the country; a father being the sovereign lord of his children, he may extinguish life whenever he perceives or pretends that a prolongation of it would only aggravate the sufferings of his offspring."† Another late traveller says, "In some provinces, not one out of three is suffered to live; and in others, as the writer has been informed by the Chinese from those places, the difference between the male and the female population is as ten to one."‡

Among the *Hindoos*, infanticide presents itself in a form still more horrible. It is incorporated into their system of religion, and its atrocities are beyond description. In has existed among them for at least 2000 years; for Greek and Roman historians notice it, and refer to some of the very places where it is now known to exist.§ The number of infantile murders in the provinces of Cutch and Guzerat alone, amounted, in 1807, according to the lowest calculation, to 3000 annually; according to another computation, 30,000.‖ Females are almost the only victims. In defence of the practice, they urge the difficulty of rearing female children, the expense attending their education, and the small probability of their ever being married.¶ Within a few years, through the benevolent exertions of some of the subjects of Great Britain, it was supposed that infanticide had been completely abolished in many of the provinces. Mr. Duncan, governor of Bombay, Marquess Wellesley, and Col. Walker, were the persons who took the lead in this affair, and whose energy and perseverance it was hoped and asserted had been crowned with complete success.** It is

* Journal of Three Voyages along the Coast of China, in 1831, 1832, and 1833; with Notices of Siam, Corea, and the Loo-Choo Islands. By Rev. Charles Gutzlaff. P. 142. (American edition.)

† A Sketch of Chinese History, Ancient and Modern, &c. By Rev. Charles Gutzlaff. Vol. i. p. 46. (American edition), 1834.

‡ See a Journal of a Residence in China, &c. from 1829 to 1833. By Rev. David Abeel. Pp. 128, 158. New York, 1834.

§ Christian Researches in Asia. By the Rev. Claudius Buchanan, D.D. (English edition, p. 49.)—View of the History, Literature, Religion, &c. of the Hindoos. By William Ward, D.D. P. 393. (American edition.)—Also Moor's Hindu Infanticide, &c. Review of the same in London Quarterly Review, vol. vi. p. 210.

‖ Buchanan's Researches in Asia, p. 49. Also Moor's Hindu Infanticide, p. 63.

¶ The modes of perpetrating the deed are various. Dr. Buchanan states that two are principally prevalent. As soon as it is known to be a female, a piece of opium is put into its mouth; or the umbilical cord is drawn over its face, which, by preventing respiration, destroys it.—Researches in Asia, p. 47. Moor's Hindu Infanticide, pp. 55, 56. Another mode still more common, however, is to drown the child, as soon as it is born and ascertained to be a female, in a large vessel of milk placed in the room for that purpose.—Moor's Hindu Infanticide, p. 27. Heber's Travels, vol. ii. p. 70. (American edition.)

** For a full account of these measures, see "Hindu Infanticide: An account of the measures adopted for suppressing the practice of the systematic murder, by their parents, of female infants; with incidental remarks on other customs peculiar to

melancholy to be obliged to state, on the authority of a recent traveller, that the benevolent labours of these gentlemen were attended with only temporary success. Bishop Heber, in his travels in 1824 and 1825, says, " Through the influence of Major Walker, it is certain that many children were spared; and previous to his departure from Guzerat, he received the most affecting compliment which a good man could receive, in being welcomed at the gate of the palace, on some public occasion, by a procession of girls of high rank, who owed their lives to him, and who came to kiss his clothes, and throw wreaths of flowers over him as their deliverer and second father. Since that time, however, things have gone on very much in the old train, and the answer made by the chiefs to any remonstrances of the British officers, is, ' Pay our daughters' marriage-portion, and they shall live.' Yet these very men, rather than strike a cow, would submit to the cruellest martyrdom."*

Previously to the conversion of *Otaheite* to Christianity, infanticide was so common that it threatened the complete depopulation of the island. It was found as a common practice, when the island was visited by Capt. Cook;† and just anterior to the introduction of Christianity, according to the most accurate estimates, at least two-thirds of the children born were destroyed.‡ It appears to have been confined to no rank or class of the community, but to have been universally prevalent. Mr. Ellis states, that he did " not recollect having met with a female in the island, during the whole period of his residence there, who had been a mother while idolatry prevailed, who had not imbrued her hands in the blood of her offspring."§ The effect which this practice had in diminishing the number of inhabitants, was astonishing, and affords a strong fact in refutation of the doctrine which has been maintained by some, that the practice of destroying children has a direct tendency to augment population. In 1776, when Capt. Cook visited the island, he found it to contain upwards of 200,000 souls. In less than thirty years after, this terrestrial paradise, blessed with a genial climate and a luxuriant soil, was reduced to 5000 inhabitants.‖ Turnbull relates, that " the missionaries made two tours whilst he was in the island, and in each of which they numbered the people; according to the first calculation they were 7000, but in the last they very little exceeded 5000."¶ It is not to be supposed that this enormous diminution of population is to be attributed solely to this cause; other causes have doubtless co-operated, particularly certain diseases which prevail to a great extent, such as fevers, dysentery,

the natives of India." Edited, with notes and illustrations, by Edward Moor, F.R.S. London, 1811. 4to. In this volume, the report of Lieut.-Col. Walker is particularly interesting.

* Narrative of a Journey in the Upper Provinces of India, &c. By the Right Rev. Reginald Heber, D.D. Vol. ii. p. 70. (American edition.)

† Cook's Voyages, vol. ii. pp. 72, 85.

‡ Turnbull's Voyage round the World in 1800–2–3–4. Polynesian Researches, by William Ellis, vol. i. p. 198. (American edition.)

§ Polynesian Researches, vol. i. p. 198. ‖ Turnbull, vol. iii. p. 77.

¶ Ibid. vol. iii. pp. 77–8.

phthisis pulmonalis, and scrofula.* All travellers, however, who have visited the island, concur in the opinion, that the effects of infanticide have been infinitely more injurious to the population than all the other causes combined. It is consoling to reflect, that through the exertions of Christian philanthropy, this horrid and barbarous custom has been entirely abolished.

In most of the *South Sea Islands*, the same practice has prevailed to an enormous extent, and has only been checked by the benign influence of Christianity.†

Among the *Sandwich Islanders*, however, there is reason to believe that it still exists in much of its native deformity. Sometimes they strangle their children, but more frequently bury them alive. What is peculiar in the barbarity of these people, is, that even should a child be spared for a few weeks or months, they have no hesitation in destroying it at any subsequent period. Among the *Otaheiteans*, on the contrary, if the child survived only a few hours, it was generally saved: at least two-thirds of the children born, are here also sacrificed.‡ The principal cause assigned for the prevalence of this crime among these people, is their excessive indolence, and their dread of the trouble to be encountered in rearing their children. Among the *Society Islands*, the rules of the Areoi Institution, requiring the death of all the children of its members, operated as another powerful cause.

Among the natives of the interior of *Ceylon*, the same inhuman practice prevails. When a child is born, an astrologer is consulted to foretel its future fortune; if it should be unhappy, it is carried to the jungle and abandoned, where it is destroyed by cold, or devoured by wild beasts. Generally speaking, all the male children, as well as the first female child, are exempted from this unhappy lot. So common is the destruction of all the rest of the female offspring, that "it has been observed, in the districts where this practice prevails, that more than one female child is rarely to be found in a family."§ The effect of this practice upon the relative proportion of male and female population, is very striking. According to the calculation of Mr. Marshall, the females are to the males as 84 to 100; while in England they are as 98·8 to 100.‖ The only extenuation offered for this crime, is the extreme poverty of the people. Bishop Heber, in speaking of the prevalence of infanticide in Ceylon, states that in the last general census in 1821, the number of males exceeded by 20,000 that of females; in one district there were, to every hundred men, but fifty-five women; and in those parts where the numbers were equal, the

* Edinburgh Medical and Surgical Journal, vol. ii. pp. 284–290.

† For interesting notices on this subject, see Journal of Voyages and Travels by the Rev. Daniel Tyerman and George Bennet, Esq., vol. i. p. 53; vol. ii. pp. 67, 162. (American edition.)—Also Polynesian Researches, by W. Ellis, vol. ii. p. 29, &c.

‡ Polynesian Researches, vol. iv. p. 240. Stewart's Journal of a Residence in the Sandwich Islands, pp. 185, 251.

§ Notes on the Medical Topography of the Interior of Ceylon. By Henry Marshall, Surgeon to the Forces, pp. 22, 33, 37. London, 1821.

‖ Ibid. p. 33.

population was almost exclusively Mussulman.* The difficulty of marrying their daughters, in a country where to live single is disgraceful, is one of the principal causes, according to Heber, of this unnatural custom.†

The natives of *New South Wales* resort to violent and unnatural compression of the body of the mother in order to procure abortion. This process is called by them *Mee-bra*, and is resorted to for the purpose of avoiding the trouble of carrying about the child when young, a duty which devolves entirely on the female. As may naturally be supposed, the mother not unfrequently falls a victim in this horrid process. Another practice still more shocking prevails of burying a child with its mother, if she happens to die.‡ This practice is justified by them on the ground of the difficulty, and even impossibility of nursing and rearing a child under these circumstances.

Among the *New Zealanders*, infanticide is asserted to be a common occurrence. When a girl is born, it is said the mother not unfrequently destroys it "by pressing her finger upon the soft part between the joinings of the skull."§

Among the *Hottentots*, infanticide appears to be a common crime. Sparman states, "that the Hottentots use, in case of the mother's death, to bury alive children at the breast;"‖ and Barrow describes a race of them called *Bojesmans*, who destroy their offspring on various occasions: as "when they are in want of food; when the father of a child has forsaken its mother; or when obliged to fly from the boors and others; in which case they will strangle them, smother them, cast them away in the desert, or bury them alive."¶

The *Mahometans* do not appear to attach any criminality to child-murder;** on the contrary, the very sources of honour and authority among them are polluted by it. Even the palace of the sultan is constantly stained by the blood of infants. Thornton states, that the offspring of the younger princes of the royal family, who are kept in honourable confinement in the palace, are destroyed as soon as they are born.†† And Blacquiere accounts for the smallness of the number

* Narrative of a Journey through the Upper Provinces of India, with Notes upon Ceylon, &c. &c. By the late Right Rev. Reginald Heber, vol. ii. p. 197. (American edition.)

† "An astrologer is consulted on the birth of a female child; and if he pronounces her to have been born under evil auspices, she is exposed alive in the woods, to be destroyed by beasts of prey or by ants—generally, I was happy to hear, without the consent of the mother."—Ibid. vol. ii. p. 197.

‡ Account of the English Colony of New South Wales. By Lieut.-Col. Collins, of the Royal Marines, pp. 124, 125. Edinburgh Review, vol. ii. p. 34.

§ The Library of Entertaining Knowledge (New Zealanders), p. 387. Cruse's Journal, p. 290.

‖ A Voyage to the Cape of Good Hope, &c. from the year 1772 to 1776, by Andrew Sparman, M.D. vol. i. p. 257.

¶ An Account of a Journey in Africa, made in the years 1801 and 1802 to the residence of the Booshuana Nation, &c. by John Barrow, Esq. pp. 378, 391.

** It is proper to state, however, that the Koran forbids it; and in the oath which Mahomet required of the women who joined his party, called the "woman's oath," the prohibition of infanticide was distinctly mentioned.—Burke's Theological Dictionary, art. *Mahomet*.

†† The present state of Turkey, &c. by T. Thornton Esq. vol. i. p. 120.

of children belonging to the Bashaw of Tripoli, from the fact of his encouraging his wives to evade their accouchements.* A recent traveller says, that the Turkish women, after getting two or three children, or as many as suits their fancy to have, are addicted to procuring miscarriages, at which they or their accouchesses (Jewesses) are exceedingly expert, not producing constitutional injury.†

Dr. Bryce, in speaking of the present state of medicine at Constantinople, says, "Midwifery is almost exclusively practised by Jewish and Turkish women; and it is worthy of remark, that the obstetric art forms a very small portion of their adroitness or employment. All pretend to possess, and some have become famous and wealthy by their pretensions, certain means not only to obviate sterility, but also to produce abortion by administration of drugs — a practice, avowedly tolerated and frequently resorted to by Turkish females, both from their dislike to frequent pregnancy, and from command of their lords, when their harem threatens to become too numerous."‡

In *modern Egypt* nothing is more common than the procuring of abortion. A class of females, well known for their skill, are employed to aid those who consult them in cases of this kind. This practice, which is very ancient, surprises nobody; and a woman aborts with astonishing indifference. In the towns and villages, there are individuals who are specially employed in this barbarous business. At Cairo, there are Arabian physicians who, for a great length of time, have followed this infamous trade. Infanticide is rarely made a subject of criminal investigation. When a married woman destroys her new-born infant, in order to bring her to punishment, two eye-witnesses are necessary. If she is convicted, she has to pay a large sum of money as a fine to her husband; or, if she is unable to do this, he has it in his power to imprison her. If there are nothing but suspicions, and she persists in denying the crime, she is only obliged to take a certain oath, to free herself. When a girl who may have become pregnant, destroys her child to exculpate herself from the crime, she has only to liberate a male or a female slave.§

Even in *Iceland*, we find traces of this inhuman crime. The custom appears to have been derived from their Norwegian ancestors, among whom it continued to prevail for nearly one hundred years after it had been abolished in Iceland. It became extinct shortly after the introduction of Christianity into the island, which event took place at the end of the tenth century.‖

If we turn our attention from the OLD WORLD, and direct it to the

* Letters from the Mediterranean, by E. Blacquiere, Esq. vol. i. p. 90.

† Records of Travels in Turkey, Greece, &c., in the years 1829, 1830, and 1831, by Adolphus Slade, Esq. vol. ii. p. 162. (American edition.)

‡ Sketch of the State and Practice of Medicine at Constantinople, by C. Bryce, M.D.—Edin. Med. and Surg. Journal, vol. xxxv. pp. 8, 9.

§ See a Letter on the State of Legal Medicine in Egypt, by Hamont, Directeur of the Veterinary School of Medicine, of Abon Zabel, in the Annales d'Hygiène Publique et de Médecine Légale, vol. x. pp. 202, 203.

‖ Dr. Holland's Preliminary Dissertation on the History and Literature of Iceland, in Sir G. Mackenzie's Travels in the Island of Iceland, during the summer of the year 1810, Edinburgh, 2d edition, p. 39.

New, we shall find this crime presenting itself under forms no less horrible and disgusting.

Among the natives about *Hudson's Bay* it is common for the women to procure abortion by the use of a certain herb which grows there.*

In *Labrador*, the Moravian missionaries who first landed there found it a prevailing custom to put to death their widows and orphans; not to gratify a natural ferocity of disposition, but merely on account of a supposed inability to provide the means of support for the helpless orphan or the desolate widow of another. By the exertions of the missionaries, the practice was arrested.†

Nor were the savages of these inclement regions the only people who were guilty of this horrid crime. The gloomy superstition of the *Mexicans* delighted in human sacrifices, and the altars of their divinities were continually drenched with the blood of infants and of men.‡ The number of these sacrifices has doubtless been exaggerated; but the fact is unquestionable, that countless victims poured forth their lives to appease or conciliate their imaginary deities.

The mothers in *California* are described as voluntarily destroying their offspring. Venegas states, that the common cause of it was a scarcity of food, and that the practice was put a stop to by the Father Salva-Tierra, who ordered a double allowance to be given to women newly delivered.§

Charlevoix describes a race of savages in North America, who make a practice of destroying all infants who are so unfortunate as to lose their mothers before they are weaned; at the same time they inter alive all the other children, upon the plea that no other female can nurse them properly.‖

The *Peruvians*, whom Dr. Robertson eulogises for the mildness of their manners and the benevolent spirit of their religion,¶ were, nevertheless, in the habit of sacrificing children. Acosta tells us, that in such cases as the sickness of the Inca, or doubtful success in war and other affairs, ten children were sacrificed; and upon the coronation of the Inca, two hundred were offered up. When a Peruvian father was taken sick, he sacrificed his son to *Viriachocha* (the sun), beseeching him to accept the life of his child and to save his own. The same writer, when comparing the Peruvians and Mexicans, describes the former as exceeding the latter in the sacrificing of *children;* while the latter were chiefly addicted to the sacrifice of *men* taken in battle, of whom they murdered an immense number. Robertson endeavours to rescue them from this charge, by invalidating the testimony of Acosta. He cannot, however, help confessing that the prac-

* Ellis's Voyage to Hudson's Bay, p. 198.

† Barrow's Account of a Journey in Africa, in 1801, 1802.—Edinburgh Review, vol. viii. p. 438.

‡ Robertson's History of America, vol. iii. p. 325.

§ History of California, by Miguel Venegas. London, 1759. Vol. i. p. 82.

‖ Journal d'un Voyage à L'Amerique Septentrionale, par le P. De Charlevoix. À Paris, 1744. Vol. iii. p. 368.

¶ History of America, vol. iii. p. 335.

tice did prevail among "their uncivilised ancestors;" but he adds, "that it was totally abolished by the Incas, and that no human victim was ever offered in any temple of the sun." He admits, moreover, that "in one of their festivals, the Peruvians offered cakes of bread moistened with blood drawn from the arms, the eyebrows, and noses of their children. This rite may have been derived," he says, "from the ancient practice, in their uncivilised state, of sacrificing human victims."*

Besides those that have been enumerated, travellers record the names of other tribes and nations inhabiting this vast continent who murder their children with impunity and without remorse. They tell us of the *Abiponians*, a migratory race, inhabiting the province of Chaco, in Paraguay, among whom mothers have been known to destroy all their children as soon as they were born;† and of the *Araucanians*, a powerful nation of Chili, who permit fathers and husbands to kill their children and wives.‡

To the honour of our *North American Indians*, it deserves to be mentioned, that they are not known to be guilty of this horrid crime. Mr. Heckewelder, in his interesting account of the Indians who inhabited Pennsylvania and the neighbouring states, says, "I have never heard of any nation or tribe of Indians who destroyed their children, when distorted or deformed, whether they were born so or come to be so afterwards."§ To the same effect are the testimonies of Captain Franklin and Dr. Richardson, both of whom represent infanticide as an exceedingly rare occurrence, and when an occasional instance of it takes place, is looked upon by them as a crime of the greatest magnitude. Dr. Richardson, in his interesting account of the Cree Indians, in giving their belief in relation to a future state, says that it is a crime which they believe to be punished hereafter. "Women who have been guilty of infanticide, never reach the Mountain (the Indian heaven) at all, but are compelled to hover round the seats of their crimes, with branches of trees tied around their legs."‖

But it is unnecessary to extend this sketch any further. Enough has been recorded to give a view of the wide-spread desolations of this unnatural crime; certainly too much for the honour of human nature.

* History of America, vol. iii. p. 429.

† Edinburgh Encyclopædia, art. *Abiponians*. ‡ Ibid. art. *America*.

§ A Narrative of the Mission of the United Brethren among the Delaware and Mohegan Indians, from its commencement in the year 1740, to the close of the year 1808, &c. By John Heckewelder, who was many years in the service of that mission. 8vo. Philadelphia. p. 216.

‖ Journey to the Shores of the Polar Sea, in 1819, 1820, 1821, 1822. With a Brief Account of the Second Journey, in 1825, 1826, 1827. By John Franklin, R.N. Vol. i. p. 151. London, 1829.

Part II.

By infanticide in its most extensive signification, is understood the criminal destruction of the fœtus in utero, or of the child after it is born. It embraces, therefore, two subjects somewhat distinct, and which require separate discussion.

1. *Of the murder of the fœtus in utero, with an account of its various proofs and modes of perpetration.*

This is usually called *criminal abortion.* Recently the more appropriate and classical term of *fœticide* has been applied to it. In the following essay these terms will be used indiscriminately.

In every instance in which a reputed case of fœticide becomes the subject of legal investigation, the great points which present themselves are the following:

1. Has the fœtus in utero been actually destroyed?

2. Has this been brought about by *intentional means*, or by *accidental and natural causes?*

These are the questions concerning which the opinion and testimony of the professional witness will be required; and these, therefore, are the subjects which it becomes necessary specially to examine. Before proceeding, however, to the discussion of these points, it becomes necessary to settle a preliminary question of great importance, and which is to determine, if possible, the period of gestation when the fœtus is to be considered as endowed with life.

In reviewing the various opinions which have been advanced on this subject at different periods, it will abundantly appear that too often fancy has usurped the prerogative of reason, and idle speculation been substituted in the place of rational investigation. The consequence has been that doctrines have been promulgated, not only the most erroneous and absurd in their nature, but the most dangerous in their tendencies to the best interests of society.

The ancients were by far the most extravagant in their notions on this subject. The same fundamental error, however, pervaded all their theories. They believed that the sentient and vital principle was not infused into the fœtus until some time after conception had taken place. It is not surprising that the exact time at which this union is effected could never be satisfactorily settled by them. According to *Hippocrates* the male fœtus became animated in thirty days after conception; while the female required forty-two.* In another part of his works he asserts that this does not occur until the perfect organisation of the fœtus.

The *Stoics* believed that the soul was not united to the body before the act of respiration, and, consequently, that the fœtus was inanimate during the whole period of utero-gestation.† This doctrine prevailed until the reigns of Antoninus and Severus, when it gave way

* Lib. de Nat. Puer. Num. 10.

† Plutarch's Morals, vol. iii. p. 230. London.

to the more popular sentiments of the sect of the *Academy*, who maintained that the fœtus became animated at a certain period of gestation. The *Canon Law* of the Church of Rome also distinguished between the animate and inanimate fœtus, and punished the destruction of the former with the same severity as homicide.*

Galen considers the animation of the fœtus to take place on the fortieth day after conception—at the same time that he supposed the fœtus to become organised.†

Others believed shorter periods sufficient; and accordingly three days and seven have respectively had their advocates.‡ Another contends that eighty days are requisite for the animation of the female, while only forty are necessary for the male.§ Some advocate forty days as sufficient for both.‖ Others again make a distinction between the imperfect embryo and the perfectly formed fœtus, and consider abortion of the latter only as a crime deserving the same punishment as homicide,—a distinction, of which it is justly remarked by a celebrated writer on medical jurisprudence, "ennemie de la morale et de l'humanité, digne de l'ignorance et des préjugés de ses auteurs."¶

Amidst these discordant sentiments, Zacchias offers himself as a mediator, and proposes sixty days as the limit; and recommends that any one who should cause an abortion after that period, whether of male or female, should be punished for homicide.**

All the foregoing opinions, wholly unsupported either by argument or experiment, might be dismissed without a comment, were it not to point out the evils to which they have given rise. It may be said of them, with perfect truth, that their direct tendency has been to countenance rather than to encourage abortion, at least in the earlier stages of pregnancy. On a subject of this nature it was to be supposed that legal decisions would be influenced in a great measure by the opinions of philosophers and physiologists; and, accordingly, while the delusion of the Stoics continued its sway, the law could view nothing very criminal in wilful abortion,†† as the fœtus was considered merely portio viscerum matris.‡‡ And afterwards, when the Academicians flourished, punishments very different in the degree of their severity were inflicted, according as the abortion was supposed to be that of an animate or inanimate fœtus.§§

In modern times an error no less absurd, and attended with consequences equally injurious, has received the sanction, not merely of popular belief, but even of the laws of most civilised countries. The error consists in denying to the fœtus any vitality until after the time of quickening. The codes of almost every civilised nation have this principle incorporated into them; and, accordingly, the punishment which they denounce against abortion procured after quickening is

* Zacchiæ Quæst. Med. Leg. lib. ix. tit. i. ii. v. p. 744.
† Opera Galeni, de Usu Part. lib. xv. cap. v. Lugduni, 1643.
‡ Zacchiæ, lib. i. tit. ii. Q. x. p. 82. § Ibid. ‖ Ibid.
¶ Foderé, vol. iv. p. 484. ** Zacchiæ, lib. i. tit. 2, Q. x. p. 83.
†† Foderé, vol. iv. p. 382. ‡‡ Plutarch's Morals, vol. iii. p. 230.
§§ Foderé, vol. iv. p. 382.

much severer than before. The *English law* "considers life not to commence before the infant is able to stir in its mother's womb."* The *law of Scotland*, adopting the creed of the Stoics, believes the fœtus in utero previous to quickening to be merely pars viscerum matris. In *Saxony*, in consequence of the disputes of medical men on this subject, it was formally decided that the fœtus might be esteemed alive after the half of pregnancy had gone by.†

The absurdity of the principle upon which these distinctions are founded is of easy demonstration. The fœtus, previous to the time of quickening, must be either dead or living. Now that it is not the former is most evident, from neither putrefaction nor decomposition taking place, which would be the inevitable consequences of an extinction of the vital principle. To say that the connexion with the mother prevents this is wholly untenable: facts are opposed to it. Fœtuses do actually die in the uterus before quickening, and then all the signs of death are present. The embryo, therefore, before that crisis, must be in a state different from that of death, and this can be no other than life.

But if the fœtus enjoys life at so early a period, it may be asked, why no indications of it are given before the time at which quickening generally takes place? To this it may be answered, that the absence of any consciousness on the part of the mother relative to the motions of the child is no proof whatever that such motions do not exist. It is a well-known fact that, in the earlier part of pregnancy, the quantity of the liquor amnii is much greater in proportion to the size of the fœtus than at subsequent periods. Is it not, therefore, rational to suppose that the embryo may at first float in the waters without the mother being conscious of its movements; but that afterwards, when it has increased in bulk, and the waters are diminished in proportion, it should make distinct and perceptible impressions upon the uterus? Besides, it should not be forgotten that fœtal life at first must of necessity be extremely feeble; and therefore it ought not to be considered strange that muscular action should also be proportionably weak.

But granting, for the sake of argument, that the fœtus does not stir previously to quickening, what does the whole objection amount to? Why, only that one evidence of vitality, viz. motion, is wanting; and we need not be told that this sign is not essential to the existence of life.‡

The *incompleteness* of the embryo previous to quickening is no objection to its *vitality*. Life does not depend upon a complication of

* Blackstone, vol. i. p. 129.

† Specimen Juridicum Inaugurale. Auctore Van Visvliet, p. 46. Lugduni Batavorum, 1760.

‡ There is a difference of opinion as to the real nature of quickening. It has been lately suggested by a writer that it is altogether independent of any motion of the child, and that it is to be attributed to the sudden rising of the uterus out of the pelvic cavity into the abdomen. — London Med. and Phys. Journal, vol. xxvii. p. 441. If this opinion be true, it would afford another incontrovertible argument in favour of the position which I have advocated.

organs; on the contrary, it is found that some of the simplest animals, as the polypi, are the most tenacious of life. Besides, upon this principle, vitality must be denied to the child after birth,—because many of its bones, as well as other parts of its body, are imperfect.

Nor is the *want of organic action* any argument against this doctrine. Life appears to depend essentially as little upon organic action as it does upon a complication of organs. If it did, the fœtus, after quickening, would be just as destitute of life as before; for its brain, lungs, stomach, and intestinal canal, perform no more action at the eighth month than they do at the third. But if organic action be essential to life, how are we to account for those singular cases of fœtuses born alive, and yet destitute of some of the most important organs in the body, such as the head, brain, &c.?* And how are we to explain those temporary suspensions of organic action in the bodies of adults, which sometimes happen without the principle of life being extinguished?

The observations of physiologists tend also to prove the vitality of the fœtus previously to quickening. Long before quickening takes place, motion, the pulsation of the heart, and other signs of vitality, have been distinctly perceived. Haller, indeed, asserted, "that all the viscera and bones of the future fœtus, nearly fluid indeed, and therefore invisible, were preformed before conception in the maternal germ." However objectionable such an opinion may be, yet the fact is certain, that *the fœtus enjoys life long before the sensation of quickening is felt by the mother*. Indeed, no other doctrine appears to be consonant with reason or physiology but that which admits the embryo to possess vitality from the very moment of conception.

If physiology and reason justify the position just laid down, we must consider those laws which exempt from punishment the crime of producing abortion at an early period of gestation as immoral and unjust. They tempt to the perpetration of the same crime at one time which at another they punish with death. In the language of the admirable Percival, "to extinguish the first spark of life is a crime of the same nature, both against our Maker and society, as to destroy an infant, a child, or a man: these regular and successive stages of existence being the ordinances of God, subject alone to his divine will, and appointed by sovereign wisdom and goodness, as the exclusive means of preserving the race and multiplying the enjoyments of mankind."†

Having thus endeavoured to shew that there is no period of gestation at which the fœtus is not to be considered alive, I come now to take up the consideration of the questions originally proposed.

1. *Has the fœtus in utero been actually destroyed?*

The proofs to establish this are to be drawn from two sources, viz., —from an examination of the reputed mother, and an examination of the fœtus.

* Saumarez' Physiology, vol. ii. p. 21; Review of Sir E. Home's Paper on the Functions of the Brain; Edin. Review, vol. xxiv. p. 439.

† Percival's Works, vol. ii. p. 430,431.

Of the signs of abortion to be deduced from an examination of the female.

In the early months of pregnancy it is extremely difficult to ascertain whether an abortion has taken place or not. The fœtus has scarcely had time to make those firm attachments which afterwards unite it to the womb; nor has it attained to a size sufficient to produce those general changes in the constitution of the mother, nor those local alterations from the distention of the uterus and abdomen, which are afterwards occasioned. Its separation, therefore, is unattended by violence, and leaves but faint, if any, traces of its previous existence. The hæmorrhage attending it is also of small consequence, inasmuch as the uterine vessels have not yet sustained any great enlargement, and therefore very speedily contract. The period to which these remarks more particularly apply is the two first months of pregnancy, during which it is conceded that no satisfactory opinion can ever be formed from an examination of the female.* After this period, and just in proportion to the approach to the full term, will the signs be more decisive and satisfactory. For obvious reasons, I shall describe them such as they will be found when existing in their most marked and defined character, and these are the same as those which occur after ordinary delivery.

The signs are deduced from three different sources, viz.,—from the *condition of the organs of generation themselves*,— from the *condition of the abdominal parietes*,—and from the *condition of the breasts*.

1. *Condition of the organs of generation.* In consequence of the expulsion of the fœtus from the uterus, there are several striking changes which take place in these organs from which important conclusions may be drawn. The more characteristic of these are the following:

Labia and perinæum. The labia will be found, on examination, to be tumefied and relaxed, and of a dark red colour; while, in some cases, the anterior edge of the perinæum, called the fourchette, will be lacerated. These changes, of course, are owing to the unnatural irritation and distention which these parts have necessarily undergone during the passage of the fœtus.

Vagina. On introducing the finger into this organ, it will be found preternaturally enlarged and relaxed, from the same cause as the preceding. From the distention which it has suffered, its natural rugæ will also be obliterated, and its inner surface, in consequence, rendered smooth.

* Manuel de Médecine Légale. Par J. Briand, p. 67.—A Manual of Medical Jurisprudence, by M. Ryan, M. D. Edited by R. E. Griffith, M. D. p. 129. —Marc, Dictionnaire de Médecine, vol. iii. p. 193.—Dr. Montgomery, in his valuable paper on the signs of pregnancy and delivery, relates the case of a lady to whom he was called who miscarried at the end of the second month. In twenty-four hours afterwards he found the os and cervix uteri almost completely restored to their natural state; the vagina and external parts hardly if at all dilated, and very little relaxed; and the breasts exhibited very imperfectly the appearances which accompany pregnancy, the ordinary sympathetic symptoms of which had been almost entirely absent.—See Cyclopædia of Practical Medicine, vol. iii. p. 504.

Os and cervix uteri. On examining with the finger immediately after delivery, the neck of the uterus will be indistinct, and the mouth of that organ so dilated as to be scarcely distinguishable from the cavity of the vagina. When it is discovered, its edges will be found to be soft and flabby, and so open as to admit of the introduction of two or more of the fingers. After delivery, the os uteri gradually contracts, but never or "rarely closes to the same degree as in the virgin state."*

Uterus. This is to be examined through the abdominal parietes. On applying the hand to the abdomen immediately after delivery, this organ will be readily detected just above the pubes, in the shape of a hard round ball about the size of the child's head. It is during the first week after delivery, that the uterus is to be felt most distinctly in this situation; after this, the uterine tumour gradually lessens, and becomes more and more indistinct. It is at least a month, according to Burns, before the uterus returns to its natural dimensions.†

The lochia. This is a discharge which takes place from the uterine organs immediately after the completion of delivery, and continues for a certain number of days. At first it is pure blood, and continues so during the first two or three days after delivery. It then changes to a paler colour, and finally assumes a whitish appearance. In some cases it eventually becomes of a dark dirty green aspect, when it is known by the name of the "*green waters.*" Now as this discharge comes from the relaxed and ruptured vessels of the uterus, and as its cessation depends upon the contraction of these vessels, it is evident that not merely its quantity, but its duration, must vary very greatly, according to the particular condition of the patient, and the greater or less rapidity with which the uterine vessels contract. Accordingly, it will be found that in some cases this discharge ceases in ten or twelve days, while in others it continues to the twenty-fifth or thirtieth day, and sometimes even longer.‡ Attending this discharge, there is an odour so peculiar that it can always be recognised by those at all conversant with it, and which is not present in any other discharge from the uterine organs.

2. *Condition of the abdominal parietes.* The circumstances indicative of delivery, in connexion with the abdominal parietes, are their flaccidity, and the presence of the lineæ albicantes.

Flaccidity of the abdomen. On examining the surface of the abdomen after delivery, besides detecting the uterine tumour, which has been already mentioned, the abdomen will be found soft, relaxed, and frequently lying in folds. So great is this relaxation of the parietes sometimes, that they may be almost folded round the hand. This is more especially observed in those who have borne a number of children.

Lineæ albicantes. These are shining whitish lines, to be seen on

* Burns's Midwifery, p. 564. Seventh American edition. † Ibid.

‡ See an Elementary Treatise on Midwifery, by A. L. M. Velpeau, M.D. Translated by C. D. Meigs, M.D. p. 579. A Compendious System of Midwifery, &c. by William P. Dewees, M.D. p. 210.

the surface of the abdomen, extending chiefly from the groins to the navel. They arise from the great distention and cracking of the skin during pregnancy, and remain frequently permanent for life.* They are not, therefore, to be looked upon as the evidences of recent delivery.

3. *Condition of the breasts.* The phenomena connected with the breasts as evidences of delivery, are their enlargement, the secretion of milk, and the presence of the areola.

Enlargement of the breasts. About the third month of pregnancy, the breasts begin to enlarge, and continue to do so until they frequently become double their original size; at the same time they become tender and painful, and have a firm lumpy feeling. After delivery, particularly if examined about the third or fourth day, they will be found full and tense.

Secretion of milk. This is another sign of pregnancy and delivery. It is important, however, to recollect that too much stress should not be laid upon this, apart from other indications, inasmuch as it frequently takes place independently of both. Dr. Blundell relates the case of a female who had not had a child for three years; she had not suckled for some time previously, and was not pregnant, and yet the secretion of milk was so active, that it flowed freely on the least pressure of the breast.† Another case is related by him of a negress who secreted milk for twenty years after her pregnancy.‡

Areola around the nipple. In the virgin state, the nipple is surrounded by a circular discoloration of the skin which is generally of a rosy tint, sometimes merely a little lighter than the natural skin. During the pregnant state, this undergoes striking changes. It becomes broader and darker, being converted into "a coppery red, or a dark mahogany brown."§ The diameter of this circle averages from one inch to one inch and a half. Both the extent and colour of the areola differ considerably in different persons.‖ After a first pregnancy, it is to be recollected that the areola remains more or less permanent; it is therefore not to be looked upon as a criterion of a recent delivery. Of all the individual signs, this is one of the most certain,

* Foderé, vol. ii. p. 9.

† Blundell's Midwifery, p. 112. (American edition.)

‡ Ibid. p. 112. § Ibid. p. 113.

‖ Dr. Montgomery records a case in which the diameter exceeded three inches. In negro women, the areola is almost jet black.—Cyc. Prac. Med. vol. iii. p. 474.

Dr. Montgomery, who has paid especial attention to this subject, describes other features besides mere colour, as characterising very strikingly the areola. His words are the following: "In the centre of this circle (the areola) the nipple is observed partaking of the altered colour of the part, and appearing turgid and prominent; and the part of the areola more immediately around the base of the nipple, has its surface rendered unequal by the prominence of the glandular follicles, which, varying in number from twelve to twenty, project from the sixteenth to the eighth of an inch; and lastly, the integument covering the part is observed to be softer and more moist than that which surrounds it, and the breasts themselves are at the same time observed to be full and firm, at least more so than was natural to the person previously. Such, we believe to be the essential characters of the true areola, the result of pregnancy; and that, when found possessing these distinctive marks, it ought to be looked on as the result of that condition alone, no other cause being capable of producing it."—Cyclopædia of Practical Medicine, vol. iii. p. 474.

and may be depended upon with a good deal of confidence, provided the discoloration be very decided, and the female has not borne children previously.

Such are the signs deduced from the female, by which it is to be determined whether a delivery has taken place. From the account given of them, it is evident that many are necessarily evanescent in their character; and, therefore, in order to obtain the fullest amount of testimony from them, the examination should be instituted as speedily as possible after delivery has taken place. With regard to the latest period after delivery, at which a satisfactory decision may be made, some difference of opinion has existed. The period fixed upon by medical jurists generally, is from the eighth to the tenth day.* After this, many of them become too obscure to be relied on with any degree of certainty.

Relative value of the preceding signs of delivery. In relation to the foregoing signs, it is essential to recollect that all of them have been objected to as uncertain, inasmuch as almost every one of them may be produced by other causes than delivery. Thus, for example, the enlargement and relaxation of the external parts may arise from simple menstruation; the dilatation of the vagina and os uteri, and the enlargement of the uterus, may arise from hydatids or moles; the relaxation and marked state of the abdomen may arise from dropsy; even the areolæ around the nipples, as well as the secretion of milk, may arise from other causes than pregnancy and delivery.

Now it must be admitted that all these objections are, to a certain extent, well founded; and they go to shew that no one sign, taken by itself, ought to be considered sufficient to establish the fact. In all cases, a *number of the signs* should concur before any satisfactory conclusion can be formed. If this general caution be observed, the force of all the preceding objections will be materially weakened. Thus, for instance, *menstruation* may relax the vagina and external parts, at the same time that it causes a discharge from these organs. In this case, however, all the other signs will be absent. The peculiar odour of the lochia will be wanting; there will be no dilatation of the os uteri—no enlargement of the uterus—no wrinkling of the abdominal parietes—no secretion of milk—and no areola around the nipples. Again, *dropsy* may cause a great relaxation and wrinkling of the abdomen. I say *may*, because, generally speaking, unless the dropsical fluid be suddenly removed by tapping, this will not happen, as in ordinary cases the fluid is removed so gradually that the abdomen has time to contract, and accommodate itself to the change. Admitting, however, that these signs of pregnancy may be counterfeited by dropsy, so many others will be absent as to leave no doubt in the case. The vagina and external parts will not be affected; the os uteri will not be dilated; the uterus will not be enlarged; the breasts will have undergone no change, and there will be no lochial discharge.

With regard to the *secretion of milk* from other causes than preg-

* Paris and Fonblanque, vol. i. p. 252. Foderé, tom. ii. p. 87. Montgomery in Cyclopædia of Practical Medicine, vol. iii. p. 503. Griffith's Ryan, p. 133.

nancy, this is a fact which cannot be denied. But in cases of this sort so many of the other signs of delivery will be absent as to obviate any difficulty that may arise.

As to the objections founded on the existence of hydatids, it must be confessed that much more difficulty attends a correct decision. These however I shall consider fully under the next head.

Of the signs of abortion in cases in which the delivery is followed by the death of the female.

Cases of this kind sometimes occur, and it then becomes the duty of the professional man to prosecute his researches still further by an anatomical inspection of the uterus and its appendages.

1. *The uterus.* In this organ, various appearances will be detected, indicating the fact of its having contained a fœtus.

Its *size* will be different from that of the unimpregnated uterus. In the unimpregnated state, the dimensions of the uterus may be put in round numbers at three inches for its length, two for its breadth at the fundus, one inch at the cervix, and one inch for its thickness. In the gravid state, it is evident that its size must vary considerably according to the size of the fœtus, and according to the quantity of liquor amnii.* A general average, however, of its gradual changes in this respect may be put as follows: — During the first month, the uterus undergoes little or no change in its size.† During the second month it becomes considerably enlarged. About the end of the third month it will measure about five inches in length, of which the cervix will measure one inch. In the fourth month, it will measure five inches from the fundus to the beginning of the neck. In the fifth month, it will measure six inches from the fundus to the cervix. In the sixth and seventh months, it will measure about eight inches, and in the ninth, it will be from ten to twelve inches from the top to the bottom.‡

Now in a case where a woman dies from hæmorrhage during labour, at the full time or immediately after, the uterus will be found like a large flattened pouch measuring from ten to twelve inches. In this case, little or no contraction having taken place, the dimensions of the uterus are little changed from what they were anterior to labour. If, however, uterine contractions should have taken place, the dimensions of the uterus would be considerably less. If some days had elapsed, the size would of course be still more diminished. If the examination be made about two days after delivery, the uterus will be about seven inches long. At the end of a week, it will be about five or six inches,§ and at the end of a fortnight about five inches long.

Its *shape* will be different from what it is in the unimpregnated state. In the unimpregnated state, the uterus is a flat body, pyriform or somewhat triangular in its shape. During the first two months of pregnancy its shape remains unchanged; after this, the body of it be-

* An Anatomical Description of the Human Gravid Uterus and its contents. By the late William Hunter, M.D. p. 2.

† Maygrier's Midwifery, p. 81. ‡ Burns' Midwifery, pp. 185, 563.

§ According to Burns, "a week after delivery, the womb is as large as two fists." — Midwifery, p. 564.

comes globular without any material change having taken place in the neck, until about the fifth month. After this the neck grows shorter and broader, until in the last two months it is almost entirely obliterated, and forms a part of the general cavity of the uterus. The shape of the uterus is now completely ovoid. Now, if death takes place during or immediately after labour, the shape of the uterus will be ovoid, or if contractions have taken place, it will be globular. If, on the other hand, several days have elapsed, it will have regained somewhat of its pyriform shape.

Thickness of the uterus. On this point, contradictory accounts are given. At the full time, however, and when the uterus is still distended with its contents, its thickness varies very little from that before impregnation; in some cases, even it appears to be thinner;* according to Hunter, its more common thickness is from one to two thirds of an inch.† Generally speaking, too, the uterus is thickest at its fundus, and especially where the placenta has been attached. When, however, the examination is not made until some hours or days after delivery, and the uterus has had time to contract, it will then be found thicker than natural. In that state it will often be found two inches thick.‡ It is well enough to recollect, that gravid uteri, when injected, are much thicker than in their natural state.§

Uterine blood-vessels. There is nothing in connexion with the pregnant uterus more striking, than the great enlargement which the blood-vessels have undergone. Both the arteries aud veins, but more especially the latter, are enormously enlarged from their natural dimensions. This is most strikingly observed in that portion of the uterus, to which the placenta is attached.‖ The arteries will be found from the size of a goose quill, to that of a crow quill, and downwards,¶ and the veins will be found much larger. In some cases, the orifices of the veins opening into the uterus from the surface where the placenta has been attached, are large enough to admit the extremity of the little finger.**

Inner surface of the uterus, and the placental mark. If the examination be made shortly after delivery, the cavity of the uterus will be found to contain coagula of blood, or a bloody fluid. The part of the uterus to which the placenta has been attached, will be very visible, and corresponding in size to the placenta. This part will be of a dark colour, and have a gangrenous appearance; the vessels leading to it will also be much more enlarged than those of any other portion of the uterus.

Ligaments of the uterus. These undergo great changes. The *broad ligaments* will be found effaced, in consequence of the fundus of

* Monro in the Edinburgh Essays and Observations, Physical and Literary, vol. i. p. 418. See also Hunter on the Gravid Uterus, p. 15.

† An Anatomical Description of the Human Gravid Uterus and its Contents. By William Hunter, M.D. p. 15. ‡ Ibid. p. 15.

§ Edinburgh Essays and Observations, vol. i. p. 418.

‖ Hunter on the Gravid Uterus, p. 17.

¶ Edinburgh Essays and Observations, vol. i. pp. 427, 435.

** Ibid. vol. i. p. 412.

the uterus enlarging and rising, so as to stretch them into a uniform covering of the uterus. This, of course, is only at the full time of pregnancy; at earlier periods, the condition of these ligaments will vary according to the enlargement which the uterus may have undergone. The *round ligaments* will be found much elongated, and thicker than in the ordinary state. In this enlarged state, they are about the thickness of the little finger; while in their natural state, they are not thicker than a crow quill. They are also exceedingly vascular—so much so, that when injected, "they seem to be little more than a bundle of arteries and veins."*

Fallopian tubes. These will be found less convoluted—larger, and much more vascular, than in the unimpregnated state. So great is this vascularity, as frequently to give them a purplish appearance, looking very much as if they were in a state of inflammation. Generally the tube leading to the ovary from whence the ovum has escaped, will be found the most enlarged. Mr. Burns says, "the fallopian tube preserves its greater vascularity for a very considerable time, I cannot say how long, after delivery."†

Ovaria. These will be found but little different from the state anterior to impregnation, with the exception of the one from which the ovum has escaped, and which contains the *corpus luteum*. This ovarium can easily be identified by a peculiar fulness or prominence in one part of it, sensible both to the sight and touch, in the middle of which there is a small indentation like a cicatrix. On laying open the ovarium at this part, there will be found a body of a very distinct nature from the rest of the ovarium; this is the *corpus luteum*. It is sometimes round, but more generally oblong or oval. "Its centre is white, with some degree of transparency; the rest of its substance has a yellowish cast, is very vascular, tender and friable like glandular flesh."‡ Such is the appearance of the corpus luteum, if examined shortly after delivery at the the full time. If examined, however, at other periods, these appearances will be considerably different. The earliest period after impregnation, at which the corpus luteum has been observed in the human subject, is in the case recorded by Sir Everard Home. Here the female died about eight days after impregnation; and on dissection, the right ovarium was found to have a small torn orifice upon the most prominent part of its external surface. On slitting open this orifice, it led to a cavity filled with coagulated blood, and surrounded by a yellowish substance.§ The blood is gradually absorbed, and the cavity becomes lined with a white membrane. During the earlier months, a fluid will be found in the cavity.‖ Its dimensions after this become gradually contracted, and in the third or fourth month, it is about large enough still to contain a grain of wheat; after this it is completely obliterated, and in its place there is left a central white radiated cicatrix.¶ This cicatrix is looked upon by

* Hunter on the Gravid Uterus, p. 13. † Midwifery, p. 564.
‡ Hunter on the Gravid Uterus, p. 14.
§ Philosophical Transactions for 1817, part 1.
‖ Hunter on the Gravid Uterus, p. 74.
¶ Montgomery in Cyclopædia of Practical Medicine, vol. iii. p. 497.

Dr. Montgomery as a distinguishing characteristic of a genuine corpus luteum.* This cicatrix is not permanent, but disappears at about five months after delivery.

Such is the corpus luteum. It is largest and most vascular in the earlier periods of pregnancy; less so at delivery; and disappears altogether, according to the observations of Dr. Montgomery, at about five months after delivery.

Relative value of the preceding signs drawn from an examination after death. Striking as the foregoing signs unquestionably are, objections of a very serious character may be made against them. As these objections have actually been brought forward in criminal trials, a notice of them is unavoidable. Of these, the only ones which require consideration, are, that all the appearances just described as found on dissection after delivery, may have been occasioned by the delivery of *hydatids or moles;* and that the corpora lutea may exist independent of pregnancy and delivery. Each of these objections I shall briefly notice.

1. *Hydatids.* Although not of very frequent occurrence, these are sometimes found existing in the uterus. They are small vesicles, hung together in clusters, and filled with a watery fluid. Their real nature is not exactly known, although they are supposed to be animals of a very simple structure. They sometimes exist in large masses in the uterus. The origin of these curious productions is by no means established. By some it is supposed that they may exist in the uterus itself, and originate without any connexion with impregnation. This, however, is by no means certain; and the probability is that they never occur *without sexual intercourse.*† As commonly found, they appear to arise from the destruction of the ovum at an early period, or portions of the placenta remaining in the uterus after abortion or delivery, and degenerating into this kind of growth. Now it is very evident that some of the appearances and phenomena of pregnancy may be, and actually are, simulated by the presence of these substances in the uterus. Every phenomenon that depends upon the mere distention of the uterus, and the subsequent discharge of its contents, may thus be counterfeited. So far then as the mere external appearances go, it is frequently impossible to decide whether they originate from a real fœtus, or from hydatids. Even where there is no wish to conceal the real condition of the person, it is sometimes difficult to make up a positive opinion. Females have in this way been themselves deceived. Presuming themselves pregnant, the discharge of the hydatids has led them to suppose it a real miscarriage.‡ In cases like

* "Of this latter appearance (the radiated cicatrix), it ought to be observed here, that it is visible as long as any distinct trace of the corpus luteum remains, and forms an essential character, distinguishing this body from every other that might be confounded with it."—Montgomery in Cyclopædia of Practical Medicine, vol. iii. p. 497.

† Madame Boivin broadly asserts that hydatids are always the product of a degenerated conception, and that no virgin female can ever have them.—Nouvelles Recherches sur l'origine, la nature, et le traitement de la mole vésiculaire ou grossesse hydatique. Par Me. Boivin. Paris, 1827.

‡ An Account of some of the most important Diseases peculiar to Women. By Robert Gooch, M.D. p. 216. (American edition.)

those of criminal abortion, where every effort is made at concealment, it is of course out of the question to say which was the cause;* and the only way to settle the question, is by an examination of what may have been actually discharged from the uterus. In cases where the abortion ends in the death of the female, although we have the benefit of the additional information furnished by dissection, still the inquiry is not unattended with difficulties; and it is by no means easy to decide whether the phenomena which are observed are the result of the expulsion of a real fœtus, or of hydatids. The following considerations must render this obvious. It has already been stated that, in all probability, hydatids are always the result of impregnation, the ovum, or some portion of the contents of the gravid uterus, being converted into this kind of growth. If this be so, a corpus luteum will be found, if the examinatian be made under favourable circumstances. Besides this, it has already been stated that every phenomenon connected with the enlargement of the uterus, and the dilatation of the os uteri, may also be produced by hydatids. Even the placental mark may be present. Cases therefore might occur, in which it would be impossible to distinguish between the two. I say *may*, because, generally speaking, in cases of hydatids, no placenta is found, and therefore they do not leave behind them any thing like the mark which is left by that body on the inner surface of the uterus. In cases of hydatids the vesicles hang in clusters, attached by an intermediate membrane to the inner surface of the uterus.† This then would furnish one mark of distinction. Another might be found in the different condition of the uterine bloodvessels. In cases of real pregnancy, the bloodvessels, especially those confined to the placental space, undergo a much greater enlargement than when hydatids alone are in the uterus. Independently, however, of all these considerations, there is not practically after all so much difficulty in these cases as might be anticipated. If hydatids are always the result of a degenerated conception, then the fact of impregnation is conceded; and this, after all, is the great point to be established in these cases. If, on the other hand, hydatids have no connexion with conception, then the question will be at once decided by the placental mark, but more especially by the existence of the corpus luteum.

Besides all this, in cases where the signs of delivery are alleged to be owing to hydatids, it is but reasonable to expect that these should

* Gooch, after relating some cases of hydatids, says, "In the progress of these cases, it is impossible to come nearer the truth than this — that the abdomen owes its enlargement to a distended uterus; but what this organ contains is uncertain."—Account of some of the most important Diseases peculiar to Women, p. 218.

† By Dr. Denman, they are described in the following manner: "Hydatids or small vesicles, hung together in clusters from *one common stem*, and containing a watery fluid, are sometimes formed in the cavity of the uterus."—Introduction to the Practice of Midwifery, p. 146. (American edition.)

According to Dr. Baillie, "they consist of vesicles of a round or oval shape, *with a narrow stalk to each, by which they adhere to the outside of one another.* Some of these hydatids are as large as a walnut, and others as small as a pin's head. A large hydatid has generally a number of small hydatids adhering to it by *a narrow process.*"—Morbid Anatomy, p. 136. (American edition.)

be addueed in evidence, and in that case, of course, all difficulty will at once be obviated.

2. *Moles.* These are peculiar substances contained within the cavity of the womb. They consist of a membrane enclosing generally a quantity of coagulated blood. Frequently, however, they appear of a fleshy structure without any blood. In their size, consistence, and structure, they differ very much in individual cases. They occur, too, under a variety of circumstances. They have been met with in females who have never been married or borne any children. In some cases they have followed a natural delivery or a miscarriage; while in others they have accompanied certain diseased conditions of the uterus. By some it is supposed that these formations never take place in the *virgin state.* Mr. Burns says he has never met with a case contradictory of such a supposition.* That they may, however, occur occasionally without any sexual intercourse, appears to be pretty well established. Now in these cases, many of the symptoms of actual pregnancy are present. The abdomen becomes enlarged; the stomach is affected with nausea; and even the breasts become swollen.† Here then, also, as in the case of hydatids, it is impossible, from mere external appearances, to say whether these symptoms arise from genuine pregnancy or not.

In cases where death takes place, and dissection has been had, the same reasoning is applicable here as in cases of hydatids. If the mole be the product of a real conception, the great object of the investigation is at once conceded. If on the other hand, it be not the product of a real conception, then the examination of the placental mark and ovaria will indicate the fact.

3. With regard to the objection raised on the ground that the *corpora lutea are sometimes found in virgins*, and, therefore, are not to be looked upon as the infallible evidences of impregnation, it has been rendered more than doubtful whether a genuine corpus luteum is ever present except in cases of real pregnancy.‡

Of the signs of abortion, deduced from an examination of what may have been expelled from the uterus.

Here there are three objects to be had in view, viz: To ascertain whether it be really a fœtus that has been expelled from the uterus;

* The Principles of Midwifery, p. 127. † Ibid.

‡ On this subject see the luminous investigations of Dr. Montgomery, in the Cyclopædia of Practical Medicine. According to him the appearances which are considered as corpora lutea occurring in virgins, differ from those of impregnation in all the following particulars: "1. There is no prominence or enlargement of the ovary over them: 2. The external cicatrix is wanting: 3. There are often several of them in both ovaries, especially in patients who have died of tubercular diseases: 4. They are not vascular, and cannot be injected: 5. Their texture is sometimes so infirm that they seem to consist merely of the remains of the coagulum, and at others appears fibro-cellular and resembling that of the internal structure of the ovary, but in no instance did we ever see them presenting the soft, rich, and regularly glandular appearance which Hunter meant to express when he described them as 'tender and friable like glandular flesh:' (Description of Gravid Uterus, p. 14.) 6. They have neither the central cavity nor the radiated cicatrix which results from its closure."—Cyclopædia of Practical Medicine, vol. iii. p. 502.

and if it be a fœtus, to ascertain its age; and lastly, to ascertain the cause of its expulsion.

1. *To ascertain whether it be really a fœtus which has been expelled.* From the difference in structure of the fœtus from hydatids and moles, it is scarcely possible that any mistake can be made in distinguishing them from one another, except in the very early months of pregnancy, say in the first two months; and at this early period, probably no medico-legal investigation could ever be instituted with any satisfactory result.

2. *To ascertain the age of the fœtus.* This is important, inasmuch as it enables us to compare it with the appearances found on an examination of the female, to see how they correspond, and in this way to assist in detecting any imposition which may be attempted. In judging of the age of the fœtus, the circumstances more especially to be attended to are its *length—weight—and the relative situation of the centre of the body.*

Notwithstanding the various observations which have been made, it appears never yet to have been settled precisely, when the ovum enters the womb, or when the embryo first becomes visible. Mr. Hunter made a dissection in which impregnation was supposed to have taken place nearly a month previously, and yet no ovum was detected either in the fallopian tubes or in the uterus.* Mr. Burns states that he examined very carefully three uteri within the first month after menstruation, and in none could he discover an ovum.† By Sir Everard Home, however, a minute ovum was discovered as early as the eighth day after impregnation.‡ The period usually fixed upon, however, is from the nineteenth to the twenty-first day. When first seen, the ovum is in the state of a membranous egg, filled with a semi-transparent fluid, in the centre of which is the embryo. The parietes of it consist solely of two membranes, chorion and amnion. At first, the ovum is unattached to the uterus; afterwards it becomes united to it by means of the placenta.

At about *thirty days* after conception, the fœtus is about the size of a large ant, or, as it is described by others, of a barley-corn.

At the end of *two months*, the fœtus is nearly two inches in length, and its weight about one ounce; at this time, the different parts of it are perfectly distinct, and even the sex can sometimes be distinguished.

At the end of *three months*, its length is from three to five inches, and its weight about three ounces.

At the end of *four months*, its length is from six to seven inches, and its weight from four to five ounces.

At the end of *five months*, the length is from eight to nine inches,

* Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge, vol. ii. p. 63.

† Principles of Midwifery, p. 189. (American Edition.)

‡ Philosophical Transactions for 1817.

Mr. Burns thinks that the soaking of the uterus in spirits, practised in this case by Sir E. Home, may have rendered the ovum more distinct, and thus enabled him to detect its existence.—Principles of Midwifery, p. 189.

and the weight from nine to ten ounces. At this period, the abdominal parts begin to predominate over the thoracic parts.

At the end of *six months*, the weight is from one to two pounds, the length from eleven to twelve inches, and the centre of the body is at the abdominal extremity of the sternum.*

At the end of *seven months*, the length is from twelve to fourteen inches, the weight from two to four pounds, and the centre of the body is between the umbilicus and the lower part of the sternum, but rather nearer to the latter than the former.

At the end of the *eighth month*, the length is from sixteen to seventeen inches, the weight from three to five pounds, and the centre of the body between the umbilicus and the lower extremity of the sternum, but nearer to the former than the latter.

At the end of *nine months*, the length is from nineteen to twenty inches, the weight from five to eight pounds, and the centre of the body at the umbilicus.†

It is very evident, however, that as it regards the *size and weight* of the fœtus, there must be a very great diversity. The foregoing may serve as a general average, at the same time that it may fail to be applicable in any individual case. Sometimes a fœtus of only six months will be as large as another at the full time. In this case, however, notwithstanding its size, it will have all the signs of an immature fœtus, which cannot easily be mistaken. Its different members will be more or less imperfect; the colour of its skin will be lively red and transparent; the bones of the head will be soft, and the fontanelles

* For this criterion by which to judge of the age of the child, we are indebted to Chaussier. In the adult, the centre of the body is just above the pubis; in the child at birth, it is just at the umbilicus; at eight and seven months it is still higher, and at the sixth month, it is just at the lower part of the sternum.—Considerations Médico-Légales sur L'Infanticide. Par Lecieux. Pp. 17, 18.

† According to experiments made in the Parisian hospitals, the following results were obtained from fifteen hundred and forty-one children who were weighed at birth, and who, with the exception of eight or ten, appeared to have attained the full term.

3	weighed	....	2	pounds and some ounces.
31	—	.....	3	———
97	—	.....	4	———
308	—	.....	5	———
606	—	.....	6	———
380	—	.....	7	———
100	—	.....	8	———
16	—	....	9	———
1541				

The average weight fixed upon by Chaussier and Lecieux for the child at full term, is 6¼ lbs.—Considerations sur L'Infanticide. Par Lecieux. P. 9.

With regard to the length of child, as the result of numerous observations, the following are fixed upon by Chaussier and Lecieux, as the average:

At 5	months,	.....	9½	inches.
6	—	.....	12	—
7	—	.....	14	—
8	—	.....	16	—
9	—	.....	18	—

—Considerations sur L'Infanticide. Par Lecieux. P. 12.

very large; the hair will be very thin; the nails will be either wanting altogether, or very soft; there will be constant sleep, and an absence of the ordinary cries of the child; its movements will be feeble; and the discharge from the bowels will be either wanting altogether, or very small in quantity. All these signs will be found, of course, more or less strikingly marked, according to the approach of the fœtus to the full term.*

3. *To ascertain, if possible, what has been the cause of the miscarriage.* If the abortion has been occasioned by the use of drugs, &c. taken by the mother, nothing can be learned as to the cause of it, whether it be voluntary or involuntary, from any examination of the fœtus. In all cases its appearance will be very much the same, whatever may have occasioned its expulsion from the womb. As, however, it may have been produced by mechanical violence done to the fœtus itself, by the introduction of instruments, &c. it becomes necessary to examine it very carefully, and more especially its head, to discover the nature and extent of the wounds, if any, which may have been inflicted.

II. *Of the means by which the death of the fœtus may have been produced.*

Having, in the foregoing manner, examined the first question to be solved, viz. whether a fœtus in utero has actually been destroyed, the second question relates to the causes by which it may have been produced.

The practice of causing abortion, is resorted to by unmarried females, who, through imprudence or misfortune have become pregnant, to avoid the disgrace which would attach to them from having a living child; and sometimes it is even employed by married women, to obviate a repetition of peculiarly severe labour-pains, which they may have previously suffered. But abortion is not always associated with crime and disgrace; it may arise from causes perfectly natural, and altogether beyond the control of the female. The physician should therefore be extremely cautious in his proceedings, even in cases of illegitimate pregnancy, and where the voice of popular prejudice seems to call upon the medical witness merely to confirm its previous, and often false decisions. The destruction of the fœtus may then result from two sets of causes: 1. The use and application of various criminal agents. 2. The ordinary and accidental causes which are known to produce it without any criminal interference. Each of these require examination, as in every trial of this kind, they may be made the subject of special inquiry by the court and jury.

1. *Of the criminal means resorted to for the purpose of destroying the fœtus.*

These may be divided into general and local. To the first belong

* Manuel de Médecine Légale. Par J. Briand. Pp. 66, 67. 1821.

venesection, emetics, cathartics, diuretics, emmenagogues, &c. &c. The second embraces all kinds of violence directly applied.

Venesection. From the earliest periods it has been supposed that bleeding during pregnancy exercised some deleterious influence upon the fœtus, and that the repetition of it would infallibly destroy it. Hippocrates entertained this belief,* and it has accordingly long been resorted to as one of the popular modes of producing abortion. Bleeding from the foot has been supposed to be particularly effective in this way: all this is probably founded on the supposition that, whenever blood is taken from the mother, the fœtus also loses a proportional quantity, and that by a frequent repetition of it the latter may eventually be bled to death. Experience, however, the most ample and satisfactory, has proved conclusively, that except in particular states of the constitution, venesection, however repeated and copious, can have no direct effect upon the fœtus; and further, that in many cases it is the most effectual agent in averting abortion. Mauriceau relates the history of two pregnant women, who were delivered at the full period of living children, although one of them had been bled forty-eight times, and the other ninety times, for an inflammation of the chest.† By the same author, a case is recorded in which a person was bled ten times from the foot during pregnancy, without any bad effect on the fœtus.‡ Dr. Rush, in speaking of the effects of bleeding in the yellow fever of 1793, asserts that not one pregnant woman to whom he prescribed it, died, or suffered abortion.§ In his defence of blood-letting, the same writer gives us the account of one woman whom he bled eleven times in seven days, during her pregnancy; of another, who was bled thirteen times, and of a third who was bled sixteen times while in the same condition. All these women, he adds, recovered, and the children they carried during their illness, were born alive and in good health.‖ The foregoing facts, selected from a multitude of a similar character, are abundantly sufficient to shew the extent to which venesection may be carried during pregnancy, without being attended with any injurious consequences to the fœtus; and the effect is the same, from whatever part of the body the blood is drawn, whether from the arm or from the foot.

In the cases just alluded to, it is true, blood was drawn during a state of disease, when the loss of a much larger quantity can be borne than in ordinary health. Nevertheless, even in a state of health, the loss of a very large quantity of blood is not necessarily attended by any injurious consequences to the fœtus. On the other hand, it should be recollected, that when the constitution of the mother is naturally feeble and irritable, or has become much debilitated by disease, the injudicious loss of blood during pregnancy may prove fatal to the fœtus. In all cases, therefore, the question whether the bleeding has had any

* Mulier uterum ferens abortit, sectâ venâ, eoque magis, si sit fœtus grandior.—Hippocrates, sec. 5, aphor. 31.

† Capuron, p. 307.

‡ An Elementary Treatise on Midwifery. By A. L. M. Velpeau, M.D. Translated by C. D. Meigs, M.D. P. 236.

§ Medical Observations and Inquiries, vol. iii. p. 309. ‖ Ibid. vol. iv. p. 302.

agency in producing the destruction of the fœtus, must be determined by the particular circumstances of the individual case. At the same time, the mere fact of repeated bleedings having been resorted to without any obvious necessity for it, must be held as a sufficient evidence of the intention of the person.

Leeches. By some it is supposed that the application of *leeches* to the anus, insides of the thighs, or the vulva, has the effect of producing abortion. In this country, this practice is so uncommon, that we are hardly able to form any very correct opinion on the subject. A recent French writer, however, states that he has frequently applied leeches to these parts during pregnancy, in cases of intestinal affections, and in no instance did he find any bad consequences happen. At the same time he recommends great caution in the use of this remedy, especially in females who are liable to abort.*

Emetics. From the well-known fact, that many women are troubled with distressing nausea and vomiting during the whole of their pregnancy, and yet are safely delivered of living children at the regular period, it has been supposed that the fœtus could not be much injured by the use of emetics. The fact, however, seems to be, that although the vomiting attendant upon pregnancy very seldom produces an abortion, yet that which is produced by emetics is not unfrequently followed by consequences the most serious, both to mother and fœtus. In this opinion I am supported by the authority of Mr. Burns, who says that "it is worthy of remark, that abortion is very seldom occasioned by this cause (the vomiting of pregnancy), though emetics are apt to produce it."† The reasons of the difference in the two cases, may be the following. In the first place, the vomiting of pregnancy is less violent than that which is excited by artificial means; and, in the second place, it occurs, as a general rule, only in the early months of pregnancy, when of course less danger attends the operation. Just in proportion to the size and developement of the uterus, is the danger to be apprehended from the spasmodic contraction of the diaphragm and abdominal muscles during vomiting. In the latter months of pregnancy, therefore, emetics prove much more dangerous than they do at an earlier period. Notwithstanding this, even emetics do not always succeed. Velpeau relates a case falling under his own observation, in which fifteen grains of *tartar emetic* were taken to produce abortion. Although violent efforts at vomiting were occasioned, yet the progress of the pregnancy was not interrupted.‡

Cathartics. As a general rule, pregnant women are not apt to be injured by moderate purging. When attacked with disease, too, they may be purged very freely without any risk. During the yellow fever of 1793, Dr. Rush informs us, that he gave large and repeated purges of calomel and jalap to many women in every stage of pregnancy, and in no case did any injury ensue to the child; nay, he adds, that out of a

* Etudes Cliniques sur les Emissions Sanguines artificielles. Par A. P. Isidore Poliniére. Tom. i. p. 34.

† The Principles of Midwifery, p. 230. (Seventh American edition.)

‡ Meigs' Velpeau, p. 236.

great number of pregnant women, whom he attended in this fever, he "did not lose one to whom he gave this medicine, nor did any of them suffer an abortion. One of them had twice miscarried in the course of the two or three last years of her life. She bore a healthy child three months after her recovery from the yellow fever."* If, however, the purging should happen to be carried too far or be continued too long; if the article used be very drastic in its nature, if it act particularly on the rectum† (between which and the mouth of the uterus there appears to be a peculiar sympathy), or if the female be of a nervous, irritable habit, then purging may be, and frequently is, followed by the death and expulsion of the fœtus. Purgatives, therefore, may or may not produce abortion, according to circumstances.‡

Diuretics. This class of agents has long been supposed capable of producing abortion, and has accordingly frequently been used for this purpose. That they may have been occasionally attended with success is very possible, but I have no doubt that generally speaking they have failed. They certainly are destitute of any specific power of exciting uterine action. Mr. Burns seems to think that they are capable of bringing on abortion, and accordingly advises that they should be avoided during pregnancy.§ Still, from his own language, I should not infer that he had ever witnessed this effect, although he says that he has seen diuretics given very freely to pregnant women labouring under ascites.‖ On the other hand, there are many positive facts on record to prove that diuretics may be taken with impunity by pregnant women. Zacchias relates the case of a female, who, after an interval of five years, considered herself pregnant, and shortly afterwards was attacked with sciatica. Several physicians and midwives were called to examine her, and decided unanimously, that she was not pregnant, particularly as she lost a little blood every month, though not so much as in menstruation. They therefore prescribed for the disease which afflicted her, bled her repeatedly in the foot, administered purgatives frequently, together with diuretics and sudorifics. All this did not prevent her from bringing forth a healthy child at the end of the expected time.¶

Concerning the *oil of juniper*, Foderé relates the following fact, which shews that this powerful article has failed in effecting an abortion. A pregnant female took every morning for twenty days, one hundred drops of the distilled oil of juniper, without injury, and was delivered of a living child at the expiration of the ordinary term.**

Even *cantharides* have been taken in very large doses, with a view of procuring an abortion, without accomplishing the desired effect. "Some years ago," says Mr. James Lucas, one of the surgeons of the

* Medical Observations and Inquiries, vol. iii. p. 249.

† All those purgatives which produce tenesmus, are most apt to cause abortion. Hence it is, too, that dysentery frequently produces this effect.

‡ Dr. James Johnson states that he has known a very moderate dose of calomel and rhubarb to cause a premature delivery. — Medico-Chirurgical Review, vol. xvii. p. 98.

§ Principles of Midwifery, p. 283. ‖ Ibid. p. 288.

¶ Foderé, vol. iv. p. 430. ** Ibid.

General Infirmary at Leeds, " I was called to a patient who had taken about a drachm of powdered cantharides in order to induce abortion, and which brought on frequent vomiting, violent spurious pains, a tenesmus and immoderate diuresis, succeeded by an acute fever, which reduced her to extreme weakness, yet no signs of miscarriage appeared, and about five months afterwards she was delivered of a healthy child.* Cases, however, have occurred in which cantharides have caused abortion. Dr. James Johnson mentions a case of this kind, as occurring within his own knowledge.†

Nitre. Dr. Paris relates the case of a woman in Edinburgh, who having swallowed by mistake a handful of this salt, suffered abortion in less than half an hour.‡

Emmenagogues. Under this general head there are several articles which require notice. Among the more important are savine, mercury, polygala seneka, and pennyroyal.

Juniperus sabina, (savine.) This is a powerfully stimulating article, and, as an emmenagogue, has been used with considerable effect. It has also long been used for the purpose of producing abortion, and no doubt possesses considerable power in this way. Galen asserts that it acts with sufficient energy on the uterus to destroy the fœtus;§ and in the present day, it is said to be constantly used by the negresses in the Isle of France with this intention.‖

In the case of Miss Burns, for whose murder Mr. Angus was tried at Lancaster in 1808, there is reason to believe, from the testimony offered, that savine oil had been administered to effect an abortion. That it does not always succeed, is evident from a case related by Foderé. In 1790, a poor imbecile and cachectic girl, in the duchy of Aoust, in the seventh month of her pregnancy, took from the hands of her seducer a glass of wine, in which there was mixed a large dose of powdered savine. She became so ill, that report of it was made to the magistrate, who ordered Foderé to visit her. The patient stated to him, that on taking the drug, she had felt a burning heat accompanied with hiccup and vomiting. This was followed by a violent fever, which continued for fifteen days. By the proper use of refrigerants, however, she recovered, and at the end of two months was safely delivered of a healthy child.¶

In another case recorded by Murray, while it was successful in producing an abortion, it destroyed the life of the mother.** Professor Christison relates, on the authority of Mr. Cockson, the case of a girl, who, to produce abortion, took a strong infusion of savine leaves. Violent pain in the abdomen, and distressing strangury ensued. In two days after taking it, she miscarried; and in four after that, she died. On dissection, Mr. Cockson found extensive peritoneal inflammation—the inside of the stomach of a red tint, checquered with patches of

* Memoirs of the Medical Society of London, vol. ii. p. 208.
† Medico-Chirurgical Review, vol. xvii. p. 98.
‡ Medical Jurisprudence, by Paris and Fonblanque, vol. iii. p. 94.
§ Dictionnaire Matière Médicale, vol. iii. p. 696. ‖ Ibid..
¶ Foderé, vol. iv. p. 431.
** Apparatus Medicaminum, vol. i. p. 59. Dict. Mat. Méd. vol. iii. p. 696.

florid extravasation. The uterus presented all the signs of recent delivery.*

Mercury. This has long been considered as an article capable of occasioning abortion. Crude quicksilver was at one time supposed to possess this property. It was accordingly used, not merely for this purpose, but also in all cases of difficult labour. It was not long, however, before it was ascertained that large quantities of it might be taken by pregnant women with perfect impunity. Matthiolus relates of several pregnant women, each of whom drank a pound of quicksilver to cause abortion, without any bad effect.† The same fact is confirmed by Fernelius.‡ *Calomel*, however, is the preparation of mercury most generally supposed to exert a specific influence upon the uterine organs. That it possesses the power of producing miscarriage, is countenanced by the authority of Mr. Burns, who directs that a full course of mercury should be avoided during pregnancy.§ Facts, however, both numerous and conclusive, are on record to prove, that a pregnant woman may go through a long course of mercury, without the least injury either to herself or to the child. Bartholin and Mauriceau relate several cases, in which mercury was given to salivation, to pregnant women affected with syphilis, and who all, at their full time, were safely delivered of healthy children.‖ Mr. Benjamin Bell, than whom I could not quote higher authority, says, "It is a prevailing opinion, that mercury is apt to occasion abortion, and it is therefore seldom given during pregnancy. Much experience, however," he adds, "has convinced me that this opinion is *not* well founded, and, when managed with caution, that it may be given in sufficient quantities at every period of pregnancy, for curing every symptom of syphilis, and *without doing the least injury either to the mother or child.*"¶ To the same effect is the testimony of Dr. Rush concerning the use of calomel in the yellow fever of 1793. In not a single instance did it prove injurious to pregnant women.** The following case which fell under my own care, confirmed me in the opinion already advanced. A female, eight months gone with child, was attacked with a violent inflammation of the lungs. After the use of the ordinary depleting remedies, I found it advisable to have recourse to mercury. She was accordingly put upon the use of small doses of calomel and James's powder. In a few days, salivation came on; after which, all the symptoms of her pulmonary complaint speedily vanished, and the patient was restored to her usual health. She was afterwards delivered of a living child at the full period.

Dr. Campbell states that he was once asked to visit a young girl, whom he found so violently salivated, with a view to excite abortion, that her tongue could be compared to nothing else than a honey-comb.

* Treatise on Poisons, pp. 531, 532. Second ed. † James's Dispensatory.

‡ Vidi mulieres qui libras ejus biberunt ut abortum facerent, et sine noxâ.—Fernelius.

§ Midwifery, pp. 231, 233. ‖ Foderé, vol. iv. p. 429.

¶ Bell on the Venereal, vol. ii. p. 265. (American edition.)

** Medical Observations and Inquiries, vol. iii. pp. 249, 309.

But notwithstanding her extreme suffering, she went to the full time.* At the same time there can be no question that the preparations of mercury, if given to patients *predisposed to abortion*, and especially if carried so far as to produce salivation, may be followed by that result.

Polygala seneka. This article has now been known and used in this country for a number of years, for the purpose of acting on the uterine organs, with the view of restoring menstrual secretion. The first notice which I have met with of its properties in this respect, is in an inaugural dissertation by Dr. Thomas Massie of Virginia, published in 1803. By him the action of it on the uterus is specially noticed; and the authority of Dr. Archer of Maryland is given, of its being used by the common people in that state, for the purpose of procuring abortion.† That it may possess some power as an abortive, may be inferred from its acknowledged power as an emmenagogue.‡

Pennyroyal. This article is reputed by some to be a powerful abortive. Dr. Watkins relates a case, in which the mere odour of it produced abortion in a delicate woman in the fourth month.§ At the Chelmsford assizes, August 1820, Robin Collins was indicted for administering steel filings and pennyroyal water to a woman, with the intent to procure abortion. He was convicted, and sentenced to transportation for fourteen years.‖

Besides the foregoing articles, belonging to the class of emmenagogues, there are others which are entitled to a place under the class of abortive agents.

Secale cornutum—spurred rye—ergot. This article, at present so fashionable in obstetric practice, was first announced to the profession in this country in the year 1807, by Dr. John Stearns of New York, as a substance capable of accelerating, in an extaordinary manner, the process of parturition. As might naturally be expected from the announcement of a remedy so novel and unique, it excited much interest, and as soon as subsequent experience had confirmed its virtues, rose at once into the most unlimited popularity. In the year 1812, it was suggested by the editors of the New England Journal of Medicine and Surgery, that while fully convinced of the parturient powers of the ergot, they were apprehensive that an evil of great magnitude not unfrequently resulted from its use; and that was, the death of the child. They stated that they had been led to this apprehension, from "observing that in a large proportion of cases where the ergot was employed, the children did not respire for an unusual length of time after the birth, and in several cases the children were irrecoverably dead."¶ The observations of numbers of highly respectable physicians since that period, have tended but too strikingly to confirm this melancholy fact. At present, it will scarcely be denied by any one acquainted with the operation of ergot, that if given in very large

* Introduction to the Study and Practice of Midwifery. By W. Campbell, M.D. P. 142.

† Medical Theses. By Charles Caldwell, M.D. Vol ii. p. 203.

‡ See paper of Dr. Hartshorn in Eclectic Repertory, vol. ii. p. 201.

§ Coxe's Medical Museum, vol. ii. p. 431.

‖ Paris and Fonblanque, vol. iii. p. 88. ¶ Vol. i. p. 70.

doses, or at improper periods, it will but too certainly prove detrimental to the life of the child.* It is to be feared, that for this purpose it has been but too frequently used in this country. It cannot, therefore, be too strongly insisted upon, that the life of the mother is equally jeopardised with that of the child, by its improper use. By some it has been doubted whether the ergot is capable of producing an abortion, or whether its action is limited to the full period of utero-gestation, and when the uterus is beginning to act itself for the purpose of unloading its contents. That it does possess the power of causing abortion at any period, would seem to be proved by experiments made upon animals;† and Dr. Chatard records a case of abortion induced in the human female subject at the fourth month of pregnancy, by twelve grains of ergot.‡ Notwithstanding all this, it is a fact that ergot is no more infallible as an abortive than any of the agents already noticed. Dr. Condie states, that instances have come to his knowledge, in which the ergot was employed to the extent of several drachms a day, for the express purpose of inducing abortion, but without exerting the least effect upon the uterus. In all these cases, gestation continued for the full period, and the females were delivered of living children. He also states that he has known the ergot to be given in large and repeated doses, by ignorant midwives, where pains simulating those of parturition have occurred towards the termination of utero-gestation, in order to quicken the labour; but so far from doing this, the pains have actually ceased under its use, and labour has not occurred for several weeks subsequently.§ I have myself met with one case in which a female who had had several children, took of her own accord three drachms of ergot to produce an abortion, without any effect.

Actæa racemosa. The common name of this plant is the *black cohosh*, or the *squaw root.* It is a common plant, found in every part of the United States, and the root of it is a good deal used by some of our American practitioners. Recently it has been brought into notice as an article possessing powers analogous to those of the ergot. By our native Indians, it appears to have been long supposed to possess properties of this sort, and Mr. Rafinesque states that it is "much used by them in facilitating parturition, whence its name—squaw root." Dr. Tully, in a paper on this subject, has recorded the testimony of a number of respectable physicians, who have used this article for this purpose; and, as they state, with decided success, acting very much in the same way as the ergot. A fluid drachm of the saturated alcoholic tincture acted as a sufficient dose, without being repeated.‖

* For testimony on this point, I refer to the following authorities: New York Medical Repository, vol. xii. p. 344; vol. xx. p. 11; vol. xxi. pp. 23, 139. New England Journal of Medicine and Surgery, vol. i. p. 70; vol. ii. p. 353; vol. v. p. 161; vol. vii. p. 216; vol. viii. p. 121. New York Medical and Physical Journal, vol. i. pp. 205, 278; vol. ii. p. 30.

† Philadelphia Journal of Medical and Physical Sciences, vol. xi. pp. 112, 113.

‡ New York Medical Repository, vol. xxi. p. 16.

§ American Journal of Medical Sciences, vol. x. p. 227.

‖ Actæa racemosa. By William Tully, M.D. Professor of Materia Medica, in Yale College, in the Boston Medical and Surgical Journal for April 10, 1833.

According to Dr. Tully, the actæa does not appear to exert the same stupefying aud deleterious influence on the fœtus, that he supposes is produced by the ergot.

Digitalis. Of the effect of this active drug upon the uterine system, the following case is related by Dr. Campbell. "A married female, aged 26, fair complexion, relaxed, delicate habits, but not spare, the mother of several children, had ascites in her former confinement, and applied for the same complaint, when in the eight month of this, her fourth pregnancy. In the course of twelve days, she took six drachms of the tincture of digitalis. On the twelfth day, at two A. M., the fœtus, stillborn, was thrown off before assistance could be afforded to her; and in twelve hours and a half afterwards, the woman herself expired, although she was in the most favourable state when left after her delivery. The child seemed to have been but a very short time dead, for it exhibited no evidences of putrefaction. The body was examined twenty-five hours after death; it was running rapidly into putrefaction. About three pounds of water were contained in the chest; in the pericardium were found a few ounces of sero-sanguineous fluid; in the abdomen, the effusion was very trifling."*

Among the *local means* used for procuring abortion there are only two which repuire to be noticed—

Blows and other injuries on the loins and abdomen. In cases where severe blows have been received on the back, the danger of abortion is always imminent. It is, indeed, rare that a female goes to her full time when she has received such an injury. Blows on the abdomen are equally dangerous; and in most cases of this kind, a considerable hæmorrhage precedes the death of the fœtus. In disputed cases, where it is denied that the injury inflicted has caused the abortion, we should attend to the two following circumstances: First, whether the violence offered was sufficiently great to be considered as the sole cause; and second, whether the female was not predisposed to abortion, and had failed in some precautions, or committed some imprudence, which might have induced it. After investigating these facts, we ought to inquire whether the accused knew of the pregnancy of the female, or whether she had not provoked the blows which she received. Two cases from Belloc may serve to illustrate these distinctions. A young woman, between the third and fourth months of her pregnancy, had received, from a robust man, several kicks and blows with the fist, the marks of which were very evident. Immediately after the accident, she was put to bed, bled, and various remedies given her by a surgeon. The hæmorrhage, however, continued, with pains in the loins and abdomen, and on the next day she had an abortion. Belloc, on being examined, declared that the accident was owing to the violence which had been inflicted.† In another case, a female brought forth a dead fœtus, four months advanced, two days after a quarrel with her husband, in which she said he had struck her. Instead, however, of lying down, or at least keeping quiet, she

* Introduction to the Study and Practice of Midwifery, p. 141.
† Belloc, p. 81.

walked a league that day, and on the next a quarter of a league, to a place where she was to aid in bringing in the harvest; nor was it until her arrival there, that she was forced to go to bed. In this case, Belloc decides that it is very possible, had she remained quiet, and called for proper aid, the abortion would not have taken place, particularly as the violence used was only that of throwing her down in the street.*

With regard to this cause of abortion, as well as the others that have been mentioned, it is to be understood that the life of the *mother* is equally exposed with that of the child. The following case, related by Dr. Smith, illustrates this fact in a striking manner, and is only one of a number which might be adduced. In 1811, a man was executed at Stafford for the murder of his wife. She was in the pregnant state, and he had attempted to induce abortion in the most violent manner, as by elbowing her in bed, rolling over her, &c.,—in which he succeeded—not only procuring abortion, but along with it the death of the unfortunate woman.†

By Dr. Campbell, a case is recorded of a female, who, in the last month of pregnancy, was struck on the abdomen by her husband. An extensive detachment of the placenta caused the immediate death of the fœtus, and that of the mother in fifty-one hours afterwards.‡

The introduction of an instrument into the uterus for the purpose of rupturing the membranes, and thus bringing on premature action of the womb. Of this villanous practice, which has long been known and resorted to for the nefarious purpose of producing abortion, I shall say nothing more than to give the history of a few cases in which it was used, and which will shew the effects with which it is attended. "At Durham assizes, in 1781, Margaret Tinckler was indicted for the murder of Janet Parkinson, by inserting pieces of wood into her womb. The deceased took her bed on the 2d of July, and from that period thought she must die, making use of various expressions to that effect. She died on the 23d. During her illness, she declared that she was with child by a married man; and he, being fearful, should she be brought to bed, that the knowledge of the circumstance would reach his wife, advised her to go to the prisoner, who was a midwife, to take her advice how to get rid of the child—being at the time five or six months gone. The delivery took place on the 10th of July, three days previous to which a person saw the deceased in the prisoner's bedchamber, when the prisoner took her round the waist, and shook her in a violent manner five or six different times, and tossed her up and down. She was afterwards delivered at the prisoner's house. The child was born alive, but died instantly; and it was proved by surgeons to be perfect. There was no doubt but that the deceased had died by the acceleration of the birth of the child; and upon opening the womb of the mother, it appeared that there were two holes, caused by wooden

* Cours de Médecine Légale. Par J. J. Belloc. P. 82.
† Smith's Forensic Medicine, p. 305.
‡ Introduction to the Study and Practice of Midwifery, &c. p. 137.

skewers, one of which was mortified, and the other inflamed. Additional symptoms of injury were also discovered."*

In England a very curious trial took place in 1808, of two persons, William Pizzy and Mary Codd, "for feloniously administering a certain noxious and destructive substance to Ann Cheney, with intent to produce a miscarriage." On the trial, it appeared that they had given medicines several times to produce the abortion without any effect. In consequence of this failure, Pizzy, who was a farrier, introduced an instrument into the vagina, and in that way destroyed the child, and brought on premature delivery. This took place about six or seven weeks before the full time. Although the facts appeared very clear on the trial, yet the jury brought in a verdict of acquittal.†

By Foderé and Ristelheuber a case is related in which rupture of the uterus and death was occasioned by the introduction of a syringe with a long ivory pipe, for the purpose of producing abortion. On dissection, a fœtus of about two months was discovered in the abdomen.‡

By Dr. Baxter of New York, another case is recorded, in which he was called to a female who had employed a person to procure an abortion by the introduction of a silver catheter. The only effect, however, was that of wounding the os tincæ, and rupturing the membranes without expelling the fœtus. Fifteen days after the perpetration of the deed, Dr. Baxter found her in terrible pains; and, having bled her twice without relief, he gave her ergot to facilitate the delivery of the fœtus, which very shortly brought it away. It was perfect, and about four months old. Unfortunately, the names of the persons concerned in this infamous transaction were never divulged.§

On this subject, the following interesting and instructive fact is related by Dr. Gooch. "Dr. William Hunter attempted this operation (introducing an instrument to puncture the membranes) on a young woman at about the third month of pregnancy. He found that he several times punctured the cervix uteri, and the case terminated fatally. If this happened to one of so much anatomical knowledge and skill, how much more probable must it be in the hands of those ignorant men by whom, for the purpose alluded to, the operation is sometimes undertaken! No doubt these attempts often prove fatal; but the murdered do not tell tales."‖

A most extraordinary mode of causing abortion recently occurred in France which may, perhaps, be appropriately noticed in this place. The subject was a married woman, who had four children, and was pregnant of a fifth. At the commencement of her pregnancy she was persuaded, by the representations of another female, to inject sulphuric acid into the vagina, as an easy mode of inducing premature labour. As may readily be imagined, excessive inflammation of the parts took

* East's Crown Law, vol. i. p. 354. Smith, p. 306.

† Edinburgh Medical and Surgical Journal, vol. vi. p. 244.

‡ Medico-Chirurg. Review, vol. vi. p. 528.

§ The Medical Recorder, vol. viii. p. 461, for 1825.

‖ A Practical Compendium of Midwifery. By Robert Gooch, M.D. p. 94. (American edition.)

place, together with great general constitutional disturbance; and the final result was an almost complete obliteration of the vagina. "The medical men, on examination, found that a kind of irregular band surrounded and obstructed the vagina, beyond which, and on the brim of the pelvis, the head of the infant was distinctly felt, pressed forward by the uterine contractions. It was resolved to make an incision through the dense membrane; but when this was done it was found it had adhered to the bladder, which the incision had completely divided. The delivery was not at all facilitated, and the attendants felt themselves compelled to perform the Cæsarean operation. The infant was extracted dead, apparently for some time, and the mother immediately expired."*

Having thus finished the notice which I proposed to take of the methods which have been resorted to for criminally producing abortion, I must again insist upon a circumstance already adverted to, but which cannot be too often repeated; and this is the danger which necessarily attends the life of the mother in every attempt of this sort. Even in cases where miscarriage results from involuntary causes, and where every prudential measure has been adopted for obviating its consequences, it is well known that the mother frequently falls a victim. How much more likely is this to be the result when the miscarriage is occasioned by great and unnatural violence done to the system, and that, too, under circumstances which generally shut out the wretched sufferer from the benefit of all medical succour. Velpeau states that he had a female under his care, who produced a violent abdominal inflammation by taking medicines to promote abortion. She died on the eighth day, without any symptoms of abortion having appeared.† There is another circumstance also of great importance which should not be forgotten. It has happened in some instances that, while the mother has lost her life in attempting to procure a miscarriage, the child has actually been born alive, and survived. A case of this kind was witnessed by Foderé in 1791. A cook finding herself pregnant, and not being longer able to conceal it, obtained half an ounce of powdered cantharides, and mixed it with an ounce of sulphate of magnesia, and took them down in order to produce abortion. Some hours after she was seized with violent colic, and brought forth a *living child*, in the most horrible pains. During the succeeding night she died.‡ If these facts were more generally known, I suspect the attempts at abortion would be much less frequent than they are at present. With regard to the accessaries and accomplices in this crime, it would be well for them to remember that, in every experiment of this kind which they make, they take upon themselves the awful responsibility of jeopardising not merely a single life, but two lives. As far as *intention* is concerned, they are in all cases as much chargeable with the death of the mother as with the destruction of the fruit of the womb.

* The Lancet, vol. viii. p. 38. † Meigs' Velpeau, p. 236.
‡ Foderé, vol. iv. p. 436.

It results, therefore, from what has been said concerning the means of producing abortion,—

1. That all of them are *uncertain* in their operation upon the fœtus.

2. That they always endanger the life of the mother, and

3. That they sometimes destroy the mother without affecting the fœtus.

I deem it so important to enforce these results, that I shall confirm them by the following authorities. "It is evident, I believe, from experience," says Farr, "that such things (abortives) cannot act as efficient causes, without the aid of those predisposing causes, or natural habits of the body, which are necessary to concur with them. As attempts of this kind, however, should not be passed off with impunity, and *as the life of the mother as well as the child* is endangered by such exhibitions, if advised by any other, they should be considered as highly culpable, and for this reason should be made known."*

"Every woman," says Bartley, "who attempts to promote abortion, *does it at the hazard of her life.* It may be remarked, whoever endeavours to counteract the ordinary proceeding of nature will have in the end sufficient cause to repent the temerity."†

"There is no drug," says Male, "which will produce miscarriage in women not predisposed to it, *without acting violently on their system, and probably endangering their lives.*"‡

Smith says, "Abortion is in general injurious to health, and is seldom unaccompanied with suffering. The administration of emmenagogues to force a separation of the ovum, where the constitution has no tendency to throw it off, *is highly dangerous to the mother.* No drugs can act in this way upon the uterus but by involving it in a violent shock given to the general system. *It has frequently occurred, that the unhappy mother has herself been the sacrifice while the object intended has not been accomplished.*" §

Burn ssays, "It cannot be too generally known that, when these medicines do produce abortion, the mother can seldom survive their effect."‖

To shew how difficult the perpetration of abortion sometimes is, the following case will serve as an illustration. "A young woman, seven months gone with child, had employed savine and other drugs with a view to produce a miscarriage. As these had not the desired effect, a strong leather strap (the thong of a skate) was tightly bound round her body. This, too, availing nothing, her paramour (according to his own confession) knelt upon her, and compressed the abdomen with all his strength: yet neither did this effect the desired object. The man now trampled on the girl's person while she lay on her back; and, as this also failed, he took a sharp pointed pair of scissors, and proceeded to perforate the uterus through the vagina; much pain and

* Farr's Elements of Medical Jurisprudence, p. 70.
† Bartley's Treatise on Forensic Medicine, p. 5.
‡ Male's Epitome of Juridical Medicine, in Cooper's Tracts, p. 208.
§ Smith's Principles of Forensic Medicine, p. 295.
‖ Principles of Midwifery, p. 283.

hæmorrhage ensued, but did not last long. The woman's health did not suffer in the least, and pretty much about the regular time a living child was brought into the world, without any marks of external injury upon it. It died, indeed, four days afterwards; but its death could not be traced to the violence inflicted on the mother's person: all the internal organs appeared normal and healthy."*

Velpeau makes the following statement in relation to the consequences of using instruments to procure abortion.—"Those who make use of them most frequently, fail of attaining their object, and succeed only in seriously injuring the womb. I once prescribed for a female, in whom such attempts had brought on a flooding which conducted her to the verge of the grave; she suffered horribly from pain in the interior of the pelvis for two months, notwithstanding which, abortion did not take place, and she is now a prey to a large ulcer of the neck of the womb. I opened the body of an unhappy creature who suffered from the like attempts, which did not succeed any better than the one above mentioned. M. Girard of Lyons mentions a similar instance. Very recently also (Oct. 1828), a young woman who became pregnant against her wishes, succeeded by such manœuvres only in producing an organic lesion of the uterus, which, after frightful sufferings, led her to the commission of suicide." †

Of the involuntary causes of abortion. Of these it is not necessary to say much. They should always, however, be kept in view in medico-legal investigations on this subject, so that we may not attribute to criminal interference what is owing to some morbid derangement. Diseases of various kinds, as rheumatism, pleurisy, small pox, typhus and yellow fevers, scarlatina, syphilis, and measles, operating on a system predisposed by nervous irritability; a diseased state of the uterus; the intemperate use of spirituous liquors; irritation of the neighbouring organs, from costiveness, tenesmus of dysentery, hæmorrhoids, prolapsus ani, diarrhœa, incontinence of urine, errors in regimen and diet; violent exercise, as in walking, dancing, riding, running, &c.; accidental falls; a sudden contortion or shock ‡ of the body; indulgence of any violent passion of the mind, whether joyful or sad; the relation of any unexpected intelligence; a great noise; § the appearance of any

* Professor Wagner, in the London Medical Quarterly Review, vol. ii. p. 487.

† Meigs' Velpeau, p. 238.

‡ The pulling of a tooth, for instance, has been known to produce abortion.—Burns on Abortion, p. 64.

§ A case, in which a *great noise* as a cause of miscarriage was involved, was tried in 1809, at the quarter sessions of Franklin county, in Pennsylvania. The indictment charged that Taylor (the defendant) unlawfully, *secretly*, and maliciously, with force and arms, broke and entered at night the dwelling-house of James Strain, with intent to disturb the peace of the commonwealth; and after entering the house, unlawfully, wilfully, and turbulently, *made a great noise* in disturbance of the peace of the commonwealth, and did greatly misbehave in said dwelling-house, and did greatly frighten and alarm the wife of the said Strain, whereby she *miscarried*, &c. The offence was held indictable as a *misdemeanor*. The jury found the defendant guilty; but the quarter sessions arrested the judgment upon the ground, that the offence charged was not indictable. The supreme court decided in this case, that the judgment should be reversed, and the quarter sessions were directed to proceed to give judgment against the defendant. Binney's Reports, vol. v. p. 277.

extraordinary object; previous abortion; fluor albus; excessive venery; accidental blows on the abdomen; the death of the fœtus; the attachment of the placenta over the os uteri; retroversion of the womb; hæmorrhage, from whatever source, or at any period:* all or any of these causes may give rise to abortion, without the imputation of the least criminality to the female.

The influence of the passions upon the uterine functions is peculiarly striking. It is an extraordinary fact, that the melancholy and sadness caused by some great evil which is known and expected, are much less injurious to a pregnant woman, than the annunciation of some important good, or even a trifling misfortune which is unexpected. Foderé relates the case of some pregnant women, who, during the horrors of the French Revolution, were confined in dungeons and condemned to death; their execution was, however, delayed in consequence of the peculiarity of their situation. Yet, notwithstanding the actual wretchedness of their condition, and the more terrible anticipation of future suffering, they went on to the full time, during which period a fortunate change in the state of parties rescued them from unmerited punishment.†

Circumstantial evidence. In concluding the subject of abortion, I shall make a remark or two upon the circumstantial evidence which may be adduced to prove the guilt of the accused. With regard to *concealing her pregnancy*, I cannot conceive with what justice any inference can be drawn prejudicial to her character. If her pregnancy be the result of illicit commerce, it is perfectly natural that she should make use of every effort to conceal her disgrace as long as possible. The mere fact of concealment, even if proved, ought to be considered as no evidence whatever of her guilt.

If she has been known to apply frequently to the same or to different physicians to be bled, especially in the foot; if she has endeavoured to procure any of the medicines usually given to produce this effect; if any are found in her possession; or if she can be convicted of actually taking them without medical advice, we have then the strongest circumstantial evidence which the nature of the case admits of, to pronounce her *intention* to have been criminal. These are circumstances, however, which do not strictly come under the cognisance of the professional witness; they are matters of fact, which must be decided upon from the testimony which may be offered by the other witnesses cited to appear in the case.

2. *Of the murder of the child after it is born, with an account of its various proofs and modes of perpetration.*

In every case in which an infant is found dead, and becomes the subject of judicial investigation, the great questions which present themselves for inquiry are:—

* Burton's Midwifery, p. 281. Burns' Midwifery, p. 161. Burns on Abortion. Hamilton's Midwifery.

† Foderé, vol. iv. p. 422.

1. Has the child attained that size and maturity which would enable it to maintain an independent existence?

2. Was the child born alive?

3. If born alive, by what means did it come to its death?

Having come to the conclusion that the death of the child is owing to violence, it is next to be ascertained who the perpetrator of it is. Should suspicion light upon a female as being the mother of it, the questions to be determined concerning her are:—

1. Whether she has been delivered of a child? And,

2. Whether the signs of delivery correspond as to time, &c. with the appearances observed on the child?

These are the only points upon which the *professional witness* can be called to give his testimony, and to the consideration of these I shall accordingly confine myself.

1. *Proofs of a child's having attained a sufficient maturity to maintain an independent existence.* Although children born before the completion of the seventh month have occasionally survived, and been reared, yet in a medico-legal point of view, no child ought to be considered as capable of sustaining an indepedent existence until the seventh month has been fully completed. Accordingly, if it can be proved that the child which is the subject of investigation has not attained this age, no charge of infanticide can or ought to be entertained. Even when the full term of seven months has been attained, its chances of surviving are exceedingly uncertain; and just in proportion as the child approaches the full term, is the probability of its living increased. The principal signs by which a judgment is to be formed in these cases are, the *weight of the child—its length*—and the *relative situation of the centre of the body.* These have already been noticed in a previous part of this essay, and require no additional comment.*

2. *Proofs of the child having been born alive.* We know nothing of the *nature* of *life;* we judge of it only from its effects, and declare that being as enjoying it, who performs the functions considered essential to it. These functions are called *vital*, and are usually enumerated as the three following, viz: the *cerebral* and *nervous*, the *sanguineous*, and the *respiratory.* This distribution can only apply, however, to the state after birth: in the fœtal state, facts would seem to prove that nothing beside the *circulation* of the blood is necessary to the maintenance of the vital principle. Even the energy of the brain, which is afterwards to determine the character, and in a great measure to fix the destiny of the being it inhabits, is originally dormant, and the organ itself occasionally wanting. In cases of infanticide, it is only from the *circulation* and *respiration* that any thing is to be learned: the *brain* and *nerves* leave no trace of their influence behind them.

Proofs of the blood having circulated after birth. There are four things in connexion with this that require investigation, viz., *the character of the blood itself; the state of the heart and vessels circulating the blood; the distribution of the blood in the different organs of the body; and the existence of ecchymoses and extravasations.*

* See page 229.

(*a.*) *Of the character of the blood itself.* By some eminent authorities, it is asserted that there is no difference in appearance between the arterial and venous blood of the fœtus. Bichat investigated this point particularly, and he states that he made numerous dissections of young guinea pigs while yet in the womb of their mother, and he uniformly found the blood of the arteries and veins presenting the same appearance, resembling the venous blood of the adult. Not the slightest difference was observed between the blood taken from the aorta, and that from the vena cava, nor between that drawn from the carotid artery and the jugular vein. He made the same observations in three experiments of a similar nature upon the fœtuses of dogs. He also frequently dissected human fœtuses who died in the womb, and found the same uniformity in the arterial and venous blood. From these facts he concludes, that no difference exists between the arterial and venous blood of the fœtus, at least in external appearance.* Velpeau and Autenreith, as the result of their experiments and observations, confirm this statement.† By other observers this is positively contradicted; and it is asserted, that the difference between the blood of the arteries and veins is very obvious.‡ By Dr. Jeffrey the following experiment was made. He took part of the umbilical cord and dissected away the gelatinous part of it, until he had laid bare the vessels, when, on puncturing them, he found there was a difference between the blood in the vein and the arteries.§ A simpler mode of performing this experiment, suggested by Mr. Carr of Sheffield, is the following. As soon as the child is born and the cord divided, take the placental portion of it, around the end of which a ligature has been previously applied, and cut it two or three inches from the ligature with a sharp scalpel, so as to make an even surface. If the portion of cord be now pressed from below upwards, the blood flowing from the vein and that from the arteries will be found very different. "Sometimes a large drop of florid blood is observed to stand directly over the umbilical vein, and another dark-coloured over the arteries, without their being in the least mingled with each other, and in this case the difference between the two is so striking that no one can fail to observe it."‖ In relation to this experiment, it is to be remarked, that to render it of any force in controverting the observations of Bichat, it ought to be made upon the *stillborn* child, in whom respiration has never taken place. Performed upon the child which has been born alive and breathed, the difference between the arterial and venous blood is just what might have been expected.

Of its coagulation. By some it has been supposed that the blood of the fœtus does not coagulate. This, however, is a mistake. But although the fœtal blood does coagulate like adult blood, yet there is this difference between them, that the coagulation of the former is

* Bichat's General Anatomy. Translated by Hayward, vol. i. p. 355.

† Velpeau's Midwifery, p. 219.

‡ Bostock's Physiology, vol. ii. p. 157. (American edition.)

§ The Physiology of the Fœtus, Liver, and Spleen. By George C. Holland, M.D. P. 154.

‖ Ibid.

by no means so firm and solid as that of the latter. This was originally observed by Fourcroy,* and has since been confirmed by other observers.

The effect of exposing the fœtal blood to the action of the atmosphere. In the experiments made by Fourcroy, the coagulum of a brown red, exposed to the atmosphere, did not become florid in the same manner as that of the adult. There were, however, filaments of a red colour running over the brown mass,† giving it a veined appearance. By others, this is controverted; and Dr. Blundell states that it can easily be proved that the blood of the fœtus does become florid, by taking it from the umbilical vessels, and setting it aside, exposed in a cup to the action of the atmosphere. In a very short time, he says, it will be found to undergo a change to a bright red colour; and if the clot be cut vertically in two,‡ the contrast between the exposed and unexposed parts will be very striking. Here, too, the same remark is applicable, that was made in relation to the experiments of Drs. Jeffrey and Carr. The blood which is exposed ought to be that of the fœtus which has not respired. The blood taken from the umbilical vessels in ordinary cases of delivery, where the child is born alive, and has breathed, is not fœtal blood. Whether this precaution was observed by Dr. Blundell, does not appear from his statement.

Chemical composition of fœtal blood. On this subject I believe we have nothing but the analysis of Fourcroy. As the result of this, there would seem to be a real difference between the composition of fœtal and adult blood. According to him, the points of difference are the following: — 1. In the fœtus the colouring matter is darker, and the blood is not so susceptible of taking the brilliant red shade on exposure to the atmosphere. 2. It contains no fibrous matter; the thickened and coagulated matter which is found in its place resembles more gelatinous matter. 3. It does not contain any phosphoric acid.§

According to the observations of Fourcroy, Tiedemann, and others, it would appear, also, that the proportion of serum in fœtal blood is much larger than in adult blood.‖

In addition to the foregoing, the microscopical observations of MM. Prevost and Dumas have ascertained that the red globules of the blood in the fœtus differ in their form and volume from those of the adult, the former being much smaller than the latter.¶

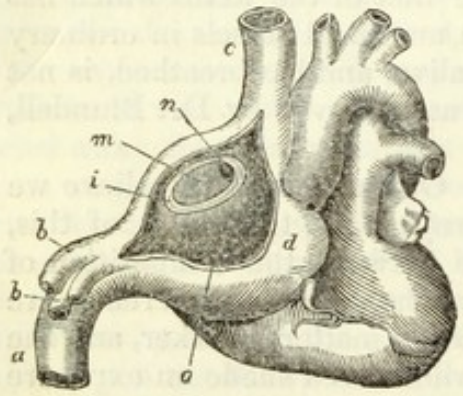
The foregoing facts and observations, although they go to shew that there are some interesting points of difference between the blood of the fœtus and that of the adult, are yet, I fear, of too delicate a nature to be rendered practically available in a question of so grave import as that of infanticide.

(*b.*) *The condition of the heart and blood-vessels.* Without going into any elaborate description of the circulation in the fœtal state, it is only necessary to state, that there are a number of striking and interesting peculiarities in the organs circulating the blood in the

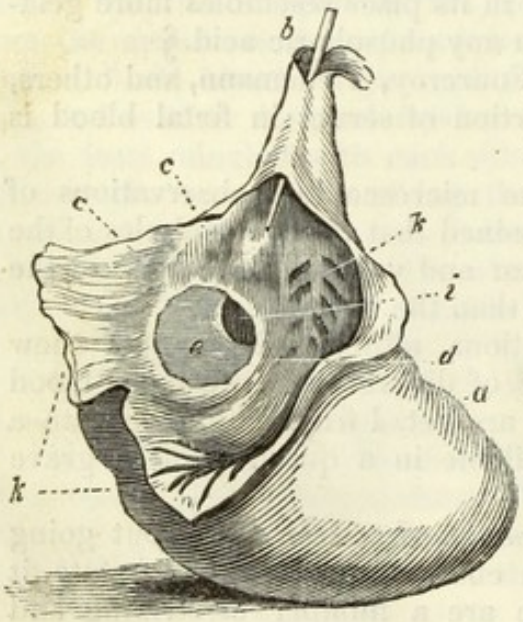
* Annales de Chimie, tom. vii. p. 162. † Ibid. p. 163.
‡ Blundell in Lancet, for 1828, p. 130.
§ Annales de Chimie, tom. vii. p. 165. ‖ Velpeau's Midwifery, p. 218.
¶ Velpeau's Midwifery, p. 219. Bostock's Physiology, vol. ii. p. 158. (Am. ed.)

fœtus which are modified, or entirely lost, after the child is born, and respiration is established. These peculiarities, therefore, require to be specially noticed. They are the *foramen ovale*, the *ductus arteriosus*, the *ductus venosus*, the *umbilical vessels*, and the *cord*.

The *foramen ovale*. This is an opening situated in the septum which divides the right auricle from the left, and through it part of the blood is conveyed directly from the right to the left auricle. It is nearly equal in size to the mouth of the inferior cava, and is supplied with a thin transparent falciform valve, situated on the side of the left auricle. In this way the valve permits the flow of blood into the left auricle, but prevents its return into the right auricle. When the valve is closed there is generally a small aperture still left open, where the valve falls slack, and is ready to open. The accompanying sketches will render more intelligible the relative situation and appearance of the foramen ovale.



a. The ascending cava, with its hepatic branches, *b b*.
c. The descending cava.
d. The right auricle, where it lies against the roots of the aorta and the pulmonary artery.
i. The circle which surrounds the foramen ovale, sometimes called the *isthmus vieussenii*, but more commonly the *circulus foraminis ovalis*.
m. The valve of the foramen ovale.
n. The aperture or opening in the foramen ovale.
o. The opening towards the ventricle.



This sketch is intended to shew the foramen ovale still more plainly. Every portion of the fœtal heart is cut away, except the ventricles and the partition between the auricles.

a. The ventricles.
b. The vena cava, with a blowpipe in it.
c c. The septum between the auricles laid open to display the foramen ovale.
k k. The musculi pectinati, or muscular fibres of the auricle.
d. The circulus foraminis ovalis.
e. The valve of the foramen ovale.
i. The aperture of the valve, where the valve falls slack, and opens.

After birth the foramen becomes obliterated by the closure and adhesion of the valve, and leaves behind it in the adult nothing but an oval depression in the septum between the auricles. This depression is called the *fossa ovalis*, and corresponds to the space occupied in the

fœtus by the foramen ovale.* In the fœtal state, and anterior to respiration, this foramen is always open; and it becomes closed only in consequence of the blood taking a new route through the lungs, when respiration commences. If, therefore, in examining any case, the foramen ovale be found closed, it is a very decisive evidence of the child's having been born alive. It is to be recollected, however, that this closing and obliteration of the foramen ovale is a gradual process, taking sometimes from two to three weeks before it is completed. Hence it is obvious, that however strong a proof its closure may be of previous life, yet its being open is no evidence to the contrary. To render the phenomena connected with the foramen ovale available in these cases, it was suggested, originally I believe by Professor Bernt of Vienna, that, although the complete closure of the foramen ovale did not take place until some days after birth, yet that during all this time it underwent certain changes which would distinctly mark the period which had elapsed after the birth of the child. That the foramen ovale does undergo a series of changes during the process of obliteration was remarked so early as 1750, by the English anatomist Ridley, and has since then been confirmed by the observations of anatomists and physiologists. These changes consist mainly in the position of the aperture of the foramen. In the fœtus, anterior to respiration, the aperture of the foramen ovale is always found at the lowest part of the valve; as soon as respiration has commenced it is gradually turned towards the right; after some weeks it is elevated still higher; and, finally, after revolving as it were around the right edge of the valve, it is found at the *upper* instead of the *lower* side of it:† In other words, as soon as respiration commences, the aperture of the foramen ovale moves gradually from the bottom to the top, and from left to right. Now these changes in the foramen ovale, according to Professor Bernt, will indicate not merely the existence of respiration, but also the different periods during which it has continued. With regard to the validity of this test, however, it must be obvious that, from the gradual manner in which these changes take place, a great many cases must occur in which they can furnish no decisive evidence. For instance, suppose a child had taken only one or two inspirations, sufficient to fill the lungs, and to shew that it had actually been born

* Bell's Anatomy, vol. i. p. 396. (American edition.) See also Meckel's Anatomy, vol. ii. p. 207. (American edition.) By Doane.

† "1. *In fœtu*, omnino non respirante, hiatus foraminis ovalis *ad imam partem valvulæ* reperitur, per quam sanguis e vena cava ascendente effusus, statim ad sinistrum ventriculum transjiciendus, transmigrat.

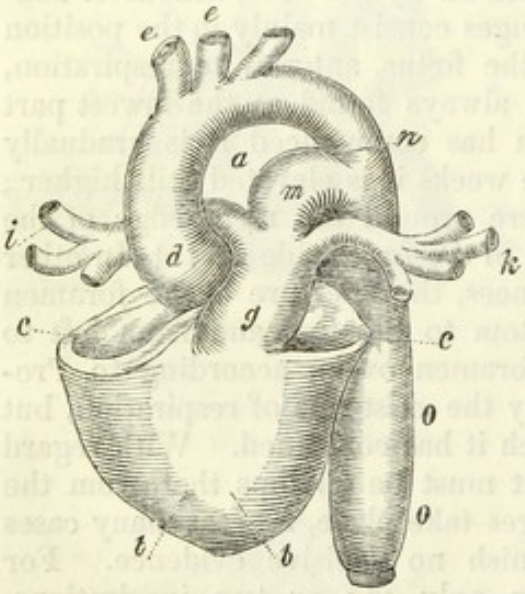
"2. *In infante recens nato, qui per paucula momenta respiratione usus est*, apertura istius foraminis e tramite suo pristino jam paululum *dextrorsum deflexa* conspicitur, inde sanguis e vena cava inferiori illuc appellens, cum sanguine e superiori vena cava refluo, per partem foraminis jam clausam novo incepto circuitu decurrit.

"3. *In infante plures septimanas nato*, apertura foraminis *adhuc altius* cum valvula *dextrorsum suspensa* deprehenditur.

"4. *In adulto*, demum foramen cum sua apertura et valvula plane *inversum* apparet, adeoque ejus apertura supra tuberculi Loweri marginem inferiorem penitus se recondit, cum valvula eadem transitu temporis, ni impedimentum intercurrat, firmiter adhæsura."—Experimentorum Docimasiam Pulmonum Hydrostaticam Illustrantium. Centuriæ i. Sectio ii. Curante Josepho Bernt. Prefatio, p. xii. Viennæ, 1824.

alive, the change in the position of the foramen ovale would be so slight as to render it altogether inappreciable. Besides this, there is another consideration of great importance, which is, that, from the very nature of these changes, no one would be competent to decide upon them, unless he had had the good fortune, which falls to the lot of very few, of making a great number of dissections and observations upon the fœtus. In the hands of the generality of physicians it might lead to numerous and even unavoidable errors. In addition to all this, the very observations made by Bernt himself prove that the changes in the foramen ovale do not take place so uniformly and certainly as to render it safe to draw any positive conclusion from them. On these various accounts I must confess that I do not attach the same importance to this test as is done by Professor Bernt.

The *ductus arteriosus.* This is a vessel which passes directly from the pulmonary artery, and enters the aorta just below its arch. It is a vessel of considerable size, being somewhat larger than the aorta itself in the fœtus. It conveys a large portion of the blood sent into the trunk of the pulmonary artery directly into the aorta.



b b. The ventricles of the heart.
c c. The places from which the auricles have been cut away.
d. The root of the aorta, with (*e e*) its branches.
g. The pulmonary artery.
i. The right branch of the pulmonary artery.
k. The left branch.
m. The *ductus arteriosus*, running from the pulmonary artery to the aorta, which it joins at *n*.
o o. The aorta, increased in size after the junction of the ductus arteriosus.

In this sketch the ductus arteriosus is unnaturally separated from the aorta, by pulling it down, and thus leaving the space (*a*) between them.

In the fœtus the ductus arteriosus will be found open, and filled with blood. After birth it becomes obliterated, and the duct itself becomes eventually changed into a ligament.* If, therefore, in any case, this duct is found permanently closed, it is a positive proof that the child has been born alive, and enjoyed it for a longer or shorter period. As, however, its closure does not take place sometimes till two or three weeks after birth, its being found open is no proof that the child was born dead. By Professor Bernt, however, it is urged that, as in the foramen ovale, a succession of changes takes place which may

* "In the adult it is so thoroughly obliterated, that by the most careful dissection we can shew no other vestige of it than a cordlike adhesion of the aorta and pulmonic artery."—Bell's Anatomy, vol. i. p. 465. (American edition.)

According to Meckel, the obliteration of the ductus arteriosus leaves behind it "a round solid cord, a line thick, and about four lines long."—Meckel's Anatomy, vol. ii. p. 374. Translated by A. S. Doane, M.D.

sufficiently mark the various intervals which have elapsed between them and the birth of the child; and upon these he has founded another test in cases of infanticide to which he attaches great value. According to Dr. Bernt, in the mature fœtus, before respiration, this duct is nearly half an inch long; its shape is cylindrical; its diameter is equal to that of the main trunk of the pulmonary artery, and more than double the capacity of the branches of that artery, each of which is equal to a crow-quill.

If the child has respired only a few moments, the ductus arteriosus loses its cylindrical shape; the part towards the aorta becomes contracted, and the whole duct assumes the shape of a truncated cone, the base of which is towards the pulmonary artery, and the apex towards the aorta; sometimes the contrary of this is observed.

If the child has lived for several hours, or for a day, it recovers its cylindrical shape, but is greatly diminished both in length and diameter. It is now not larger than a goose-quill, and not more than equal to one of the branches of the pulmonary artery. If it has lived for some days, or a week, the duct will be found wrinkled and shortened to the length of only a few lines, while its diameter is not larger than that of a crow-quill; at the same time the diameter of the branches of the pulmonary artery will be found increased to that of a goose-quill. Finally, the perfect closure of the duct does not take place until after the lapse of several weeks, or months.*

If, therefore, *the ductus arteriosus be found cylindrical in its shape, and not contracted towards the aorta, and if it equal in size the trunk of the pulmonary artery*, the inference would be that the child was not born alive. On the other hand, if *the ductus arteriosus be contracted towards the aortal end, and if its size be much less than the trunk of the pulmonary artery*, the inference would be that the child had been born alive.

With the view of testing the correctness of the observation of Bernt, some experiments were instituted by Orfila, and of the eight cases which he details only four were found to confirm them.

In one case, of a mature stillborn male fœtus, the ductus arteriosus was found only *half the size of the trunk of the pulmonary artery*, —it was cylindrical, half an inch long, and about as large as one of the branches of the pulmonary artery.

In a second case, of a male fœtus eight months old, born dead, the

* "1. Si *paucula momenta* recens nati exstiterint, aortam descendentem versus sphæroides, paulo post mutata figura cylindracea, apparuit conus truncatus, basim cordi, apicem aortæ descendenti, aut contra, obvertens.

"2. Si *plures horas diemve* vitam retinuerint, denuo formam cylindraceam, ast longitudinem et latitudinem imminutam, diametrum caulis pennæ anserinæ, adeoque diametro trunci arteriarum pulmonalium longe minorem, et illi *arteriarum binarum pulmonalium* fere parem exhibuit.

"3. Si vitam *ad plures dies septimanamve* perduxerint, canalis jam rugosi longitudo ad lineas aliquot, crassities ad diametrum pennæ corvinæ coarctata, diameter vero *arteriarum pulmonalium* ad crassitudinem caulis pennæ anserinæ aucta conspicitur.

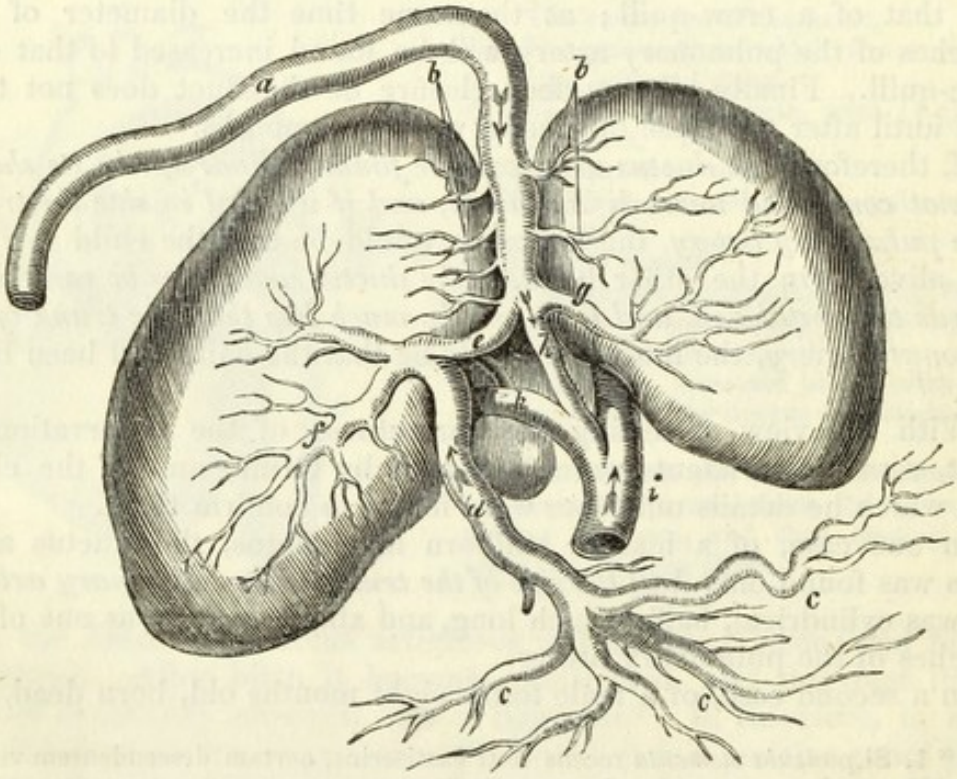
"4. Pœnitus autem occlusus ductus hic multo serius et incerto hebdomadum mensiumve numero deprehenditur."—Experimentorum Docimasiam Pulmonum, &c. Præfatio, pp. 15, 16.

ductus arteriosus was found not quite *half the size of the trunk of the pulmonary artery*,—larger than the right, and much larger than the left branch of that artery.

In a third case, of a mature female infant which had lived five hours, the ductus arteriosus, so far from being cylindrical, was found dilated at its middle part, and its extremity towards the aorta much larger than that towards the heart,— it was eight lines in length, and considerably diminished in size. The trunk of the pulmonary artery was sensibly larger than the left branch of that artery, but scarcely equalled in size the right branch of this vessel.

In the fourth case, a female infant of full age, having lived nineteen days, the ductus arteriosus was only three lines in length, cylindrical, its size three times less than that of the trunk of the pulmonary artery, a little less in size than the right branch, but much larger than the left branch of that artery.*

In four other cases of infants at full age, two of whom were born dead, it was found that the ductus arteriosus corresponded with the statements of Professor Bernt.



a. The umbilical vein.
b. Branches given off to the substance of the liver.
i. The vena cava ascendens.
h. The *ductus venosus*.
k k. The hepatic veins.
d. The vena portæ, formed by the junction of the abdominal veins, *c c c*.
e. The cylinder of the vena portæ, being its great right branch, where it lies in the transverse fissure.
f. The right branch of the vena portæ in the liver.

* Leçons de Médecine Légale. Par M. Orfila. Vol. i. pp. 388,389. (Second ed.)

From the foregoing, therefore, it would seem that, however correct the observations of Bernt may be as a general rule, yet they are not to be considered as *invariably and universally so*,—a fact continually to be borne in mind in their application to cases of infanticide.

The *ductus venosus*. This is a vessel lodged in the posterior part of the longitudinal fissure of the liver. It comes off directly from the umbilical vein, and opens with the venæ hepaticæ into the vena cava ascendens. It is large enough to admit a common sized probe, which can easily be introduced into it through the umbilical vein. Through this vessel, a portion of the blood passing through the umbilical vein goes directly to the cava, and then to the heart.

In the fœtus anterior to respiration the ductus venosus is always found open, and containing blood. In the child which has respired for a certain length of time, on the contrary, it will be found collapsed, and empty of blood. The whole vessel, after a certain time, becomes impervious, and is finally converted into a ligament. The period at which this final change takes place varies very much in different cases. In twenty infants who had lived three days, the ductus venosus was found empty and obliterated.* Generally speaking, this vessel is obliterated before the ductus arteriosus or the foramen ovale. The only inferences that can be drawn from the ductus venosus are these: if it be obliterated, it is a proof that the child has lived and respired; on the contrary, as it remains open a day or two at least after birth, its being found open is no proof that the child was born dead.

The *umbilical vessels*. These consist of two arteries and a vein. The former (the arteries) are nothing more than continuations of the iliac arteries. They mount up along the sides of the urinary bladder, and go directly to the umbilicus, through which they pass, forming with the vein the umbilical cord. These are the *umbilical arteries*, and they carry the blood of the fœtus to the placenta. The latter (the *umbilical vein*) carries the blood from the placenta to the fœtus. It enters the fœtus at the umbilicus, and goes upwards and backwards to the great fissure of the liver. After birth these vessels become gradually obliterated, and converted into ligaments. The period at which this obliteration takes place varies in different subjects: It takes place, however, sooner than that of any other of the fœtal openings. In twenty cases of infants who died on the third day, they were in all found obliterated; anterior to this they are open. The only inference, therefore, that can be drawn from finding them closed is that the child has been alive; at the same time, their being open is no proof that the child was born dead.

With regard to the whole of the changes which take place in the circulation after birth, M. Billard has made a number of exceedingly interesting and important observations, which deserve to be recorded.

Children of one day old. In eighteen children of this age fourteen had the *foramen ovale* completely open; in two its obliteration had commenced; and in the remaining two it was completely closed, and passed no blood. In the same infants, thirteen had the *ductus arte-*

* Leçons de Médecine Légale. Par M. Orfila. Vol. i. p. 384. (Second edition.)

riosus open, and full of blood; in four its obliteration had commenced; and in one it was completely obliterated, This last was one of the two that had the foramen ovale completely closed. The *umbilical arteries* were open quite to their insertion in the iliac arteries; their calibre, however, was diminished by a remarkable thickening of the coats. In all these children the *umbilical vein and the ductus venosus* were open, and the latter vessel generally gorged with blood.

Children of two days old. In twenty-two infants of this age fifteen had the *foramen ovale* quite open; in three it was almost obliterated; and in the remaining four entirely closed. In thirteen of the same children the *ductus arteriosus* was open; in six the obliteration was commenced; and in three it was complete. In all of the twenty-two the *umbilical arteries* were obliterated to a greater or less extent. The *umbilical vein* and *ductus venosus*, though empty and flat, could yet be passed with a probe of considerable size.

Children of three days old. In twenty-two infants of this age fourteen had the *foramen ovale* still open; in five the obliteration had commenced; and in the remaining three it was complete. In fifteen the *ductus arteriosus* was still free; in five the obliteration had commenced; and in only two was it complete. These two were of the three which had the foramen ovale closed. In all the twenty-two the *umbilical vessels* and *ductus venosus* were empty, and even obliterated.

Children of four days old. In twenty-seven infants of this age seventeen had the *foramen ovale* still open; and in six of these this opening was very large, and distended with a great quantity of blood; in eight the obliteration was commenced; and in two complete. In seventeen the *ductus arteriosus* was still open; in seven the obliteration had commenced, and, indeed, consisted only of a very narrow passage; in the three remaining the obliteration was complete. The *umbilical arteries* were in almost all obliterated, even to the umbilicus, but were yet capable of being dilated, almost up to their insertion into the iliacs. The *umbilical vein* and the *ductus venosus* were completely empty, and very much contracted.

Children of five days of age. In twenty-nine infants of this age thirteen had the *foramen ovale* yet open, although the opening did not exist in the same degree in all (in four of them its size was large, and in the nine others moderate); in six the obliteration was complete; and in the remaining ten almost complete. In fifteen of these twenty-nine the *ductus arteriosus* was found open; in ten of them very freely so; and in the other five the obliteration was very much advanced. In seven this canal was completely obliterated, while in the remaining seven it was nearly so. In all the *umbilical vessels* were completely obliterated.

Children of eight days of age. In twenty children of this age the *foramen ovale* was completely shut in eleven, incompletely so in four, and open in five. In three the *ductus arteriosus* was not obliterated; in six it was almost entirely obliterated; and in eleven the obliteration was complete. In fifteen the *umbilical vessels* were obliterated: the remaining five were not examined.

In children at more advanced ages. In the most of these the fœtal

openings are obliterated; nevertheless, the *foramen ovale* and the *ductus arteriosus* may be found open as late as twelve or fifteen days, and even three weeks, without any particular accident happening during its life to the child.*

From these observations the conclusions may be drawn,—1. That the fœtal openings are not obliterated immediately after birth. 2. That the period at which they are obliterated is extremely variable. 3. That most commonly the foramen ovale and the ductus arteriosus are obliterated towards the eighth or the tenth day. 4. That the order in which they are obliterated is the following, viz., the umbilical arteries obliterate first, then the umbilical vein, the ductus venosus, the ductus arteriosus, and, finally, the foramen ovale. 5. That their obliteration proves that the child was born alive. 6. That it is impossible to infer from the fact of their not being obliterated that the child has not respired, since it has been shewn that the obliteration is very far from being made immediately after birth.†

The *umbilical cord.* This is the last peculiarity of the fœtal circulation which requires notice. After the birth of the child and the division of it from the placenta, it is well known that, after some days elapse, the cord separates from the child, and drops off. If, therefore, in examining a case, it be found that the cord has separated in the usual way, it is a proof that the child must have enjoyed life. As, however, the separation of the cord takes some days, it is obvious that its presence is no proof that the child was not born alive. As in the case of the foramen ovale and the ductus arteriosus, it has been supposed, however, that the successive changes which the umbilical

* In some cases these openings have remained for a much longer period. Mr. Burns relates the case of a person who lived to the age of between forty and fifty, in whom, on dissection, both the *foramen ovale* and the *ductus arteriosus* were open. The former was equal in size to the barrel of a goose-quill, while the latter was equal to that of a crow-quill. From the age of three years, till his death, he was incessantly harassed with paroxysms of difficult breathing, cough, and discoloration of the skin. These became more and more frequent, and he eventually died of œdema and exhaustion.—Observations on some of the most frequent and important Diseases of the Heart, &c. By Allan Burns, Lecturer on Anatomy and Surgery. P. 17. 1809.

Corvisart relates the case of a postilion who died at the age of forty-seven, in consequence of local injuries which he received, in whom, on dissection, the *foramen ovale* was found open, and more than an inch in diameter. The *ductus arteriosus* was transformed into ligament.—An Essay on the Organic Diseases and Lesions of the Heart and Great Vessels. By J. N. Corvisart. P. 209. (American edition.)

A similar case is quoted by the same author from Morgagni, of a girl who died at the age of seventeen, in whom the *foramen ovale* was open, and large enough to admit the little finger.—Ibid. p. 229.

By Dr. Perkins a case is related of a child eleven months old, in whom, on dissection, the *foramen ovale* and the *ductus arteriosus* were both found open.—New York Medical and Physical Journal, vol. ii. p. 444.

By Dr. R. K. Hoffman another case is recorded of a child who lived to the age of nine months, and in whom, on dissection, the *foramen ovale* was found open.—Ibid. vol. vi. p. 250.

Another case is recorded in which the *foramen ovale* was found open in a man who died at the age of sixty.—American Journal of Medical Sciences, vol xv. p. 223.

† Traité des Maladies des Enfans, &c. Par C. M. Billard. Pp. 476–480. Also Leçons de Médecine Legale. Par M. Orfila. Vol. i. p. 387. (Second edition.)

vessels undergo from birth until their final separation might afford some indication of the length of time during which life had existed. M. Billard was the first person who properly investigated these changes. The first of these changes he denominates a *withering* of the cord. This is the incipient stage of the process of desiccation, and varies in its commencement from five hours to three days after birth. Of eighty-six infants, sixteen had the cord a little withered: and of these sixteen, one was five hours old, six were a day old, four were two days old, and four were three days old. In these cases the cord was soft, a little bluish, very flexible, filled entirely the knot of the ligature, and the cut surface was still clean. Thus the withering of the cord may take place from the first to the third day after birth.

The next change which the cord undergoes is that of *desiccation*, or *drying*. The cord now becomes of a reddish brown colour; is flattened and shrivelled; its vessels are obliterated, and it becomes tortuous and dry. This process varies in its commencement from one and two days to four days after birth. Out of eighty-six infants, twenty-four had the process of desiccation commenced; of these seven were only one day old, eleven were two days old, three were three days old, and three were four days old. In all these the cord was blackened, shrivelled, and was loose in the ligature. The period at which the desiccation is complete varies from one to five days after birth. The general period, however, is about the third day. Out of eighty-six infants, twenty-five had the cord entirely dry: of these one was one day old; one, a day and a-half old; five were two days old; nine, three days old; four, four days old; five, five days old.

By M. Billard this desiccation is considered as a vital process, and his reasons are, in *the first place*, that the portion of cord beyond the ligature, or that which is attached to the placenta, does not undergo this process of desiccation, but decomposes and putrefies like any other dead matter, while the part of the cord between the ligature and the abdomen alone undergoes desiccation — a process entirely different from ordinary putrefaction. And, in *the second place*, that the cord ceases to desiccate as soon as life ceases; that it does not desiccate at all in the fœtus which is born dead; that on the dead subject the cord undergoes a real putrefaction, which is altogether different from this desiccation.*

The inferences drawn by Billard from the whole of his observations are the following:

1. The desiccation of the umbilical cord takes place during life only.

2. At the moment of death this desiccation is completely suspended, or considerably diminished.

3. If the cord be fresh, or commencing to wither, the infant may either have been born dead or have lived only a short time.

4. If the cord has either commenced desiccating or be completely desiccated, the infant has lived at least one day.†

* Traité des Maladies des Enfans, &c. Par C. M. Billard. P. 16. New York Medical and Physical Journal, vol. vi. pp. 303, 304.

† Billard states that in fœtal subjects brought in for the purposes of dissection,

The next change which the cord undergoes is that of *separation, or dropping off.* The period at which this takes place after birth varies very considerably. In sixteen children examined by Billard, in whom the cord had separated, three were two days old; three, three days old; six were four days old; three were five days old; one, six days old; one, seven days old.* From the fourth to the fifth day after birth, then, would appear to be the ordinary period at which the cord falls off, although it sometimes happens sooner, and sometimes later. Generally, then, the cord *withers* during the first day, at the end of which *desiccation* commences; desiccation is complete on the third day, and between the fourth and fifth day the cord *drops off.* All this, of course, is merely general, being liable to numerous variations and exceptions.

Before dismissing the subject of the umbilical cord there is another phenomenon which requires to be noticed. Anterior to the dropping off of the cord there is observed *a red or inflammatory circle around its attachment to the umbilicus;* and by many this has been supposed to be an evidence of vital action, and, of course, that the child must have been born alive. In relation to this sign, it is to be recollected that it is by no means invariably present. Indeed, according to the observations of Billard, it would seem to be more commonly absent. Out of eighty-six children he found only twenty-six who exhibited evident traces of this inflammatory circle.† Its absence, therefore, is by no means to be looked upon as an evidence that the child was not born alive.

Cicatrisation of the umbilicus. This is the last change which these parts undergo; and the period at which it takes place, is from the tenth to the twelfth day after birth.

The foregoing investigations in relation to the successive changes in the umbilical cord, are important not merely to establish the fact, of a child's having been born alive, but to determine how long it lived after birth.

he always observed that they may be kept for several days without any drying of the cord. The cord even remains sufficiently soft and its vessels sufficiently open to permit of their being injected. During life, on the other hand, the cord desiccates and the vessels become obliterated from the first, second, or third day. For the purpose of testing these facts, he preserved a number of dead bodies of children for several days. The cord did not desiccate, but remained soft and flexible, even to the fourth and fifth day, and then it fell into a state of putridity. He also succeeded in injecting, by the umbilical cord, at the end of four days, the body of a stillborn child. The cord here was not the least desiccated, and was only very soft. —Billard, p. 21.

When the umbilical cord is left to undergo putrefaction it becomes greenish white; after that it puckers at its extremity; the cuticle of the cord is easily separated, although the cord itself does not separate from the abdomen as it does during life. The cord can be torn in different places; and if it has been in water for some time it is soft and very fragile. Billard has never seen the cord of a child born dead dried up before the fifth or sixth day, and in this case it preserves its circular form, and even its suppleness, for a considerable time. According to the observations of M. Billard putrefaction of the cord never occurs until this process has commenced in other parts of the body. The cord, therefore, is never affected in this way until the abdominal parietes have turned green, and the different organs are in a state of decided decomposition.—Billard, pp. 23, 24.

* Ibid. p. 26. † Ibid. p. 29.

(*c.*) *The distribution of the blood in the different organs of the body.* From what has been already stated, it appears that there is a very striking difference in the mechanism of the heart and blood-vessels of the fœtus and those of the child after birth. A difference, therefore, in the general distribution of the blood itself in these two cases, would seem to be a very natural consequence; and such, indeed, is the fact.—This difference is especially observed in two organs, the *lungs* and the *liver*, each of which requires distinct examination.

1. *The lungs.* From the peculiarity of the vascular system in the fœtus, only a very small portion of the blood goes the round of the pulmonary circulation, the greater part passing directly through the foramen ovale, and the ductus arteriosus. In the fœtal state, therefore, the pulmonary blood-vessels are small, and contain scarcely any blood. As soon, however, as respiration is established, all this is changed, and then the whole mass of blood passes through the lungs for the purpose of undergoing the process of oxygenation. The pulmonary blood-vessels, accordingly, now become distended, and filled with blood. If, therefore, on examining any case, the blood-vessels of the lungs are found to be filled with blood, it is a proof that the child has enjoyed life; and, on the contrary, if they are found empty of blood, it is a proof of the child's not having enjoyed life. The means of ascertaining whether the pulmonary blood-vessels are in one state or the other, are the two following:

(*a.*) *Making incisions with a knife into the substance of the lungs.* In the one case, a free effusion of blood follows the incision; in the other case, little or no blood follows.

(*b.*) *Ascertaining the actual weight of the lungs.* When the lungs have a large quantity of blood circulating in them, it is very evident that they must weigh much more than when they do not have this blood circulating through them. As soon, therefore, as the blood ceases to circulate through the foramen ovale and the ductus arteriosus, and passes through the lungs, the weight of these latter organs must be increased, and just in proportion to the increased quantity of blood circulating in them. This, of course, is ascertained by simply weighing them. This is what is generally known by the name of the *static test.* To make this available, however, it is very obvious that some standard weight of the lungs in these two states must be fixed upon, otherwise, no conclusions in any individual case can safely be drawn. Now, to establish such a standard, one of two modes may be adopted, viz. either to take the average weight of a certain number of lungs, and let that be the standard, or to compare the weight of the lungs in the two cases with the weight of some third body, and thus ascertain the relative difference between them. Both of these modes have been recommended by different individuals, and to test their accuracy, numerous experiments have been made.

With regard to the former of these modes, the first great object is to settle what is the greatest weight to which the *fœtal* lungs ever attain. This being established, of course, whenever the lungs go beyond this weight, it is evident that respiration has taken place.

By Schmidt, the extreme weight of the fœtal lungs, which they never exceed, is fixed at 1170 grains. Professor Bernt supports the observations of Schmidt. In twenty-four cases of stillborn children, the greatest weight of the lungs, exclusive of a case of tubercles, was 993 grains; the medium was 550 grains. By Chaussier, it has, however, been established, that the fœtal lungs do occasionally weigh more than this. "Among 104 cases of stillborn children, he found the weight of the lungs greater than 1170 grains in five cases; it was 1173 in one, 1282 in a second, 1297 in a third, 1343 in a fourth, and 1637 in a fifth." Now, it has been ascertained, that in a large proportion of cases, the lungs of children which have actually respired, do not weigh as much as is here stated. Out of twenty-five cases of children that had breathed, reported by Schmidt, only four had their lungs weighing more than 1170 grains; out of thirty-seven similar cases by Bernt, only three weighed more. As to the extreme weights from the cases of Chaussier, leaving out of view the last (1637 grains), which may be considered as an extraordinary case, and an exception to a general rule, it is very rare that the lungs of a child which has breathed weigh more than 1343. In thirty-seven cases of this kind, only three had the lungs weighing more.*

From all this, it is evident that this form of the static test can be applicable only in a very limited number of cases. Where the weight of the lungs exceeds the standard here laid down, it furnishes conclusive evidence of respiration; but as this is not the case in a large proportion of cases, the evidence deduced from it can only be comparative and presumptive.

The other mode of applying the static test, is that which is commonly known under the name of the person who first proposed it, M. Ploucquet. As this is a test of much celebrity, it requires special notice.

Ploucquet's test. This test was first announced in 1782, and is founded on the relative weight of the lungs to that of the whole body. From experiments made by M. Ploucquet, he drew the general conclusion, that the weight of the lungs before respiration is one-seventieth of the weight of the whole body; while after respiration has commenced, it amounts to one thirty-fifth; or, in other words, that the blood introduced into the lungs in consequence of respiration, doubles their absolute weight.

Beautiful and decisive as this test appears to be, and correct as the general principle upon which it is founded certainly is, objections

* See on this subject an admirable review, written, I presume, by Professor Christison, in the Edinburgh Medical and Surgical Journal, vol. xxvi. p. 376.

Arrowsmith proposes 1000 grains as the extreme weight. He says, "when the fœtal lungs, being naturally formed and of healthy structure, exceed 1000 grains, such weight may be considered as constituting decisive proof that the floating of the lungs and their loose and expanded appearance, do not result from insufflation practised on a dead child, but must be a consequence of the continuance of respiration and of the circulation of blood through them, and therefore of life; and even if the weight exceed in any considerable degree 550 grains, the same inference is a reasonable presumption." — Cyclopædia of Practical Medicine, vol. ii. p. 689.

of a very serious character have been brought against it. For the purpose of shewing to what confidence it is entitled, it may be proper to notice some of the more important objections.

Examination of objections. a. There is no fixed proportion between the weight of the lungs and the weight of the body.

An appeal to facts and experiments must, of course, determine the value of this objection. It seems to be conceded on all hands, that M. Ploucquet deduced his theory from a very limited number of experiments. In one child born dead, he found the comparative weight of the lungs to the body to be as 1 to 67; in another, as 1 to 70; in a third, which had been born alive, it was found to be as 2 to 70 or as 1 to 35. These were all the experiments which he had made, when he promulgated the general conclusion which he drew from them. As might naturally be expected from the novelty and importance of the subject, it has since then attracted the attention of the ablest medical jurists, and their researches have tended very materially to diminish the confidence originally placed in this test. The most extensive experiments yet made on this subject, were those conducted by M. Chaussier at Paris, and M. Schmitt at Vienna. The following are the results of some of their observations:

Experiments on the bodies of infants who had respired.						*Experiments on the bodies of infants who had not respired.*					
M. Schmitt.			M. Chaussier.			M. Schmitt.			M. Chaussier.		
Weight of the body.	Weight of the lungs.	Proportion between the weight of the lungs and the body.	Weight of the body.	Weight of the lungs.	Proportion between the weight of the lungs and the body.	Weight of the body.	Weight of the lungs.	Proportion between the weight of the lungs and the body.	Weight of the body.	Weight of the lungs.	Proportion between the weight of the lungs and the body.
Gram.	*Gram.*	*Gram.*	*Gram.*	*Gram.*	*Gram.*	*Gram.*	*Gram.*	*Gram.*	*Gram.*	*Gram.*	*Gram.*
1012	35	1 to 29	1025	38	1 to 28	659	18	1 to 36	650	6	1 to 108
1065	31	34	1040	32	34	873	22	39	900	19	48
1091	66	16	1100	25	44	1065	70	16	1051	21	50
1099	35	31	1163	17	43	1361	36	37	1400	60	23
1222	31	39	1224	46	26	1572	39	40	1591	38	42
1257	18	70	1250	41	31	1577	33	47	1625	66	25
1466	28	52	1469	25	59	1915	41	44	1900	52	37
1518	31	48	1520	39	39	2090	35	59	2080	48	43
1863	43	43	1850	43	43	2177	32	67	2200	37	69
1968	22	87	1953	81	63	2221	28	79	2250	87	26
2002	54	37	2000	72	28	2352	54	43	2350	44	54
2160	57	38	2150	60	36	2589	74	34	2570	30	86
2366	46	51	2360	38	62	2648	43	61	2650	47	56
2404	36	66	2400	74	32	2758	35	79	2750	74	37
2491	70	35	2490	97	26	2981	44	67	2950	48	62
2758	87	31	2750	93	28	3102	70	44	3100	57	55
2893	49	59	2900	54	54	3312	61	54	3324	41	81
2998	70	42	3000	113	27	3451	49	70	3350	54	62
3207	61	52	3250	65	50	3502	61	54	3600	50	72
3294	80	41	3300	75	44	3660	57	64	3672	41	90
3731	75	49	3650	105	35	4150	50	83	4161	83	50
4150	105	39	4040	42	96	4185	83	50	4300	106	41
Mean propor. $42\frac{528}{1130}$					$39\frac{100}{1223}$	Mean propor. $52\frac{80}{1033}$					$49\frac{9}{1103}$*

b Even admitting that there is a fixed proportion between the weight of the lungs and the body, it is very different from that of M. Ploucquet.

This objection is certainly supported by the experiments of Schmitt

* Dictionnaire des Sciences Médicales, Art. *Docimasie Pulmonaire*—and a translation of the same in the Western Quarterly Reporter, No. 4.

and Chaussier already recorded, as also by those of Hartmann. This latter physician makes the proportion to be, in an infant which has not breathed, as 1 to 59; and in one which has breathed, as 1 to 48.

c. A third objection to this test is, that an excessive congestion of blood might occur in the lungs of a fœtus that had never respired, which should render them equal in weight to the lungs of a fœtus which had respired.*

To this M. Ploucquet himself replies, that it is not possible for such a congestion to take place in lungs that have never respired, as shall render their weight equal to that consequent upon respiration; because the foramen ovale and the canalis arteriosus offer so easy a passage to the current of blood, even when flowing with the greatest rapidity, that no determination of consequence can exist towards the pulmonary vessels.

d. A fourth objection has been drawn from the alteration produced by putrefaction, in the relative weight of the lungs and body.

On this, Professor Mahon remarks, "that this may be the case if the putrefaction be very great; but then the fœtus cannot be subjected to any examination upon which a medico-legal decision can be founded. But if the putrefaction has not advanced far, as the lungs resist its effects longer than any other part, we may try the application of the proposed test, to corroborate the results afforded by the hydrostatic trials." †

The following observations and experiments have been instituted by myself, with the view of ascertaining the validity of this test:—

Obs. 1. In a male child in whom the respiration had been complete, the relative weight of the lungs and body was as 1 to $35\frac{2}{7}$.

Obs. 2. In a female child, which had respired perfectly, the proportion was as 1 to $37\frac{1}{2}$.

Obs. 3. In a male child, born alive, but both body and lungs in a state of incipient putrefaction, the proportion was as 1 to $46\frac{1}{3}$.

Obs. 4. This was a fœtus which had reached about the fifth month, and was judged to have been dead in the uterus about six days before delivery, owing to an accident which had happened to the mother. It was at present in a state of incipient decomposition; the lungs, however, were perfectly sound. The proportion between the weight of the lungs and the body was as 1 to 29.

Obs. 5. A fœtus between the fifth and sixth month, in a state of decomposition—the lungs sound. The proportion here was as 1 to $39\frac{5}{7}$.

Obs. 6. In a male fœtus between the seventh and eighth month, which had not respired, the proportion was as 1 to 62.

Obs. 7. In a male child which had respired perfectly, as 1 to 44.‡

Upon the whole, with regard to the general value of Ploucquet's test, it must be conceded that, in itself, it furnishes no conclusive evidence; as presumptive evidence, however, and when used for the corroboration or correction of other tests, it may be of great value.

* Mahon, vol. ii. p. 454. † Ibid.

‡ To those who may wish to investigate this subject still further, I must refer to the four hundred experiments detailed in Considérations Médico-légales sur l'Infanticide. Par A. Lecieux. P. 44.

Relative weight of the heart and lungs. From the degree of uncertainty hanging around the test of Ploucquet, Orfila was inclined to believe that a more definite proportion might exist between the weight of the *heart* and the *lungs*, and that this might serve as a test in these cases. He immediately put it to the test of experiment. For this purpose, he took the bodies of several fœtuses, and, having weighed them accurately, took out the heart and lungs, and cut off the venæ cavæ and pulmonary veins, as well as the pulmonary artery and aorta, as near as possible to these organs. He then opened into the heart, to let out all the blood which it contained. After this, having washed them, he weighed them separately. The results were the following:

Age of fœtus.	Duration of respiration.	Weight of the body.	Weight of the heart.	Weight of the lungs.	Proportion between the weight of the heart and lungs.
		Gram.	*Gram. c.*	*Gram. c.*	
At full time	36 hours	2280	13 5	40 5	3
———	4 days and 2 hours	2000	10 5	50	$4\frac{4}{5}$
———	8 hours	2650	19	50	$2\frac{8}{5}$
———	3 days	2700	15	59	$3\frac{14}{15}$
———	2 days	2800	16 5	87	$5\frac{1}{4}$
At eight months	9 days	1700	9 5	66	7
At seven months	4 days	1450	9 5	54 5	$5\frac{7}{9}$
At six months and a half	2 hours	800	5	24 2	5
At full time	Died during delivery	2305	14	33	$2\frac{3}{5}$
———	Born dead	3100	17 5	38	$2\frac{1}{5}$
———	———	2200	9	36	4
———	Died during delivery	2900	15 5	29	$1\frac{13}{15}$
———	———	1750	17	35	$2\frac{1}{17}$
At eight months	Born dead	1840	21 5	61	3
At seven months and a half	———	1650	8	26	$3\frac{1}{4}$
At seven months	———	1270	5	25 3	5

From these and other similar experiments, Orfila drew the conclusion that the relative proportion between the weight of the heart and the lungs was too inconstant and uncertain to draw any just inferences as to the fact of respiration having taken place.*

2. *The liver.* Next to the lungs, the liver shews in the most striking manner the change which has taken place in the distribution of the blood after birth. It is a fact well known that, previous to the birth of the fœtus, the liver is much larger than it is afterwards. From the changes which take place in the circulating system immediately upon the commencement of respiration, the cause of this diminution in the size of the liver becomes very obvious. It has already been stated that, prior to respiration, the lungs have scarcely any blood circulating through them; hence they are small and collapsed. As soon, however, as respiration is established, the pulmonary vessels become charged with blood; the lungs are consequently much enlarged, and their actual weight greatly increased. Now there is no question that this blood is chiefly derived from the liver, and to this cause must its

* Leçons de Médecine Légale, vol. i. p. 349. (Second edition.)

lessened size be principally attributed. Besides supplying the lungs with blood, there is another beneficial purpose answered by this diminution of the liver. If the lungs become enlarged and dilated, it is evident that the cavity of the chest must also be proportionably augmented, to enable them to perform their functions without restraint or injury. By the diminution of the liver this is most effectually accomplished, inasmuch as by it the cavity of the abdomen is thus lessened, and the descent of the diaphragm facilitated.*

If this be a correct exposition of the reciprocal relations of the fœtal lungs and liver, it appears to me that an examination of the state of the *liver* must throw considerable light upon the question of a child's having been born alive.

If the size of the liver in the fœtal state be owing to the large supply of blood which it then receives, and if it uniformly loses a portion of this blood after respiration commences, it strikes me that a comparison of the weight of the liver before and after respiration, with the weight of the whole body, would assist us very materially in deciding whether a child had been born alive or not. The *principle* upon which the proposed test is founded is certainly just, and in practice it would not be liable to more serious objections than that of M. Ploucquet; on the contrary, it might serve in all cases to prove the accuracy of this latter test. To exemplify—if by the application of the test of Ploucquet in a case of supposed infanticide, it should be found that the lungs had acquired the weight of those of a child that had respired, and if by a subsequent examination of the liver it should appear that this organ had lost none of its fœtal blood, then there would be just ground for suspecting that the increased weight of the lungs was owing not to respiration, but to some other cause. On the other hand, if experiments upon the liver should indicate that respiration has taken place, while the lungs themselves exhibit no sign of it, then the diminished weight of the liver must be attributed to some other cause, and no possible error could arise from this source. If, however, experiments both upon the liver and the lungs coincide in supporting the same opinion, who will deny that this concurrence of different tests would add greatly to the force and conclusiveness of the testimony.

By no writer on forensic medicine that has fallen under my examination has this test been suggested; and I throw it out at present, in the hope that it may attract the attention of inquirers on this interesting subject.†

(*d.*) *The presence of ecchymosis or extravasation of blood on the body of the child.* This is the last sign to shew that the blood has

* For a very able and satisfactory account of the state of the fœtal liver see the paper of Mr. Bryce, published in the Edinburgh Medical and Surgical Journal for January 1815.

† This was originally suggested twelve years ago; and, for obvious reasons, I leave it precisely in the form in which it was then written. Since then I find this subject has attracted the attention of foreign writers. Professor Bernt, of Vienna, has more especially noticed it; and in his *Centuria Experimentorum* has in all cases reported the weight of the liver. It does not appear from these reports, however, that any general and satisfactory proportion between the weight of the body and

circulated after birth. The characteristics of true ecchymosis are slight tumour of the part, a peculiar and variegated discoloration of the skin,* produced by a rupture of the small vessels of the part, and a consequent effusion of blood into the surrounding cellular tissue. They are produced by blows or other injuries, and when present they prove that the blood was still circulating in the body when the injury which produced them was inflicted. Injuries applied to a child in whom the circulation has ceased are not followed by such phenomena. Professor Mahon mentions another possible cause of such extravasations, which should not be overlooked. He says they may result from putrefaction, which, by means of the air that is generated, bursts the veins, and then blood from very distant parts of the body is insensibly carried along to this outlet, so as to form a considerable extravasation.†

that of the liver before and after birth can be established. Orfila has collated some of these cases, and gives the following results.

Dead before or after birth.	Weight of the body.	Weight of the liver.	Proportion between the weight of the liver and body.
	lb. *oz.* *dr.*	*oz.* *dr.* *gr.*	
Stillborn	6 2 0	4 0 70	24
do.	5 0 0	4 2 46	18
do.	5 6 0	5 1 15	19
do.	5 13 4	4 3 48	21
do.	6 0 0	6 0 60	15½
do.	6 2 2⅓	5 5 70	17
Having scarcely respired	4 12 0	4 0 11	19
do.	5 14 4	4 6 24	20
do.	5 15 4	5 6 18	16½
do.	5 13 4	3 1 52	29
do.	4 6 0	3 6 18	19
do.	5 7 0	5 0 2	16½
Having respired more	5 4 0	4 2 34	19½
do.	5 8 4	4 5 52	18½
Respiration perfectly established	4 12 4	3 3 60	22
do.	5 0 4	8 1 13½	10
do.	4 15 0	4 0 11	19½
do.	5 13 4	4 3 13	21
do.	5 4 0	3 4 33	23½
do.	6 8 6	6 2 71	16½
do.	7 11 0	9 4 61	13
do.	5 10 4	5 6 35	15½

These results, according to Orfila, shew conclusively, 1. That the weight of the liver was much more considerable in many infants in whom respiration had been completely established than in those who were stillborn. 2. That the proportion between the weight of the body and that of the liver was often much less in those cases where respiration had been perfectly established than in those who had not respired, which ought to be just the reverse, according to this test.—Leçons de Médecine Légale. Par M. Orfila. Vol. i. pp. 393, 394. (Second edition.)

* When a patient lives throughout the course of an ecchymosis, the changes of colour which it undergoes are the following. At first there is a spot of a red or bluish colour formed in consequence of the extravasation of blood into the surrounding cellular tissue; shortly after it assumes a deep leaden or livid hue; and it then changes successively to a violet, green, yellow, and finally a citron colour. Usually, it is seven or eight days before it disappears entirely.

† Mahon, vol. ii. p. 389.

It could not certainly be very difficult to discriminate in a case of this kind; yet it teaches us a practical caution of some consequence, which is, to pay particular attention to those circumstances which tend to favour the process of putrefaction, as the climate, season of the year, and place where the body is found.

Having thus considered the various changes which take place in consequence of the blood having circulated after birth, I come next to notice those which follow as the consequences of respiration.

Proofs of the child having respired after birth.

The act of respiration constitutes the great distinguishing feature between adult and fœtal life. Its commencement is succeeded by changes and revolutions in the animal economy the most wonderful and interesting; and it is from these changes that we are to gain still further materials for determining the question, whether a child has been born dead or living. The points here to be investigated are, *the general configuration and size of the thorax; the volume of the lungs; the situation of the lungs; the colour of the lungs; the shape of the lungs; the consistency or density of the lungs; the specific gravity of the lungs; the shape and situation of the diaphragm; the condition of the intestines*, and *the state of the bladder*.

1. *The general configuration and size of the thorax.* On examining a child which has never breathed the thorax will be found flattened, and, as it were compressed. On opening into the thorax, too, it will be found that the general size of this cavity is exceedingly small; the diaphragm also rises high into the thorax. All this, of course, is owing to the small size of the fœtal lungs, and to their peculiar position in the cavity of the thorax. As soon as respiration takes place the lungs distend, and, as a consequence, the shape and size of the thorax is changed. Instead of being flat and compressed, the thorax is rounded and arched, and on opening into it the cavity will be found enlarged in all directions. The diaphragm, too, will be found depressed. If, then, the thorax be found flat and small, it is an evidence that the child has not respired, and *vice versâ*. As the ideas connected with the terms *flat* and *arched*, *small* and *large*, are, in these cases, in a great measure only relative and arbitrary, it was suggested by Daniel, for the purpose of greater accuracy, that the chests of a number of infants should be subjected to measurement, in order to establish a standard of size both before and after respiration. With this view he proposed that the circumference of the thorax should first be measured by a cord; then the height of it should be taken posteriorly, measuring along the dorsal vertebræ; and finally its depth, by taking the distance from the vertebræ to the sternum. Another mode is, simply to measure the diameter of the thorax from one hypochondrium to the other, and from the sternum to the vertebræ. It must be evident, however, that such measurements must be very uncertain in their results, owing to a great variety of unavoidable causes, such as the natural size of the child, &c.; and, therefore, the inferences drawn from them must inevitably lead, in many cases, to erroneous decisions. It is to be recollected that the thorax of a child is large or small, not so

much according to its own actual size as it is in proportion to the size of the child itself. For instance, in the body of a very small child the thorax may, nevertheless, be justly considered large, although much inferior in size to that of a child much larger. Hence any opinion formed from an examination and comparison of the thorax of different children must be exceedingly doubtful and uncertain. The best way after all, perhaps, is to trust simply to ocular inspection. A little experience in examining the appearance of different subjects will much better enable a person to decide correctly than by the plan proposed by Daniel.

2. *The volume or size of the lungs.* In the fœtal state, the lungs are comparatively small in size. As soon as respiration takes place, they become distended with air, and, of course, increased in volume. For the purpose of rendering the test drawn from the volume of the lungs more accurate and available, various modes have been proposed to ascertain the exact increase of volume in different cases. The only one which I shall notice, was proposed by Daniel.

Daniel's mode. This is founded upon the principle, that every solid body, plunged into a liquid, displaces as much of that liquid as the space which it occupies. If, then, a solid body be plunged into a vessel of water, it will cause the water to rise in the vessel just in proportion to the quantity which is displaced. It is upon this principle, that Daniel proposed that experiments should be made upon lungs that had not respired, as well as those which had respired, for the purpose of ascertaining the different heights to which the water would rise. In the case of lungs which had respired, it is evident that these organs would not sink. To obviate this difficulty, he recommends that they be placed in a wire basket, the volume of which is known, and which may afterwards be deducted from the volume of the lungs.* With regard to this test, however, it does not appear that any conclusions can be drawn from the *absolute* volume of the lungs which can be depended upon with any degree of certainty.

3. *The relative situation of the lungs.* Anterior to respiration, the lungs occupy a small space at the upper and posterior part of the thorax, leaving the pericardium and the diaphragm almost entirely, and sometimes completely, uncovered. If imperfect respiration has taken place, the lungs will be found occupying the lateral portions of the thorax also. If respiration has been complete, they will cover completely the sides of the diaphragm, as well as the arch of the diaphragm. Although some three or four cases are recorded by Schmidt,† which tend to weaken somewhat the force of this test, yet, in general, it is one of considerable value, and upon which much more reliance may be placed than upon the absolute volume of the lungs.

4. *Shape of the lungs.* In this respect, a striking and peculiar change takes place in some portions of the lungs in consequence of respiration. In the fœtal state, the lower margin of the left upper and

* Dictionnaire des Sciences Médicales. Western Medical Reporter, vol. i. p. 322.

† See Marc, in Dictionnaire des Sciences Médicales. Art. *Docimasie pulmonaire.*

right middle lobes are sharp and pointed, while after respiration has taken place, they become rounded and obtuse.

5. *The colour of the lungs.* In the fœtus, previously to respiration, the colour of the lungs is *brownish red.* After respiration has taken place they become of a scarlet or pale red, at least those parts of them which have been permeated by air. It is very evident that this test, though generally true, must necessarily be liable to a great many exceptions. Disease in this respect, modifies very greatly the appearance of the lungs. In cases, for instance, where children have died from sanguineous engorgement of those organs, notwithstanding respiration may have been going on for several days, the colour of the lungs will be of a dark brown. The action of the atmosphere upon the lungs, too, changes their colour frequently. Thus, if, on opening the chest, the lungs be found of a brown colour, they change speedily to a much lighter colour. In making observations, therefore, on the colour of the lungs, it is to be done with great caution. It is proper to state here, that according to the experiments of Bernt, artificial inflation of the lungs never produces the scarlet tint of natural respiration. If it cause any changes of colour, it is only a pale or grayish red.*

6. *Consistence or density of the lungs.* In the fœtus and anterior to respiration, the lungs are dense and solid, resembling very much the solidity of the liver; when cut into with a knife, they have no crepitation. After respiration, on the contrary, the lungs are soft and spongy; air bubbles may be squeezed out of them, and when cut into they crepitate. All these phenomena, of course, are owing, in the one case, to the absence, and in the other, to the presence of air in the pulmonary cells. This is a very striking and important test. There is, however, one difficulty attending its application, which requires to be noticed. As will be shewn hereafter, it is well established, that the lungs of a child which has never respired can be completely inflated with air, and in this case, the solidity of the lungs may become changed, very much in the same way, as if natural respiration had occurred. On cutting them with a knife, crepitation will also take place. It becomes necessary, therefore, to distinguish between these two cases. The modes of doing this will be fully pointed out directly, when speaking of the hydrostatic test. With regard to the crepitation which results from cutting into the lungs, the difference between them is, that when lungs which have actually respired are cut into, the incisions are followed by a greater or less flow of blood, while in artificial inflation this is not the case. From what has been already stated, the reason of this is perfectly obvious.

7. *Specific gravity of the lungs.* It is to Galen that we are indebted for the first notice of the changes effected in the lungs by respiration. "Ob eam causam," says he, "substantia carnis pulmonis ex rubra, gravi, densa, in albam, levem, ac raram, transfertur."† The knowledge of this fact was not, however, applied to the purposes of forensic

* Edinburgh Medical and Surgical Journal, vol. xxvi. p. 367.

† Opera Galeni de usu Part. lib. xv. cap. 6. pp. 145, 146.

medicine until after the lapse of several centuries. It seems to have first attracted attention a little before the time of Morgagni, who says, "I do not know whether any one ever thought of making the experiment on this account, except a few lustra before my age."* Even Zacchias and Parè, who may be styled the fathers of forensic medicine, pass over it in silence. Haller speaks of it particularly, and notices some of the difficulties attending its practical application: "Vixit certe puer, cujus pulmo aquis innatat, neque vitium subrepere potest, nisi vel in os inflatus aer fuerit, quod verum respirationis genus est, vel putredo, neque ea modica, tantum produxerit aeris, ut pondus specificum pulmonis, aliunde equidem aere exigua portione majus, aquæ pondere minus factum sit. Id modica putredo non efficit, major præstat. Neque tunc error in medici effato locum habet, si levi opera voluerit explorare, num et reliqua viscera natent. Id si viderit, non os in pulmonem per respirationem receptus causa erit natandi, sed aer ex humoribus carnibusque per communem legem putredinis expeditus."†

In the whole range of forensic medicine, there is not a question more important, and at the same time more difficult, than the one which relates *to the floating of the lungs as a proof of the child's having been born alive.* It has divided the opinions of medical jurists from the earliest periods, and even at the present day it still remains a subject of controversy. When it is recollected, how great and just an importance has been attached to it in trials for child-murder, and how embarrassing to courts and to juries have been the contradictory sentiments advanced concerning it by medical witnesses, the propriety of a lengthened investigation of the subject cannot be questioned.

For the purpose of rendering the subject as distinct as possible, I shall first state the test, and then consider the different objections which have been brought against its accuracy.

If the lungs of a child which has never breathed, be put into water, it is found that they are specifically heavier than the water, and of course sink. On the contrary, if respiration has once taken place, the lungs being specifically lighter than water, will then float. From these facts the general conclusion necessarily follows, that when the lungs of a child float in water, it must have respired, and therefore must have been born alive. And on the other hand, when they are found to sink, it is an evidence that the child has not breathed, and therefore was not born alive. This is commonly known by the name of the *Hydrostatic test.*

Let us now see whether it is safe to trust to the evidence furnished by this test, by considering the different objections which have been urged against it. These may be arranged under two divisions. The *first*, embracing those which go to shew that the lungs may float, and yet the child not have been born alive. The *second*, embracing those which go to shew that the lungs may sink in water, and yet the child may have been born alive.

* Morgagni's Works, vol. i. Lett. 19. p. 536.
† Haller's Elementa Physiologiæ, vol. iii. pp. 279, 280.

1. *Objections brought forward to shew that the lungs may float, and yet the child not have been born alive.*

Obj. 1. It has been objected, that a child may have been born dead, and yet the lungs will float in water, from having undergone putrefaction; and, therefore, it is argued, that the mere floating of the lungs is no decisive proof of previous life.

With the view of giving this objection its full force, it may be proper first to consider the effects of putrefaction.

Strange as it may appear, it has nevertheless been a subject much debated, what the effects of putrefaction are upon lungs that have never respired; some asserting, that it renders them specifically heavier than water, and, consequently, that they will sink when thrown into that fluid; while others, of equal respectability, maintain a contrary opinion. Both parties adduce experiments in proof of their particular assertions. The only solution that can be given to these contradictory results, is to admit that all the experiments have not been performed with sufficient care, so as to lead to conclusions uniformly correct. Every thing depends upon the *manner* in which they are conducted. The most accurate, I believe, were those performed by Mayer, and as they place this subject in a very just point of view, and relieve it of much of the obscurity in which it has been involved, it may not be improper to present a summary of his observations. From a very extended series of experiments, continued during a number of years, and executed with the utmost care and precision, Mayer found, on putting into water the lungs of stillborn children, in whom, of course, no sign of respiration or life had appeared, that they sunk to the bottom. After an interval of two or three days, the water in which they were left became turbid—the lungs changed in colour, and increased in volume—here and there an air bubble arose to the surface of the water, and at the same time a putrid odour became perceptible. All these appearances continued to increase daily, until the sixth, seventh, or, at the latest, the eighth day, when the lungs, both entire and cut into pieces, floated in the water in which they became putrid. On transferring the lungs to vessels containing clean water, they still continued to float, although on the slightest compression they instantly sunk.

Lungs placed in water, and exposed to the rays of the sun, swam on the sixth day. If they were suffered to putrefy where there was a free current of air, they rarely floated before the tenth or eleventh day. After the lungs had once floated, they remained in that state, emitting daily a more offensive odour, and acquiring an increased volume, until the twenty-first, or at the latest, the thirty-fifth day. After that period, they gradually sunk down, without a single exception, to the bottom of the vessel, nor did they afterwards betray any disposition to float, although kept for seven weeks, and in some instances a much greater length of time.*

* Mayer in Schlegel's Collectio Opusculorum Selectorum ad Medicinam Forensem Spectantium, vol. i. pp. 262,—264.

The foregoing experiments were made in the month of August. The lungs, both entire and cut into sections, were immersed in pure fountain water, and contained in vessels convenient and capacious. In short, every precaution seems to have been scrupulously observed, to render the experiments accurate and satisfactory.

My own experiments on this subject, although not numerous, go to confirm, in every essential point, those which have been just detailed.

If it should be objected to these experiments, that they are not satisfactory, because the lungs were separated from the rest of the body, it will obviate every difficulty to state a case in which the same result was observed in lungs which had not been taken out of the chest, until after they had become putrid. A case of this kind is related in which the child was certainly born dead. It had already become putrid when it was dissected—its vessels were full of air—and vesicles distended with it were seen on the surface of the lungs. On putting the lungs into water, they floated.*

From the foregoing experiments it thus appears, that in the *incipient* stage of putrefaction, lungs that have never respired will float in water, whereas they will sink if it has continued long enough to completely destroy their organisation, and thus extricate all the air contained in them. These results have been corroborated by numerous other observations and experiments, and their truth cannot be doubted. It seems singular, indeed, that they should ever have been questioned, when a case perfectly analogous is witnessed in every person that is drowned. The body at first sinks; afterwards rises to the surface, when putrefaction has generated air sufficient to render it specifically lighter than water,; and finally descends again, upon the extrication of that air.

Such being the effect of putrefaction, it becomes a question of great importance, to determine in what way we may discriminate between the floating of the lungs, as caused by natural respiration, and that which is the result of decomposition.

Independently of the changes produced in the colour and general appearance of the lungs by putrefaction, there are other very characteristic marks by which they may be distinguished.

(*a.*) By the appearance of air bubbles on the surface of the lungs.

On this subject, Dr. William Hunter lays down the following rule: "If the air which is in the lungs be that of respiration, the air bubbles will hardly be visible to the naked eye; but if the air bubbles be large, or if they run in lines along the fissures between the component *lobuli* of the lungs, the air is certainly emphysematous, and not air which had been taken in by breathing."† Jaeger had before this made a similar observation. In lungs floating from putrefaction, he describes the air as contained in the form of bubbles under the external membrane of those organs, where the air introduced by respiration never finds its

* Edinburgh Medical Essays, vol. vi. p. 450.

† On the uncertainty of the signs of murder in the case of bastard children. By William Hunter, M.D. F.R.S. Medical Observations and Inquiries of London, vol. vi. p. 284.

way.* This rule appears to be founded in truth, and accordingly has been adopted by the best writers on forensic medicine.

(*b.*) By the ease with which the air can be extricated from lungs which float in consequence of putrefaction. The evidence of this is to be found in the fact, that if lungs of this description, or any portions of them, be squeezed in the hand, they will immediately sink in water. On the contrary, no compression, however strong, can force out so completely the air from lungs that have respired, as to cause them to sink. This test is insisted upon by Marc, a very distinguished writer on this subject, as the most certain means of discriminating between the effects of putrefaction and respiration.†

(*c.*) By cutting out a portion of the internal part of the lungs, and putting this in water, to ascertain whether it will float. If the lungs floated as the result of putrefaction, this internal portion will sink, inasmuch as the air generated by decomposition is confined to the surface of the lungs, If, on the contrary, the lungs have respired, the internal part will float more readily even than that towards the surface.

(*d.*) By an examination of the other viscera of the body. Numerous observations have established the fact, that, with the exception of the bones, the lungs resist putrefaction longer than any other part of the body. Faissole and Champeau, in experiments which they made upon drowned animals, observed that the lungs remained sound, after the whole of the body had become putrefied.‡ Mahon noticed the same fact in his dissections of dead bodies.§ Camper ascertained, by direct experiments that the head became so far decomposed by putrefaction, that the slightest force was sufficient to detach the bones of it from each other, as well as those of the arms and legs, before the lungs began to participate in the putrefaction.‖ I myself observed the same phenomenon in three instances. This was especially the case in a child found floating in the river. The body had become quite putrid, the scalp was distended with air, and so were the bowels. The lungs, on the contrary, were perfectly natural in their appearance, and untouched by putrefaction. From these facts the conclusion evidently follows, that if the rest of the body of the child which is the subject of examination, be unaffected by putrefaction, it may very confidently be inferred, that the floating of the lungs is not owing to putrefaction.

By a careful application of the foregoing tests, little or no difficulty can arise in deciding whether the lungs float from putrefaction or from respiration.

But suppose the lungs are found to be actually in a state of putrefaction, is the physician then justified in drawing any conclusions, or in giving any opinion? Mahon advises, in such cases, that it is better for the medical witness to be silent, and to leave to the magistrates the task of finding out other grounds of accusation.¶ Marc, however,

* Jaeger in Schlegel, vol. v. p. 111.
† Dictionnaire des Sciences Médicales, vol. x. Art. *Docimasie pulmonaire.*
‡ Mahon, vol. ii. p. 400. § Ibid.
‖ Dissertation on Infanticide. By W. Hutchinson, M.D. P. 47.
¶ Médecine Légale, vol. ii. p. 400.

answers this question in the affirmative, aud proposes two characteristics to enable him to offer a positive decision. The first is, that lungs which have respired, notwithstanding they may have been attacked by putrefaction, always have a crepitus when cut into; whereas those which have never respired, although they float in water, are destitute of this peculiarity. The second, and which he considers the most decisive and certain, is this, that upon squeezing out from sections of the lungs the matter developed by putrefaction, they will *sink* if they are from a child born dead; but, on the contrary, if they are from a child born alive, they will, notwithstanding this, continue to *float*.*

Obj. 2. It is objected, that a child may have been born dead, and yet its lungs may float in water, in consequence of their having been artificially inflated; and, therefore, it is argued, that the mere floating of the lungs is no proof of previous life.

It has been doubted by some, whether artificial inflation of the lungs can ever be effected. Heister states, that he proved, by actual experiments, that air cannot be blown into the lungs so as to cause them to float.† Hebenstreit also doubts whether it can be accomplished, in consequence of the mucus which is usually found to fill the fauces of a new-born child.‡ Roederer, from the failure of his experiments on this subject, was led to the conclusion, that it can only be effected after the child has previously breathed. "A spiritu ori," says he, "inflato pulmones infantis non inflari dilatarique; nisi fœtus aliunde respiraverit."§ Brendel is still more positive on this point. He believes artificial inflation to be utterly impossible, and assigns two reasons for his scepticism. The first is the resistance which is made by the thorax and diaphragm; and the second is the difficulty of introducing a pipe into the glottis, without which he thinks it is impossible to inflate the lungs. He adds, moreover, in confirmation of his opinion, that he made experiments upon pups that were killed while yet in the uterus; and although he attempted to force in the air by a bellows, yet no change was effected upon the lungs, and they sunk when put into water.‖

A contrary doctrine is, however, maintained by a very large majority of the most respectable authorities in forensic medicine. Low admits the possibility of it, and tells us that Bohn, together with the medical faculty of Leipsic, concurred in the same opinion.¶ Ludwig says, it is certain that air may be artificially blown into lungs which have never respired, and that they will afterwards float in water.** In several experiments made to test this matter by the celebrated Camper, the result was uniformly in favour of this opinion.†† Jaeger, Buttner, and Schmitt, concur in the same, as do most of the French and

* Manuel D'Autopsie Cadaverique, p. 134.
† Morgagni's Works, vol. i. p. 536.
‡ Anthropologia Forensis, etc. p. 405.
§ Collectio Opusculorum Selectorum ad Medicinam Forensem Spectantium. Curante Dr. J. C. T. Schlegel, vol. v. p. 112.
‖ Medicina Legalis sive Forensis, p. 186.
¶ Theatrum Medico-Juridicum, cap. xii. p. 623.
** Institutiones Medicinæ Forensis, &c. p. 97. †† Schlegel, vol. v. p. 112.

English writers. Dr. Gooch says he inflated the lungs of a stillborn child, and they floated in water as if the child had breathed some days.*

From the foregoing detail of authorities, it is quite evident, that although artificial inflation of the lungs of a child born dead is a thing perfectly practicable, yet it is not accomplished with as much facility as many have imagined. This consideration I conceive to be important, because it tends to weaken very much the force of this objection to the hydrostatic test. Still, however, the objection holds good, and there are not wanting occasions when artificial inflation might be attempted. It is not incredible that it might be the result of malice, designed to injure the innocent mother; or of maternal tenderness endeavouring to resuscitate a lifeless child. It becomes, then, a matter of great moment, to determine whether the existence of air in the lungs be the product of nature or of art; and it is fortunate for the cause of justice, as well as humanity, that this can be done.

(*a.*) The first test which I shall notice, for this purpose, was originally proposed, I believe, by Buttner, and is founded upon the difference of the fœtal and adult circulation of the blood. In the former, it is well known that the blood does not pass through the lungs; whereas, as soon as respiration commences, the old passages are closed, and the whole mass is forced through those organs. If, therefore, a child has been born dead, the arteries and veins of the lungs are found destitute of blood, and in a collapsed state, notwithstanding any artificial inflation that may have been practised upon them. On the contrary, the vascular distention of the pulmonary organs proves that the child has breathed; for nothing but natural respiration can produce this effect.

(*b.*) A second method of determining this question, is by taking the absolute weight of the lungs, according to the *static test*, as already noticed.

(*c.*) A third test has very lately been proposed by M. Béclard. He asserts that the lungs of a child which has not respired, but which float in consequence of artificial inflation, may, by pressure, be deprived of all the air introduced into them, recover their original density, and sink in water; on the contrary, in a child which has *respired*, it is impossible by any pressure to force out the air so completely from the lungs as to cause them to sink. This experiment is said to have been successfully repeated by M. Béclard, in the presence of witnesses.† The experiments of Professor Bernt would, however, seem to shew the contrary. In three cases of stillborn children, after artificial inflation, "the lungs united with the heart; separated from it; divided into lobes and segments; nay, even also, when squeezed, floated on the surface of the water."‡ Two observations of an analogous character are also reported by Professor Mendel of Breslaw.§ Still more recent experiments, on the other hand, made in England by Mr. Jennings, go to support the accuracy of this test. In seven experiments reported

* A Practical Compendium of Midwifery, p. 96. (American edition.)

† London Medical Repository, vol. ix. p. 161.

‡ See Remarks of Professor Christison on a Case of Infanticide by Dr. Scott, in the Edinburgh Medical and Surgical Journal, vol. xxvi. p. 74.

§ See Dictionnaire des Sciences Médicales. Art. *Docimasie pulmonaire.*

by him, the lungs of children stillborn and artificially inflated, were made to sink by compressing them. When the child had breathed, this could not be done without actually mashing the lungs.*

(*d.*) A fourth test has been suggested by M. Marc. He considers that art can never completely inflate the lungs; and from the greater difficulty which attends the admission of air into the *left* lung, he is induced to believe that the inferior extremity of that lung will remain in a collapsed state, and float but imperfectly, or not at all.

This test is certainly ingenious, but, I think, hardly conclusive, inasmuch as there is some doubt whether the same appearances may not be observed after natural respiration has taken place; and if so, it can furnish no ground of distinction between respiration and artificial inflation of the lungs. Whether the lungs become gradually filled with air by respiration, or whether they are filled at once, is a question in relation to which differing facts are adduced. M. Portal appears long since to have established the fact, that the right lung receives air much sooner than the left. In a kitten which he killed a few minutes after it was born, the right lung was of a whitish colour, filled the whole cavity of the chest, and swam in water; the left was of a dark red colour, in a collapsed state, and sank in water. He accounts for this interesting phenomenon, by shewing that there is a difference in the size and direction of the bronchiæ leading to the two lobes. Upon examination, he found the right one about one-fourth part thicker, and one-fifth shorter, than the left; besides, he found the passage to the right to be more direct than that to the left.† By Mr. Jennings, a case is related of a child which had breathed imperfectly for half an hour only, in whom the right lung floated and the left lung sank, with the exception of a small part about its root.‡

(*e.*) Another test is that drawn from the state of the ductus arteriosus. This has already been treated of so fully, as to require no further elucidation.

Obj. 3. It is objected that there may be an emphysematous condition of the lungs which may make them float in water, even though respiration has never taken place.

The fact of such a condition of the lungs sometimes occurring, although noticed previously,§ was first prominently brought forward by Chaussier, in some cases where he was obliged, in consequence of the smallness of the pelvis, to deliver by the feet, and where death took place during delivery. The lungs, on being put into water, floated. M. Chaussier explained this phenomenon by supposing, that in consequence of the violence done to the lungs during the delivery, an effusion of blood had taken place, the alteration of which had disengaged a quantity of air. Cases of this kind must, as a matter of course, be very rare. When they do occur, the mode of discriminating,

* Transactions of the Provincial Medical and Surgical Association, vol. ii. p. 437. London Medical Quarterly Review, vol. ii. p. 365.

† Duncan's Medical Commentaries, vol. i. p. 245. (American edition.)

‡ Transactions of the Provincial Medical and Surgical Association, vol. ii. p. 437.

§ Alberti noticed it in 1725, and Schmidt in 1806. — Edinburgh Medical and Surgical Journal, vol. xxvi. p. 374.

according to Chaussier, is by squeezing them in the hand. On putting them into water after this, they will be found to have lost their buoyancy, and will sink. In these cases, the aeriform fluid exists only in the cellular tissue.*

Obj. 4. It has been objected, that "a child will very commonly breathe as soon as its mouth is born, or protruded from its mother; and in that case, may lose its life before it is born, especially when there happens to be a considerable interval of time between what we may call the birth of the child's head, and the protrusion of the body."†

This objection did not originate with Dr. Hunter. It is noticed by Morgagni, and I find it discussed by the German writers early in the last century. It must be admitted, however, that the high authority of Hunter's name has given to it an importance which it otherwise would never have possessed, and it is on this account more especially deserving of examination. It involves two points, each of which is worthy of distinct elucidation. Is it possible that a child can breathe, when nothing more than its head is delivered? and if so, is it probable, that after having respired in this situation, it will die before the delivery of the rest of the body?

Although it is denied by some very respectable authors, that a child can perform the act of respiration when merely its head is born, yet the fact rests upon evidence too substantial to be contradicted. Independently of the authority of Dr. Hunter, we have several other writers who furnish us with decisive testimony on this subject. Marc alludes to a case of this kind reported by M. Siebold.‡ Capuron, a respectable French writer on legal medicine,§ relates a similar instance which occurred in his own practice. Osiander informs us, that he has witnessed twelve cases in which the child breathed and cried as soon as the head was born.‖ Another case of more recent occurrence is related by Dr. Ward, an American physician. Here, after the head was delivered, the pains ceased, and the child began to cry. In a short time, however, the pains were renewed, and the child delivered alive and without any difficulty.¶ By Dr. Scott of Cupar-Fife, another instance of the same kind is recorded.**

It must therefore be conceded, that a child may breathe and cry as soon as its head is delivered, although it is equally true, that it is by no means a common occurrence. Admitting, then, that a child may actually breathe in the situation we have supposed, is it probable that it will lose its life before the complete expulsion of the body? That it is not, appears to me of very easy demonstration; and if so, the objection loses at once almost all its force. Even among the writers who are most strenuous in support of this objection, I have not met with a single one who pretends to have witnessed an instance in which a child has actually died in this situation. Low, although he thinks it

* Considérations Médico-légales sur l'Infanticide. Par A. Lecieux. Pp. 55, 56.
† Dr. W. Hunter, in the Medical Obs. and Inq. of London vol. vi. p. 287.
‡ Manuel D'Autopsie Cadaverique, &c. p. 140. § Capuron, p. 405.
‖ New York Medical and Physical Journal, vol. i. p. 372.
¶ The American Journal of Medical Sciences, vol. xi. p. 546.
** Edinburgh Medical and Surgical Journal, vol. xxvi. p. 68.

possible, relates no case of it. Dr. Hunter, whose professed object was to enforce all the probable exceptions to the hydrostatic test, gives us nothing more than his opinion, unsupported by facts. Mahon barely admits the possibility of it. Capuron, who is sufficiently sceptical on this subject, contents himself with recording the case already alluded to, in which the child was safely delivered. Even Osiander, with all his marvellous cases, does not present us with a single one of this kind. In point of fact, therefore, there is no instance recorded, so far as my knowledge extends, in which a child has actually expired under these circumstances. This, however, does not prove that it might not occur; and it is, therefore, necessary to inquire into all the possible causes which might produce its death. If a child expires after the delivery of the head, and before the expulsion of the rest of the body, its death will probably be owing to one or other of the following causes: 1. Natural debility of the child. 2. Pressure of the umbilical cord, interrupting the fœtal circulation. 3. Cessation of labour pains. 4. Unusual shortness of the umbilical cord. 5. A preternatural enlargement of the *body* of the child. 6. A tumour upon some part of the body of the child, mechanically interrupting parturition. I shall very briefly examine each of these in their order.

That *natural debility* on the part of the child cannot occasion it, seems to be proved by the very fact of respiration having taken place; for the exercise of that function so prematurely, necessarily implies a degree of vigour inconsistent with the supposition of such original feebleness.

That *pressure on the cord* should produce the death of the child, appears equally improbable. It is perfectly plain, that when this cause proves detrimental, it must be anterior to respiration, and when as yet the life of the child depends wholly upon the fœtal circulation. In the present instance, however, the child is supposed to have already breathed, and therefore any accidental interruption in the fœtal circulation cannot, in all probability, be attended with any injurious consequences.

Cessation of the labour pains. If, after the delivery of the head, there be a sudden cessation of the pains, there is no doubt that the child may be retained in this awkward situation for some time, and that it may even lose its life before it is completely expelled. Still it must be obvious, that the chance of such an issue is very much diminished in all those cases where respiration has actually commenced, inasmuch as the performance of this function proves not merely that the child is vigorous, but also that its thorax and body are not so closely compressed by the parts of the mother as to endanger its life. Hence a child, under these circumstances, may be detained a considerable length of time, without jeopardising its existence.

Unusual shortness of the cord. Cases of this kind occasionally occur. But here, too, the very fact of respiration having commenced, gives the child the best possible chance of being eventually born alive.

Preternatural enlargement of the body of the child, more especially of the shoulders, may prevent the delivery of the child, even after the birth of the head. That a child might die from this cause, is not dis-

puted; but the very fact of its shoulders and chest being so large as to prevent delivery, shews how difficult, if not impossible, it would be, for it to respire. If, however, it did actually respire, then the hazard of a long detention in this situation, would, by this very circumstance, be materially diminished. In addition to all this, the cause would here be so very obvious on a bare inspection of the child, that no serious error could possibly arise from this source.*

A tumour on the body of the child. This, of course, must be a very rare occurrence, and can never lead to any false decisions. I mention it merely because a case of this kind is recorded, in which "the head

* Since penning the above, I have received the following note from Dr. Hosack, communicating the particulars of a highly interesting case.

New York, June 28, 1823.

Dear Sir—You have been correctly informed of the fact you refer to, of the death of an infant taking place between the birth of the head and the extrication of the shoulders. Such a case occurred in my practice in this city, in the year 1811.

Mrs. R——, a lady of a small, delicate frame of body, and the mother of several children, engaged me to attend her in her lying-in. The commencement of her labour proceeded with the usual symptoms that she had experienced upon former occasions, excepting that she suffered more severely from her pains, doubtless attributable to the child being larger than those she had borne in her preceding labours.

Being absent from home when sent for, another physician was called upon. We both arrived nearly at the same time. The child's head was born. It had been in that situation, without making any advance, for some minutes. The child had cried, and was yet living when I arrived. The pains were very active, but one of the shoulders was so firmly wedged above the pubes, that with all our exertions we could not release the child in time to preserve it alive. It was stillborn; and I need scarcely add, that upon examining the child, besides its extraordinary size, an unusual breadth of shoulders was found to exist, to which circumstance doubtless its detention in the passage through the pelvis was to be ascribed.

This fact, the only one of this nature which I have met with either in practice or in the records of midwifery, presents a new case for the consideration of writers on legal medicine. As such I communicate it.

I am, very truly, yours,

JOHN B. BECK, M. D. D. HOSACK.

In addition to the particulars stated by Dr. Hosack, he informed me, that judging from the size of the shoulders, he believes it would have been impossible for the child to have been extricated from its situation, without the aid of manual assistance. In a case of this kind, therefore, no difficulty could ever arise in coming to a prompt and correct decision.

Two other cases of a similar character, are recorded by Dr. Campbell, which I shall give in his own words: "In the one, it was the woman's first child, and was attended by Mr. John M'Candie, one of my pupils, now a practitioner in Tain, whom I accompanied, from the labour having been tedious. When the head was born, we both distinctly heard the infant cry. About five or seven minutes might have elapsed before the shoulders were disengaged; and although the infant appeared stout, yet it was stillborn, and could not be resuscitated. The second case happened several years afterwards. This woman was the mother of several children, and was attended by Dr. John Clarke, now a medical officer in the army. The infant was large, had several loops of the funis entwined around its neck; and I was present before the head was born, when it began to breathe. In consequence of the size of the shoulders, at least seven minutes elapsed before they could be disengaged, and the child was lost."—Campbell's Midwifery, p. 150.

It is to be regretted that in all these cases, experiments were not instituted, with the view of ascertaining the state of the lungs, especially as it regards their weight, and floating in water.

of the child was protruded, and the expulsion of the body for a considerable time prevented, in consequence of a large excrescence on the left breast of the child. During this interval, which was about half an hour, the child frequently cried so loud as to be heard by the attendants."* It does not, however, appear even in this case that the child eventually lost its life; at least nothing is stated to this effect in the account which is given of it. So far from supporting the objection of Dr. Hunter, which we are considering, it proves, in the most pointed and satisfactory manner, how little danger attends the child in this situation, when it enjoys the benefit of respiration. Besides, it should be recollected that in all cases where delivery is prevented in consequence of the unnatural size of the parts about the shoulders, &c. the assistance of a physician, or at least of a second person becomes necessary. A witness, therefore, will always be at hand, to remove every ambiguity which may surround them.

From the foregoing discussion, it may, therefore, fairly be concluded, that in reality very little danger attends the child under the circumstances which we have supposed.

I shall sustain this argument by the opinions of one or two writers, distinguished for their extensive experience, as well as practical sagacity. In a case of this kind, Burns directs that we should "attend to the head, examining that the membranes do not cover the mouth, but that the child be enabled to breathe, should the circulation in the cord be obstructed. *There is no danger in delay*, and rashly pulling away the child is apt to produce flooding, and other dangerous accidents." In another place he says, "some children die, owing to the head being born covered with the membranes, some time before the body. This is the consequence of inattention; for if the membranes be removed from the face, there is *no risk of the child.*"† Denman also remarks, that "it was formerly supposed necessary for the practitioner to extract the body of the child immediately after the expulsion of the head, lest it should be destroyed by confinement in this untoward position. But experience has not only proved that the child is not, on that account, in *any particular danger, but that it is really safer and better, both for the mother and child,* to wait for the return of pains, by which it will soon be expelled; and a more favourable exclusion of the placenta will, also, by this means be obtained."‡

On a review of the whole of this part of our subject, it results, that a child may occasionally breathe as soon as its head is delivered—that the very fact of its breathing in this situation, gives it the best possible chance of being born alive—and finally, if it should even die, the cause of its death will generally be at once evident upon a mere examination of the body of the infant.

Obj. 5. There is still another objection which requires to be noticed, and this is that a child may respire while yet in the womb and before any portion of it is delivered.

* Mahon's Essay on Infanticide, translated by Christopher Johnson of Lancaster. See note by Mr. Johnson, p. 25.

† Principles of Midwifery, pp. 246, 376.

‡ Introduction to the Practice of Midwifery, p. 289.

With regard to the occurrence of respiration in a child while yet in the womb and before the rupture of the membranes, the thing seems to me physically impossible, and there is no evidence which can satisfy me that it has ever taken place.* This cannot be looked upon in the light of an objection that requires any consideration. When, however, the membranes are ruptured—the mouth of the uterus dilated, and the head of the child descends in such way as that the mouth presents, so

* Nevertheless cases of this kind are said to have occurred, and have been gravely published to the world. In the 26th vol. of the Transactions of the Royal Society of London, Mr. Derham gives an account of a child which cried almost daily for five weeks before delivery! Another case is detailed in the 73d No. of the Edinburgh Medical and Surgical Journal, by Dr. Zitterland of Strasburgh, in Prussia. In this instance, the child is said to have been rather more civil than in the case of Mr. Derham, and began to cry only forty-eight hours before it was born! The most respectable writers, however, on Medical Jurisprudence, deny the *possibility* of the occurrence, and ridicule the instances of it which are upon record. Mahon, for example, asks, whether "the best possible authority is sufficient to establish so extraordinary a fact? Few writers," he adds, "venture to say with Bohn, that they themselves have heard it. Three-fourths quote hearsay, and adduce witnesses. The love of the marvellous often distorts facts—it invents them, and finds authority and proselytes. On the report of a fact attested by credible witnesses, we may give our assent to whatever is not contradictory in itself, but *conviction* is a much greater degree of assent, and requires other proof. Bohn may have been deceived by the parson's wife; he may have heard some gurgling noise, and may have been led away by a want of facts to prove his opinion. This mode of reasoning, and scarcity of facts, has given credit to Livy's history of a child, which cried "*Io triumphe*," in the belly of its mother. The folly has been carried so far, that we read of children that have laughed and cried in the uterus."—Johnson's Translation of Mahon on Infanticide, pp. 18, 19.

Velpeau says on this subject: "It is sometimes so difficult to avoid all causes of error, all subterfuges, not to be deceived by strange and unexpected noises, such for example as are often produced by air in the intestines, that before we admit as positive a phenomenon which it is impossible to reconcile with the laws of physiology, the same person should have ascertained its existence repeatedly; in the meantime, I may say with Fontenelle, that, since learned and credible men have heard it, I will believe it, but I should not believe it if I had heard it myself."—Elementary Treatise on Midwifery, Meigs' edit. p. 226.

In connexion with the foregoing, it is but fair to add the following: "A medical practitioner, unable to superintend a lingering case in midwifery under the care of his apprentice, requested a professional friend to give his occasional advice; the latter happening to call, found the young operator in anxious expectation of a second child, *one* being born some time before. Circumstances, however, occurred to render the operator's opinion somewhat doubtful, but he declared himself quite positive, *because he had heard the second child cry.* After all, the case ended in the single birth of a child that had been dead some time."—Johnson's Translation of Mahon on Infanticide, p. 109.

To those who feel a curiosity in investigating this subject, the following references are furnished:

Johnson's Medico-Chirurgical Review, vol. iii. p. 221; vol. vi. p. 532; vol. ix. p. 524.

Edinburgh Medical and Surgical Journal, vol. xviii. p. 550; vol. xxx. p. 224; vol. xxxiii. p. 215.

Philadelphia Journal of Medical and Physical Sciences, new series, vol. iv. p. 407.

American Journal of Medical Sciences, vol. iv. p. 248; vol. viii. p. 248; vol. xi. p. 546; vol. xiv. p. 463.

Quarterly Journal of British and Foreign Medicine and Surgery, vol. iv. p. 221.

New York Medical and Physical Journal, vol. i. p. 372.

Baltimore Medical and Surgical Journal, edited by Prof. E. Geddings, M.D. vol. ii. p. 445.

Observations on Obstetric Auscultation, &c. By Evory Kennedy, M.D. P. 319.

as to offer a ready communication between it and the external atmosphere, then imperfect respiration may take place, and in some cases has actually done so. The following cases, recorded on respectable authority, will illustrate this. The first is related by Professor Holmes, of Montreal, Canada:—"On the 29th of October, 1828, I was called to a lady in labour of her sixth child. The fontanelle presented, but the pelvis being capacious, and her labours generally easy, no attempt was made to change the position. The head continuing to descend, the mouth lay on the pubis, and the examining finger could easily be introduced into it. The occiput did not yet occupy fully the cavity of the sacrum. At this time I heard sounds like the cries of a child whose mouth was muffled by some covering, but not very distinct, and not being at all prepared for them, I thought when they ceased, that they must have been produced by flatus in the intestines of the mother. In the course of a short time, however, the cries were repeated, and with the greatest distinctness, so as not to admit of a doubt that they proceeded from the child. The mother, much alarmed, inquired the cause of these noises, and required to be assured that they were not indicative of any danger. The pains being brisk, the head was soon forced down and expelled. The child was a female, and is still (August 1829) alive and thriving. This case appears to me so curious, though easy of explanation, when the position of the mouth is considered, that I am induced to draw up this notice, not having met with any thing similar on record, and as it is entirely different from the incredible stories we have of the fœtus emitting cries before the commencement of labour."*

Another case, analogous to this, is still more recently related by Mr. Tomkins, an English surgeon, which I shall record in his own language:—"I was, some time since, called to the wife of a blacksmith at Preston who was in labour with her tenth child. I had attended her in several former confinements and she had always had quick deliveries, as the pelvis was unusually capacious, and her pains were active. After I had been a few minutes in the room, I proposed and made an examination, and found the face presenting, and making its descent into the pelvis, the chin resting on the os pubis. A few strong pains succeeded, and I again examined to ascertain if the face had made any advance. I found it had done so, and that it was pressing on the perinæum; but in making this examination, my finger passed freely into the mouth of the child, and it immediately gave a convulsive sob, and cried aloud to the great terror of the mother and of the bystanders, when they found that it was still in the womb. I had great difficulty in calming the agitation produced by this event upon the woman whose pains were suspended for nearly an hour, but I eventually succeeded by explaining that the face was presenting, and that from the circumstance of my having passed my finger into the mouth, the air had gained admission and enabled the child to breathe; this, with a little spirit and water, and a dose of the ergot of rye, succeeded in bringing on the uterine action, and after two pains, the child

* Edinburgh Medical and Surgical Journal, vol. xxxiii. p. 215.

was expelled alive and well, at least one hour after it had respired and cried in the womb."*

Now, in reply to the difficulties created by this objection, the following considerations may be urged.

In the first place, such cases must be exceedingly rare. Face presentations do not occur frequently. Out of 16,980 children born at the Hospital of Maternity at Paris, only 59, or 1 in 300, were of this nature.† Even when such presentations do happen, the occurrence of respiration anterior to delivery can take place only under very peculiar circumstances. In the two cases detailed above, it will be observed, that respiration occurred only in consequence of the introduction of the finger of the accoucheur into the child's mouth.

In the second place, even supposing respiration to take place, it must be very imperfect unless the child continued to breathe after it was delivered, in which case, the objection would, of course, fall to the ground.

In the last place, if full and complete respiration took place under these circumstances, (a case hardly supposable, however,) this fact would indicate, most clearly, that the passages of the mother were so capacious as to offer no impediment to a prompt and safe delivery; and therefore no question of a criminal nature could ever be raised.‡

From the preceding examination of objections to the *hydrostatic test*, I think that we may safely come to the following conclusions:

1. That when the lungs float in water, it must be from one of four causes: natural respiration—putrefaction—emphysema—the artificial introduction of air.

* Lancet for July, 1834.

† Edinburgh Medical and Surgical Journal, vol. xix. p. 469.

‡ I cannot take leave of this point, without presenting the following view taken of it by one of the highest authorities on every question relating to Juridical Medicine—I mean the Edinburgh Medical and Surgical Journal.

"*Uterine* respiration can never come in our way on such trials, (for infanticide), for it takes place only under circumstances which render manual aid necessary to complete the delivery. *Vaginal* respiration is also so far similarly circumstanced. Respiration in the passages, as hitherto observed, takes place only, 1, in delivery by the feet, when the whole body but the head is protruded; and 2, in natural delivery, either when the head is expelled and the body remains in the passages; or 3, when, before the expulsion of the head, and after the rupture of the membranes, the hand is introduced to accelerate tedious labour. The first case cannot occur in medico-legal practice, so far as regards infanticide and concealment of pregnancy. The second can hardly be a cause of fallacy, as the circumstance of the child being able to breathe, shews that the constriction of the chest cannot be great; that the labour must therefore be speedily completed, and that the child's life is secured against the ordinary accidents which occur after this period of the labour. The third case renders it perhaps possible, that in tedious labour, air may reach the child in the passages, and be inhaled by other means besides the introduction of the hand; at the same time, such cases are by no means likely to occur in legal medicine, as the labour must be tedious, and consequently is not easily concealed. It appears, therefore, that the possibility of respiration before the close of labour, forms an objection to the employment of the hydrostatic test, only so far as it may occur in tedious natural labour. Now, independently of respiration being exceedingly rare in such circumstances, the objection thus constituted is important only *by preventing the inspector from relying on the test in particular and known circumstances*, not by being apt to lead him into error, because the fact of the labour having been tedious, may always be ascertained by moral evidence. This objection, therefore, is not of much consequence."—Edinburgh Medical and Surgical Journal, vol. xxvi. p. 372.

2. As the lungs may float from other causes beside respiration, their mere floating is no proof that the child was born alive.

3. As, however, it is possible to discriminate between the floating of natural respiration, and of that which is the result of other causes, it follows,

4. That with due precautions, the floating of the lungs may be depended upon as a decided proof that the child has been born alive.

II. I come now to examine another class of objections to the hydrostatic test, which have been much insisted upon, and which have tended, perhaps, no less than those which have already been considered, to shake the faith of the public with regard to its accuracy; I mean *those objections which are urged for the purpose of shewing that a child may have been born alive notwithstanding the lungs sink in water.*

Obj. 1. It has been objected that the child may have breathed, and yet the lungs, in consequence of diseases of various kinds, may have their specific gravity so increased as to cause them to sink in water. And, therefore, it is argued that the sinking of the lungs is no proof that the child was not born alive.

This objection has been deduced principally from analogy. It has been observed, that various morbid affections of the pulmonary organs of adults, as peripneumony, hydrothorax, calculi, schirri, ulcers, &c., will cause their subsidence in water, and hence it has been inferred, that the same might take place in the fœtus.

That the lungs of adults may undergo such changes from disease, as to cause them to sink in water, I am not disposed to deny, although I think it occurs less frequently than is generally believed. Haller informs us, that he has seen lungs of this description, which nevertheless continued to float. "Vidi sanguinem ex ruptis per funestam peripneumoniam vasis in pulmonem effusum, ut tamen nataret; vidi schirrhos, calculos, et lymphaticum coagulum, ut minime tamen subsideret."* He admits, however, having seen a case of peripneumony, in which the lungs sunk in water, and, he adduces several other cases of a similar nature, upon the authority of others.† Heister records the case of a young man who died of phthisis, whose lungs were specifically heavier than water.‡ De Haen relates, that he met with three or four cases, in which portions of the lungs of adults sunk in water, and, he adds, that Diemerbroeck witnessed the same in a patient whose lungs were in a schirrous condition.§ Hoffman details the case of a young man who died of pneumonic fever, in whose lungs the same was observed.‖ In speaking of the dissections of those who died of pleurisy in the Island of Minorca, Cleghorn says, that "in many the lungs were converted into a hard liver-like substance, and *sunk in water.*"¶ Dr. Baillie confirms the same general fact. "In consequence," says he, "of the greater quantity of blood being accumulated in the inflamed portion of the lungs, they become considerably heavier

* Element. Physiologiæ, vol. iii. p. 281.
† Ibid.
‡ Hebenstreit, p. 401.
§ Ratio Medendi, p. 114.
‖ Opera Omnia, vol. ii. p. 140.
¶ Observations on the Epidemical Diseases of Minorca. By Geo. Cleghorn. P. 159. (American edition.)

and will *frequently sink in water.*"* Finally, there is recorded in a late Journal, a case of "condensed lungs," occurring in a subject twenty-four years of age, and which immediately sunk on being immersed in water.† These facts are sufficient to illustrate the grounds upon which the objection rests. And they prove incontestably, that the lungs may occasionally be rendered, by disease, specifically heavier than water. It cannot be admitted, however, that these morbid conditions will frequently occur in the fœtus, for it is not exposed to the influence of the causes which usually produce them. Haller, notwithstanding his great experience and extensive learning, relates no instance of it, and expressly asserts, that they are very rarely found in the fœtal state. "In adulto homine *aliquando*, in fœtu *rarissime*, ut pulmo calculis, schirris, aliave materie, morbose gravis in aqua subsideat, etsiquam respiraverit."‡ Brendel, in speaking on this subject, relates only a single case of an abortive fœtus which had schirrous lungs, and considers it a singular occurrence.§ I shall only add, in confirmation on this point, the opinion of Dr. Duncan, Jr. the accomplished editor of the Edinburgh Medical and Surgical Journal. "Unquestionably a piece of inflamed lung will sink in water like a piece of liver, *but we doubt that such inflammation was ever observed in the lungs of a newborn infant*, concerning which a question of its having been stillborn could arise; and we deny the fact, that any portion of lungs which have breathed, will ever be rendered specifically heavier than water. by the mere settling of the blood in the lower portions after death."‖

It appears then, as well from reason as from facts, that the objection is founded upon the existence of circumstances rather possible than probable; as such, however, it demands consideration, and it is necessary to suggest the means by which a false judgment may be prevented.

For this purpose we have a test both simple and certain. The objection takes it for granted that the child has breathed; whether feebly or vigorously is a matter of no consequence. Some part, therefore, of the lungs *must* contain air, and although the quantity of it may be too small to cause the whole of the lungs to float, yet if they be divided into a number of pieces, and any of them remain on the surface, there can be no hesitation about the conclusion to be drawn. Foderé states that he frequently made experiments upon lungs that were schirrous, or had congestions of blood, and he uniformly found, that although they sunk when put into water entire, yet, when cut into pieces, some of them always floated.¶

An additional consideration, to aid in doing away this difficulty, is this. If the lungs are so diseased by tubercles, or any other morbid cause, as to render them specifically heavier than water, and thus

* Morbid Anatomy, p. 33. (American edition.)
† Edinburgh Medical and Surgical Journal, vol. iv. p. 301.
‡ Element. Physiologiæ, vol. iii. p. 281.
§ Medicina Legalis, p. 10.
‖ Edinburgh Medical and Surgical Journal, vol. xii. pp. 79, 80.
¶ Foderé, vol iv. p. 487.

cause them to sink, there can be no difficulty in detecting the presence of such disease, and, therefore, no error can arise from this source.

Obj. 2. It has been objected, that a child may have actually breathed, but yet so feebly and imperfectly, that the lungs shall not have received air sufficient to enable them to float; and hence it is argued, that the sinking of the lungs is no proof that the child was born alive.

In support of this objection, facts of a very pointed nature have been adduced. Heister relates the case of a very feeble infant, whose lungs sunk in water, though it lived nine hours after birth.* And a late writer on infanticide states, that he had been informed by a physician to the Foundling Hospital at Naples, who opened daily, on an average, the bodies of ten or twelve infants, which had generally died within twenty-four hours after birth, that he had hardly ever found more than a very small portion of the lungs dilated by air: this portion was frequently not larger than a walnut in its green shell, and but rarely larger than a hen's egg, and it was commonly situated in the right lung.†

The same method must be here adopted, as in cases where the lungs are diseased; they must be cut into several parts, and experiments instituted upon each. However imperfect the respiration has been, some portion of the lungs will necessarily be inflated, and therefore must float. Any error which might possibly arise, may be still further corrected, by the application of the static test, and by observing the state of the ductus arteriosus.

Obj. 3. It has been objected, that a child may be born alive without breathing; and, therefore, in this case, the sinking of the lungs is no proof that the child was not born alive.

The fact upon which this objection is raised, cannot be questioned;‡ nevertheless, it is both safe and just to consider as dead, every child that has not breathed. Governed by such a rule, any error that may be committed, will always be on the side of mercy. It is true, that certainty is as desirable here as in any other case, for the destruction of a feeble child is a crime as enormous as that of a vigorous and healthy one, and the punishment of the murderer of the one, is equally an object of public concern with that of the other. But, in the language of a distinguished writer on this subject, "pour le punir, il faut le constater; et lorsque les limites de l'art nous refusent le degré de certitude que nous ambitionnons, la clémence, que dis-je, la crainte d'immoler l'innocence devra l'emporter sur toute autre considération."§

This objection, so far from shewing the inconclusiveness of this test, serves only to establish more clearly its absolute necessity. It is

* Morgagni's Works, vol. i. epist. xix. p. 536.

† A Dissertation on Infanticide, in its relations to Physiology and Jurisprudence. By W. Hutchinson, M.D. 1820.

‡ A case of this kind is related by Ouvrard, in which a child actually lived fourteen hours, without breathing. On dissection after death, the ordinary test, applied to the lungs gave no evidence of respiration, except the escape of a few bubbles of air on passing the right lobe under water. Every portion of the lungs however, sank in water.—American Journal of Medical Sciences, vol. iv. p. 247.

§ Manuel D'Autopsie Cadaverique, &c. Par C. C. H. Marc. P. 140.

by resorting to it alone, that the sacrifice of innocence can be prevented, for who would assume the responsibility of deciding that a child had been born alive, when no evidence could be discovered of its having respired?

From the foregoing considerations, it may, therefore, be concluded,—

1. That when the lungs sink in water it must be from one or other of the following causes: the total want of respiration—feeble and imperfect respiration—some disease of the lungs, rendering them specifically heavier than the water.

2. As the lungs may sink from other causes than the absence of respiration, their *mere sinking* is no decisive proof of the child's having been born dead.

3. As, however, the sinking from the want of respiration may easily be distinguished from that which is the result of other causes, it follows,

4. That with due precautions, the sinking of the lungs is a safe test that the child was not born alive.

I have now gone through the discussion of this subject; and although the general conclusion is decidedly in favour of the accuracy of the hydrostatic test, yet nothing can be plainer than the necessity of an extensive acquaintance with the subject, to enable the professional witness to do justice to himself and to the cause of truth. It is much to be feared, that from the ignorance of some, and the precipitancy of others, great and fatal errors have not unfrequently been committed. It may not, therefore, be improper to present a summary of *practical rules*, for the guidance of the physician when called to the examination of a case, which, of all others, demands a combination of the exercise of the soundest judgment and the most profound knowledge.

(*a.*) As preliminary to any examination of the lungs, the child should be weighed, and the general appearance and condition of the body should be particularly noted, with the view of ascertaining the following points, viz.: If the child be full grown; if the different parts of its body be well proportioned; if the shoulders be uncommonly large, when compared with the size of the head; if any tumours are to be found upon the body; if the cord be unusually short; and, finally, if any symptoms of putrefaction be present.

(*b.*) The chest should then be carefully opened, and the following things noticed; the general shape of the thorax; the situation of the lungs, especially their relative situation to the diaphragm and pericardium—their volume—their shape—their colour; and whether there be any appearance of putrefaction.

(*c.*) The next step is to remove the contents of the chest, for the purpose of performing the necessary experiments upon the lungs. The aorta and vena cava should first be tied near the heart, and then cut beyond the ligatures; the trachea should then be also divided. The lungs, together with the heart, are now to be taken out of the chest, and to be submitted to an additional inspection, to ascertain whether they are sound or diseased, and if they are at all affected by putrefaction.

(*d.*) A convenient vessel containing water should now be provided, and particular attention should be paid to the temperature of the water in which the lungs are to be immersed. The reason of this will be perfectly obvious, when it is recollected that the specific gravity of water varies with its temperature; thus, for instance, water at 100° is lighter than water at 60°, and still lighter than at 40°. Besides, if the water be too hot, it will have the effect of expanding the lungs, and thus favour their floating, especially when there already exists a tendency to putrefaction. If, on the contrary, its temperature be too low, the air cells may be contracted, and some of the air be thus expelled. The temperature of the water should, therefore, be regulated by that of the surrounding air. Another precaution relative to the water is, that it should not be impregnated with *salt;* for, in consequence of the greater specific gravity of saline water, a body might float in it which would sink in fresh water.

(*e.*) The lungs, together with the heart, should then be cautiously placed in water, and it should be observed whether they float or sink: if they float, whether above the surface of the water, or just under it; if they sink, whether they do so rapidly or gradually.

(*f.*) The lungs should then be taken out of the water, and after tying the pulmonary vessels, they should be separated from the heart, and accurately weighed.

(*g.*) The lungs should then be replaced in the water, to see whether they sink or float, and in what way.

(*h.*) The two lobes should then be separated, and the same experiment repeated upon each, noticing the difference, if any, between them. If one only floats, see if it be the *right* one.

(*i.*) Each lobe should then be divided into a number of pieces, taking care not to confound the fragments of one lobe with those of the other, and upon each of these the same experiments should be instituted.

(*k.*) While cutting the lungs, observe if there be any crepitus; if the vessels are charged with blood; and if there be any traces of disease.

(*l.*) If any of the sections of the lungs float, they should be taken and squeezed forcibly in the hand, and then replaced in the water, to determine whether after this they will sink.

Having gone through these different processes, the conclusions to be drawn from them are evident. If there is nothing to be discovered on the body of the child, to favour the belief that it might have lost its life during delivery—if the lungs be not touched by putrefaction, nor be artificially inflated—if on cutting into them, a crepitus be perceptible—if the entire lungs, as well as the separate divisions of them, remain on the surface of the water—if, after squeezing portions of the lungs, they still continue to float—then the mass of evidence is strong, that the infant enjoyed perfect respiration. If only the *right* lung, or its pieces, float, the respiration has been less perfect. If some pieces only float, while the greater number sink, it proves respiration to have been still less complete. On the other hand, if neither the entire lungs, nor any section of them, float in water, the inference is, that the child never respired.

8. *State of the diaphragm.* It is very evident, that as soon as respiration commences, the cavity of the chest must necessarily be enlarged in every direction, to give play to the action of the dilated lungs. In consequence of this, the chest externally becomes more elevated and arched, and internally the diaphragm descends. To a person accustomed to the examination of subjects, this descent will be obvious, and taken in connexion with the other signs of respiration, is one not to be disregarded. The best mode of measuring the elevation or depression of the diaphragm, is by the corresponding ribs.

9. *The discharge of the meconium.* The meconium is a dark pitchy matter, contained in the intestinal canal of the fœtus, and is evacuated shortly after birth, when the child is born alive. In relation to its precise nature, some difference of opinion has existed. The opinion, however, which seems most plausible, considers it to be the bile collected in the fœtal liver, and which is propelled from that organ into the intestinal canal, by the compression which the liver necessarily sustains as soon as respiration commences.* The same compression afterwards expels it from the intestinal canal. Upon this principle, the connexion between respiration and the discharge of the meconium, is perfectly plain. Too much stress should not, however, be laid upon this circumstance. For although Mr. Bryce asserts, that "there is no instance in which infants born at the end of the ninth month, have ever suffered this evacuation previous to their birth," yet we have the high authority of Dr. Denman to the contrary, who states, that he met with a case in which the meconium was discharged upwards of thirty hours before the child was born.†

10. *The state of the bladder.* Anterior to birth, it has been ascertained that the bladder contains a considerable quantity of urine. If, therefore, on examination it should be found empty, the presumption is in favour of the child having been born alive, and of having lived sufficiently long to pass its urine by its own efforts. It is obvious, however, that this test is liable to many exceptions, and should not, therefore, be infallibly relied on. It is not impossible that, under certain circumstances, a child may void its urine before birth, and, on the other hand, a child born alive may die before it has performed that function.

Having thus discussed the various signs by which we are to determine whether a child was born alive or not, the following *general inferences may be deduced from them.*

1. If the ductus arteriosus, the foramen ovale, and the ductus venosus, be obliterated, and if the umbilical cord be separated, the conclusion is certain, not merely that the child was born alive, but for that it lived a considerable time, whatever may be the state of the lungs.

2. Even should the ductus arteriosus, the foramen ovale, and the ductus venosus, be still open, and the umbilical cord still attached, the

* Bryce on the fœtal liver. Edinburgh Medical and Surgical Journal. Blumenbach's Physiology, p. 359. (American edition.)

† Introduction to the practice of Midwifery, p. 395.

conclusion may be drawn that the *child was born alive, and respired perfectly*, if the thorax be arched; if the lungs cover the diaphragm as well as the sides of the pericardium; if the edges of the right middle and left upper lobes, instead of being sharp, are rounded; if their colour is pale red, or scarlet; if, on being cut into, they crepitate, and the blood-vessels pour out blood freely from the incisions; if the lungs weigh 1000 grains or upwards; if they float in water with the heart attached, and when cut in pieces, each fragment floats; and if this floating of the lungs be proved not to be owing to putrefaction, inflation, or emphysema of the lungs; and finally, if the ductus arteriosus be so diminished in size as not to be larger than one of the branches of the pulmonary artery, or if it be so much contracted towards the aortal cord as to form a truncated cone.

3. It may be inferred that a child has been born alive, but has only respired *imperfectly*, if the lungs present here and there streaks of scarlet intermixed with brownish red, and this, especially, in the right lung; if the lungs partially cover the diaphragm and sides of the pericardium; if the edges of the right middle and left upper lobes are more or less rounded; if portions only of the lungs float in water, and if this be proved not to be owing either to putrefaction, inflation, or emphysema; and, finally, if the ductus arteriosus be somewhat lessened in size, and have assumed the conical shape.

4 It may be inferred that a child was *not born alive, and has not respired*, if the thorax be flat and compressed; if the lungs occupy only the posterior and superior part of the thorax—small in volume, and leaving uncovered the diaphragm and the sides of the pericardium; if the edges of the right, middle, and left upper lobes be sharp; if the colour of the lungs be dark brown; if they do not crepitate when cut into, and no blood follows the incision; if the entire lungs, as well as every fragment, sink rapidly in water; if their weight be under 500 grains; and, finally, if the ductus arteriosus be cylindrical, and of the size of the trunk of the pulmonary artery, and more than double the size of the two branches.

Of the various modes in which the life of a new-born child may be destroyed or lost.

Like the causes of abortion, these may be divided into two classes, viz. those which are *criminal*, and those which are *accidental*. As in every case of alleged infanticide, a question may be raised as to whether the death was owing to the one or the other of these sets of causes, it becomes necessary to examine them separately and in detail.

Criminal modes resorted to for the destruction of a new-born child.

1. *The intentional neglect of tying the umbilical cord.* The majority of medical practitioners, from the time of Hippocrates down to the present day, concur in the necessity of tying the cord, to obviate fatal hæmorrhage which might ensue from the omission of it. Such was the unanimity of opinion on this subject, that previous to the seventeenth century, a doubt was not entertained with regard to

it. According to Foderé,* *J. Fantoni*, professor of anatomy at Turin, was the first who suggested that this precaution was useless, and that the neglect of it was unattended with any danger to the life of the child. After his time, the same opinion was adopted and defended by *Michael Alberti*, in 1731, and *J. H. Schultzius*,† in 1733, both professors in the university of Halle. In 1751, *Kaltsmidt* maintained the same doctrine at Jena.‡ The arguments offered by them in defence of their opinion are the following: 1. They maintain that the umbilical vessels, whether cut or torn, have a sufficient contractile power to prevent any great loss of blood. 2. That, because in other animals it is not necessary to tie the cord, therefore it is equally useless in the human species. 3. Kaltsmidt adduces an argument from the analogy of arteries contracting spontaneously in some surgical operations, and he thence infers, that a similar contraction would take place in the vessels of the cord.§

Let us examine these arguments for a moment. With regard to the *first*, it is obvious that it is nothing more than a reiteration of the subject in dispute, with the addition of an attempt to explain the reason of it. To say that the vessels of the umbilical cord contract sufficiently to prevent fatal hæmorrhage, is, in fact, to say nothing more nor less than that such hæmorrhage does not take place. It offers neither fact nor argument in relation to the disputed point. This, therefore, requires no examination.

The *second* argument is drawn from analogy. To render it therefore available, the analogy between the human cord and the cord in animals must be complete. This, however, is not the case. That there is some difference in the structure of the human cord and that of other animals, is not merely a rational conjecture, but proved by actual observation. Professor Brendel, in examining pups and heifers, found their umbilical vessels full of rugæ or folds throughout the whole of their course, and their size much less also in proportion.‖ In another place, the same writer says, that in brutes the vessels of the cord are much smaller than in man; and that when the animal is born, they are in a measure closed by a kind of cellular structure.¶ From this it appears, that in brutes there is a peculiar construction of the vessels of the cord, tending to interrupt the flow of blood through them, and favouring their speedy contraction after they have been cut. Besides, the manner in which the cord is separated in brutes, facilitates contraction. It is never *cut* in them — it is *torn asunder*, and the disposition of a vessel to contract under such circumstances is greatly increased.

The *third* has still less force than the foregoing. That arteries of inconsiderable magnitude frequently contract spontaneously, is granted; but that vessels of a size equal to that of the umbilical ones, do generally contract of themselves, cannot be admitted, when we know that very

* Foderé, vol. iv. p. 502.

† In a dissertation entitled, "An umbilici deligatio in nuper natis absolute necessaria sit."—Halæ, 1733.

‡ Foderé, vol. iv. p. 509. § Mahon, vol. ii. p. 422, &c.

‖ Medicina Legalis sive Forensis, p. 9. ¶ Ibid. p. 189.

dangerous hæmorrhages sometimes occur from vessels even much smaller than those of the cord.

After all, the whole question rests upon a simple matter of fact, and this fact is, whether the omission of the ligature upon the cord has ever been attended with fatal hæmorrhage. That it has been so, cannot be questioned. Among others, a very striking case is recorded by Foderé, which he was called upon by the authorities to examine. An illegitimate child, immediately after its birth, had been carried about three leagues to a woman who was to perform the office of nurse. Finding it very feeble, the nurse, on examination, ascertained that it was covered with blood, and that the ligature around the cord was quite loose. The child died shortly after. On examination, Foderé reports that he found the body extremely pale; without any sign of violence or wound; the umbilical cord flaccid; the lungs floated perfectly, not only alone, but with the heart attached—when cut into pieces, too, every piece floated; the heart completely empty, as also the large vessels, the vena portæ, the ductus venosus, the umbilical vessels, and even the capillary system of vessels. On weighing the blood found in the child, he found that it did not amount to two ounces. From all this, he concluded very justly that the child had enjoyed perfect life, and had died from umbilical hæmorrhage.*

Dr. Campbell states, that he met with two cases in which infants were destroyed, one by the accidental, and the other by the intentional, removal of the ligature from the cord.†

The following case is recorded by Dr. Hutchinson; although the life of the child was saved, it shews conclusively the great danger attending hæmorrhage from the cord. "The navel-string of a living infant was tied in the usual way; but, by accident, the funis separated very close to the ligature. Two hours afterwards, the practitioner was sent for; and on his arrival, he found the infant on the point of dying from hæmorrhage that had just occurred from the navel-string. The infant had been washed and dressed in the usual way, and had not cried after it had been placed in bed with the mother; soon after which, the hæmorrhage was discovered. The child was fortunately preserved by very assiduous subsequent care."‡

Although there can be no question, therefore, that fatal hæmorrhage may, and has occurred, from not tying the umbilical cord, yet it is equally certain that it does not necessarily do so. Observations, to a great extent, have been made, which prove that this precaution has been omitted, without any serious consequences resulting. It is stated that M. Klein has reported one hundred and eighty-three cases of sudden labours, in many of which the cord was ruptured, and in twenty-one cases close to the abdomen, yet there was no fatal umbilical hæmorrhage.§ In no case, therefore, is the mere

* Traité de Médecine Légale, etc. Par F. E. Foderé. Vol. iv. pp. 515, 516.
† Introduction to the Study and Practice of Midwifery, p. 151.
‡ A Dissertation on Infanticide, &c. By William Hutchinson, M.D. P. 87.
§ A Manual of Medical Jurisprudence. By M. Ryan, M.D. P. 144. (Griffith's ed.)

absence of the ligature to be taken as conclusive evidence of death by hæmorrhage.

Signs of death by hæmorrhage from the cord. These are the following:

(*a.*) Paleness of the surface, with a peculiar waxy appearance.

(*b.*) Paleness and loss of colour in the muscles and internal viscera.

(*c.*) The absence of the usual quantity of blood in the heart and bloodvessels. By some it is stated, that in cases of hæmorrhage, the heart and bloodvessels are completely empty. This, however, is not the case. Generally speaking, "if three ounces of blood can be collected, it may be presumed that the child has not died of hæmorrhage."*

2. *Exposing a new-born infant to the action of cold.* It is needless to dwell upon the necessity of those precautions which are generally resorted to after the birth of a child, in order to preserve a proper degree of temperature. They are founded equally upon experience and good sense. If, therefore, they have been neglected in any case, it is just to attribute it to *design*, unless circumstances render it probable that it proceeded from ignorance, or want of the proper means. In either case, however, the physician may be called upon to decide, whether the death is to be attributed to the action of the cold, or to some other cause.

Signs of death by exposure to cold. These are given by Foderé in the following terms: "If the body of an infant be found stiff, discoloured, shrivelled, and naked, or with only a slight covering on it in a cold place—buried under stones, or under the earth—and from trials upon the lungs, it is evident that it has respired; and if the great internal vessels are found gorged with blood, accompanied with an effusion of blood into the cavities, whilst the cutaneous vessels are contracted and almost empty, and when no other cause of death can be detected, one cannot do less than attribute it to the cold, and consider this abandonment and neglect of care, the necessity of which is obvious to the dullest comprehension, as a manifest intention to make away with the child."†

3. *Keeping from the child the nourishment necessary for supporting life.* It is not easy to say how long a new-born child may sustain life without food. It is evident, however, that it ought not to be delayed for any length of time. Foderé says the neglect of it for twenty-four hours is not unattended with danger. In these cases the child is generally found exposed in some deserted place.

Signs of death from the want of food. As death in these cases does not take place until the child enjoyed life for a certain length of time, the first thing to be established is that the child has lived long enough to die from this cause. This may be done by inspecting the foramen ovale, the ductus arteriosus, the ductus venosus, but more especially the umbilical cord, according to the signs laid down in a previous part of this essay.

* Cyclopædia of Practical Medicine, vol. ii. p. 694.

† Foderé, vol. iv. p. 505.

As children who die from want of food are generally exposed also, they sink under the combined operation of exposure and want of nourishment. They will be found, accordingly, to present the same appearances as in the last case;* and, besides these, there will be general emaciation of the body; and, on dissection, the stomach and intestines will be found empty, the gall-bladder will be enlarged, and bile found generally effused in the stomach and intestines.†

4. *The infliction of wounds and injuries of various kinds.* This is among the most common of the modes by which the life of a new-born child is wilfully destroyed. Death in these cases may be produced in various ways, some of which I shall notice.

The introduction of sharp pointed instruments into different parts of the body. Gui-Patin relates of a midwife who was executed at Paris for having murdered several children, by plunging a needle into the head while presenting at the os externum.‡ Brendel also speaks of the same horrible practice. An instance of this kind is related by Belloc, where, upon examination, he found the instrument had penetrated to the depth of two inches into the substance of the brain.§ Needles, or other sharp instruments, are sometimes thrust into other parts of the child, such as the temples, the internal canthus of the eyes,‖ the spinal marrow, the neck, the thorax about the region of the heart,¶ and the abdomen. Sometimes a sharp instrument has been run down the throat, and up into the rectum. A case is recorded in a recent journal in which the child was evidently destroyed in this way.**

Signs. In all cases where death has been produced in the preceding ways, dissection alone can reveal the cause. Where the instrument has been run into the brain the head must be shaved, when a slight ecchymosis will be perceived around the puncture; after this, the examination must be pursued into the substance of the brain, to ascertain the nature and extent of the injury. Indeed, this is the only way in which injuries of this kind can be distinguished from tumours and extravasations on the scalp, which may occur during ordinary delivery, and be wholly unconnected with any malicious intent. In punctures of other parts of the body the same course must be pursued. The wound must be probed, and the dissection prosecuted, to see how the internal organs are injured.

Wounds and bruises. This is another mode frequently resorted to for destroying the new-born infant. They may be found on any part of the body; the more common part, however, is the head. For the purpose of ascertaining the effects upon the head of a child falling from

* Foderé, vol. iii. p. 238.

† Besides keeping food from the new-born child, its life may be endangered and destroyed by giving it improper food. Dr. Campbell states that he has known several illegitimate children destroyed by giving them to be nursed by women whose milk was twelve or fourteen months old, the parties concerned being well aware that the children could not long subsist on such nourishment.—Midwifery, p. 151.

‡ Mahon, vol. ii. p. 409.

§ Cours de Médecine Légale, p. 93.

‖ Prælect. Academ. J. G. Brendelii, p. 188.

¶ Foderé, vol. iv. p. 492.

** Case of Elliott and Bease. Edinburgh Medical and Surgical Journal, vol. xxxv. p. 457.

different heights, the following very instructive experiments were made at the Lying-in Hospital, and are detailed by Lecieux.

"1. Fifteen infants who had died after their birth, but in whom there was no alteration in the bones of the cranium, were selected, and after having been raised up by the feet, so that the head was at the height of about eighteen inches, were suffered to fall perpendicularly upon a hard floor; and by anatomical examination it was found that in twelve of them there was a longitudinal or angular fracture of one of the parietal bones, and sometimes of both.

"2. In the same manner fifteen infants were suffered to fall from a height of three feet, and on dissection there was found, in twelve cases, a fracture of the parietal bones, in some extending to the os frontis. When suffered to fall from a greater height the membranous commissures of the cranium were relaxed, and even broken in some places; frequently the form of the brain was changed, and in some cases there was found under the meninges, or in the thick part of the meninges, an ecchymosis—an extravasation of blood produced by the rupture of vessels; and it was only in infants whose bones were very soft and flexible that no fracture was found.

"3. After having placed on a table the head of a child that had died soon after its birth, it was pressed in different places very strongly by the two thumbs on different parts of the surface; and in fifteen experiments of this kind, seven caused longitudinal fractures of greater or less extent in one or other of the parietals; in others there was only perceived a depression, or sinking of the bones. In the greatest number the head was deformed, or flattened, and the membranous commissures exhibited a sensible relaxation.

"4. Finally, the head, supported on a table, was struck strongly, and in different places, with a short round stick. This experiment always caused a deformity, or flattening of the head; multiplied fractures, with separation of splinters; relaxation, in some places rupture, of the sutures; and, finally, extravasation of blood."*

Signs. In cases of wounds, the points to be determined are, whether the wounds are necessarily mortal, and whether they may not have been the result of accidental and unavoidable circumstances. With regard to wounds of the head, it is to be recollected that the heads of children are not unfrequently tumefied and ecchymosed from compression, during a difficult and tedious labour. In some cases, too, a peculiar sanguineous tumour forms spontaneously on the head of the new-born child.† Arising in this way, these tumours are not attended with any danger to the child, and they are never complicated with fracture of the cranium. Where this latter is the case, it is invariably a sign of criminal interference, and may prove fatal.

In all examinations of contusions, two cautions ought to be observed, viz. to distinguish them from the discoloured spots which appear on the surface of the body at the commencement of putre-

* Considérations sur l'Infanticide. Par Lecieux.

† See an excellent paper on this subject by Professor Geddings, the able and learned editor of the North American Archives of Medical and Surgical Science, vol. ii. p. 217.

faction, and, not to confound accidents which may occur during dissection with those resulting from blows and other acts of violence.

Luxation and fracture of the neck. This is a mode of infanticide frequently resorted to, and is usually perpetrated by forcibly twisting the head of the child, or pulling it backwards.* In such cases the vertebræ are fractured, the ligaments ruptured, and death is caused by the injury inflicted upon the spinal marrow.

Signs. The mode of identifying this kind of death is by the local derangements about the part, by the position of the head, and, on dissection, by the fracture of the first or second vertebra, or both, and by the extravasation of blood among the cervical muscles. This last circumstance will shew that the violence has been committed on a living subject.

5. *Asphyxiating a new-born child, or putting a stop to its respiration.* This may be accomplished in various ways,— by drowning, hanging, or strangulation, smothering under bed-clothes, suffocating— by thrusting various articles into the mouth and nostrils; finally, by exposure to noxious airs.

Drowning. If a child be found immersed in water, the questions which require to be determined are the following. In the first place, was the child born alive; or, in other words, has it respired? In the second place, supposing it to have been born alive, was it put into the water before or after its death? The first of these is to be determined by the means already indicated. With regard to the signs of drowning, they are precisely the same in the infant that they are in the adult; and a careful examination is therefore to be made, with the view of ascertaining whether these are present or not.

Signs of drowning. In cases of drowning, generally speaking, the countenance, as well as the whole surface of the body, is cold and pallid; the eyes are half open, and the pupils considerably dilated; the tongue is protruded to the edges of the lips, and sometimes it is wounded, and the mouth and nostrils are covered with froth. In some cases, instead of the countenance being pallid, it is swollen and livid. On *dissection*, there will be found a watery and bloody froth in the trachea or bronchiæ; the right auricle and ventricle will be full of blood, while the left will be empty; the lungs will be expanded, and generally livid. On opening into the stomach, it will be found to contain more or less of water; the brain will be found more or less congested with blood. The blood itself, in cases of drowning, remains fluid, and follows freely the incisions of the scalpel. Much light will sometimes be thrown upon these cases, by finding in the stomach a portion of the fluid in which the child has been drowned. As this could only have got there by deglutition, it proves that the child was living.

Such will be the appearances, external and internal, where the subject has been put into the water in a living state, and where its death has been occasioned by the submersion. In cases where the subject, previously dead from some other cause, has afterwards been thrown into the water, all these signs will be absent.

* Mahon, vol. ii. p. 409.

Hanging. In this case, the general cause of death is precisely the same as that in drowning, viz. suspension of the respiration. The signs, therefore, in the two cases are the same, except so far as they are modified by the application of the ligature and the absence of water. In cases of death by hanging, accordingly, there will probably be a circular livid mark around the neck from the application of the ligature; the face will be turgid with blood, and livid; the tongue swollen and projecting, and the mouth frothy. On *dissection*, the appearances will be found the same as in drowning, with the exception that there will be probably more congestion about the head in cases of hanging. There will also be an absence of water in the trachea and bronchiæ, and not unfrequently the vertebræ of the neck will be dislocated or fractured.

Strangulation and smothering. Death by strangulation is produced by the same general cause as hanging, and the only difference between them will be the absence of the distinct circular mark round the neck in the former, and the presence of ecchymoses and discolorations about the neck and chest, produced by the application of fingers and nails to these parts.

When the child has been *smothered* under bed-clothes, &c., the circumstances upon which to form a decision that wilful murder has been committed, besides those which characterise strangulation generally, are the place where the body is found, and the absence of any other probable cause to which its death can be attributed.

Introducing articles into the mouth, nostrils, or throat. When this is the case, dissection alone can detect the cause.

Causing a child to inhale air deprived of its oxygen. This takes place when a living child is shut up in a tight box or coffin. The oxygen of the air contained in the box is gradually consumed, until the air becomes irrespirable. On this subject, Dr. Paris makes the following statement. "Infants appear to be less able to sustain the deprivation of oxygen than adults, and in some cases on record, life has been destroyed by circumstances that we should have *a priori* considered as hardly adequate to such an effect. A case is related of a child who was suffocated by some drunken men having repeatedly blown out a candle, and held the smoking wick under its nose. The faculty of Leipsic investigated the circumstances, and declared the death to have taken place in consequence of suffocation.*

Signs. In cases of this kind, experiments upon the lungs will shew whether the child was born alive or not. If born alive, the absence of any other cause of death, and the suspicious and unnatural circumstances attending the place where the child may be found, will lead to a judgment in the case.

The inhalation of gases positively deleterious. The gas yielded by privies and sewers is sulphuretted hydrogen; and, in the smallest quantity, and even when diluted with atmospheric air, proves very speedily destructive of life. When new-born infants are thrown into these places, they are destroyed partly by the action of the gas, and partly by ordinary suffocation.

* Medical Jurisprudence. By Paris and Fonblanque. Vol. ii. p. 55.

6. *Poisoning.* Poisons may be introduced into the system in various ways. They may be inhaled into the lungs, in the form of odours; or they may be taken into the stomach, mixed with food; or they may be received in the form of injections, or be absorbed through the skin.

When the poisonous substance has been taken into the stomach and intestines, it should be carefully examined, and subjected to the various tests which chemistry supplies for detecting its presence. In cases where the cutaneous absorbents have been the medium of conveying it into the system, it may be very difficult, generally, to discover the cause of death. In some instances, an eruption on the skin, and the peculiar odour of the substance which has been employed, aided by the circumstantial evidence, may lead to a discovery.

Accidental modes in which a child's life may be lost after delivery.

Having thus considered the various criminal modes resorted to for the purpose of destroying the life of the new-born infant, I come now to notice the various causes which may destroy it, without any criminal agency. Under this head, there are three different classes of causes, which require notice — *accidental circumstances occurring, either during or immediately after delivery; various malformations inconsistent with the continuance of life, after birth; and various diseases which may have commenced anterior to birth.*

1. *Various causes connected with delivery, which may occasion the death of a new-born child, unconnected with any criminal intention.*

A new-born child may sometimes lose its life, from its not being removed from that state of supination, in which it sometimes comes into the world. In this way respiration may be effectually prevented, by the mouth of the child being closely applied to the bed-clothes, or other substances in its way. Dr. W. Hunter relates an instance of a child dying, from its face lying in a pool made by the uterine discharges, where not the least suspicion of any evil design appears to have been attached to the mother.* A case in some respects similar, occurred to myself. A woman, whom I had engaged to attend in her lying-in, was suddenly taken with labour pains, rather before the time the event was anticipated. I was sent for shortly after, but before I reached the house, she had been delivered of a male child, which I found lying dead under the bed-clothes. The mother informed me that the child had been born about half an hour, and that she had heard it cry, but as she was alone, she had been unable to give it any assistance. Not the slightest suspicion of any criminal intention could for a single moment be cherished. The woman was married, and had engaged me to attend her some weeks before the event took place.

A new-born child may lose its life from the suddenness and rapidity of the labour. Dr. Hunter relates a case, where a female was seized

* Observations on the uncertainty of the signs of murder in the case of bastard children.—Medical Observations and Inquiries, of London, vol. vi.

during the night, and the child was born before he arrived. She held herself in one posture, to prevent the child from being stifled; but although it had cried, yet on the arrival of Dr. Hunter it was found dead.* A case is recorded by Mr. Tatham, where a patient in her fourth pregnancy, after three trifling pains, was passing along the lobby to her bed-room, when the infant was suddenly thrown on the floor, bleeding profusely at the umbilicus, but ultimately recovered.† Another case is related by the same authority, of a female, who, in the last month of her first pregnancy, while the family were absent, was obliged to go to the night-chair; a great discharge of water took place, followed by twin children, which dropped into the utensil; from which, however, they were speedily rescued, but died within a week.‡

Besides this, the labour may be attended with faintings or convulsions of the mother, so as to render her incompetent to offer any assistance to the child.§ With regard to the fact of the death of the child occurring from the mere rapidity and suddenness of the labour, it must be exceedingly rare, and it must be under very peculiar circumstances, and when it does occur, it must be either from the child being suffocated by falling into a privy at the time of delivery, or by the injury which it receives from falling in cases where a female might be delivered while standing. The first of these is, no doubt, possible, and probably has occurred.‖ How improbable the second is, the following facts, collected by Dr. Klein of Stutgardt, will shew. As a member of the superior council of health, he caused a circular to be addressed to the accoucheurs of the kingdom of Wirtemberg, requesting reports of the cases of sudden expulsion of the fœtus, which might be observed by them. Returns were made of one hundred and eighty-three cases. Of these, one hundred and fifty-five children were expelled while the mothers were in the upright posture, twenty-two when sitting, and six when on the knees. Twenty-one happened at the first labour. Of the whole number not one child died; no fracture of the bones took place, nor any severe injury. Two only suffered temporary insensibility, and one an external wound with ecchymosis over the right parietal bone.¶

* Medical Observations and Inquiries, of London, vol. vi. p. 286.

† Medical Repository, for April, 1829. ‡ Campbell's Midwifery, p. 155.

§ Beck's Medical Jurisprudence, vol. i. p. 156. (First edition.)

‖ Dr. John Gordon Smith relates, that "a woman was tried at the Old Bailey for the murder of her child, by dropping it into a privy. She declared, that while there for a natural purpose, an uncommon pain took her, the child fell, and she sat sometime before she was able to stir. On this occasion, a practitioner was examined on the probability of such an event, who stated that an instance came within his knowledge, where, while the midwife was playing at cards in the room, the woman was taken suddenly and the child dropped on the floor." Dr. Smith adds, "it recently happened in the circle of my own acquaintance, that a lady who had borne several children, and must, therefore, have been alive to the import of uneasiness in the last hours of pregnancy, was sitting in company at dinner, and perfectly free from any consciousness of approaching labour, when she experienced an inclination to repair to the water-closet. She had scarcely got there when she was delivered of a child. Had the place of retirement been constructed differently," adds Dr. S. "this infant might have perished."—Principles of Forensic Medicine, pp. 381, 382.

¶ Arrowsmith in the Cyclopædia of Practical Medicine, vol. ii. p. 693.

Accidental hæmorrhage from the umbilical cord. I have already spoken of neglecting to tie the cord with a criminal intent. It should be recollected that, although it has been resorted to with the latter object in view, yet in many, perhaps, in most cases, it may be the result of ignorance. It should not be forgotten, too, that this is most likely to occur in those very cases which become the subject of judicial inquiry, inasmuch as in those cases, the female, for obvious reasons, is frequently shut out from the benefit of professional assistance. Besides this, hæmorrhage from the umbilical cord, may occur under a variety of other circumstances, purely accidental. In some cases, it may occur accidentally, from a proper ligature not being applied to the cord. Dr. Hosack states, that he once delivered a woman of a very strong and large child, the cord of which he tied with common tape, as that was the only material at hand. He had scarcely reached his home before he was sent for again, and on returning, found that the ligature had given way, and a dangerous hæmorrhage had ensued.* Mr. Burns states also, that it has "sometimes been found, that when the ligature had become slack, a considerable quantity of blood was lost, and even fatal hæmorrhage has taken place."† Sometimes the cord is very thick, in consequence of a very large quantity of glutinous matter being contained in it. When this is the case, the ordinary ligatures will not be able to prevent bleeding. After the cord is divided, it becomes lessened in size, and the ligature, which at first was tight, will now be found loose, and the mouths of the umbilical vessels open. Mr. Radford, who has noticed this especially, relates a case of this kind, in which he was called to an infant who was bleeding, about three hours after birth. The skin was pallid, and the pulse scarcely perceptible. On examination the ligature was loose, and the orifices widely gaping.‡ Another case of this kind is related by Burns.§ Sometimes the cord will be found ossified, or in a state of cartilaginous hardness. In these cases, there is always more or less danger of hæmorrhage from the inability of applying the ligature properly. A case of this kind is related by Mr. Logan in which the cord gave way several times, from pressure of the ligature and from pulling on it during the expulsion of the placenta.‖ Dr. Dewees relates another case, in which a dangerous hæmorrhage took place in a child three days old, and which, on examination, was found to be owing to a varicose state of the cord. In consequence of which, he lays down a general rule, never to apply a ligature above a varicose portion of the cord, if it be possible to apply one below.¶

There is another accident, too, which sometimes happens, in which hæmorrhage may occur; and that is, where the child is suddenly expelled, and the cord ruptured, when, perhaps, no immediate assistance is at hand. Mr. Custance relates a case of protracted labour, where

* MSS. Lectures. † Midwifery, p. 565.
‡ Edinburgh Medical and Surgical Journal, vol. xxxviii. p. 2.
§ Midwifery, p. 200. (American edition.)
‖ Edinburgh Medical and Surgical Journal, vol. xxxvii. p. 276.
¶ A Treatise on the Physical and Medical Treatment of Children. By Wm. P. Dewees, M.D. &c. P. 331.

the child was suddenly expelled, *on the bed*, with such violence as to rupture it very near the body. Although there was no hæmorrhage, it died in a few hours.* Another case is related by Mr. Chamberlayne, in which the cord broke off (just in the right place too) in consequence of the violent expulsion of the child.† In cases of this kind, however, where the cord is torn off, it is to be recollected that hæmorrhage is not so likely to occur as when it is cut.

A child may die from prematurely tying the umbilical cord. We know that the circulation by the cord and respiration, are vicarious functions, and if one be interrupted or destroyed before the other is in operation, life must cease. It is accordingly laid down as a rule by practical writers, that the cord should never be tied or divided, until respiration has been perfectly established.

That the neglect of this important rule of practice is a frequent cause of death to the new-born infant, in the hands of ignorant midwives and practitioners, does not admit of a doubt. Dr. Dewees states, that he has seen " several instances of death, and this of a painful and protracted kind, from the premature application of the ligature.‡ By Dr. Eberle a case is recorded, which illustrates the evil effects of premature tying of the cord. The child breathed freely as soon as it was born. After waiting three or four minutes, until the cord pulsated feebly, it was tied. As soon as the ligature was drawn, the breathing became catching, irregular, and, in a few moments, almost wholly suspended, and the lips acquired a deep livid hue. The cord was immediately divided below the ligature, but only a few drops of blood could be obtained from it, and it was only with the greatest difficulty that the action of the heart and lungs were re-established.§ Dr. Campbell records a similar case, in which the application of the ligature was followed by breathlessness and lividity of countenance. The child was relieved by the application of two leeches to the region of the heart.‖

2. *Congenital malformations of certain organs.*

These are by no means uncommon, and as they might be found in cases which become the subjects of judicial investigation, and give rise to doubts as to the cause of death, it is necessary to shew to what extent they may interfere with the continuance of life in the new-born infant. The subject is one of great interest as well as extent, and all I can hope to do, is to give a general outline of it. Observation has shewn, that almost every organ and part of the human body is liable to some malformation or imperfection. It is evident, however, that they cannot all be equally dangerous, or hostile to the prolongation of

* Lancet, vol. v. pp. 120, 121.

† London Medical and Surgical Journal, vol. vii. p. 284.

‡ A Treatise on the Physical and Medical Treatment of Children. By Dr. W. P. Dewees, M.D. P. 260.

§ A Treatise on the Diseases and Physical Education of Children. By John Eberle, M.D. P. 86. (Second edition.)

‖ Midwifery, p. 152.

life. In these respects they must differ greatly according to the degree in which they exist, and more especially according to the importance of the organ in which they are found.

Malformations of the heart and vascular system. Of these the following have been observed and recorded.

A congenital opening between the two ventricles. Several instances of this kind are on record. Dr. Hunter relates the case of a stillborn child at six months, who had a hole in the septum of the two ventricles, large enough to allow a goose-quill to pass through it.* Another similar case is related by Dr. Pulteney. In this instance, the person lived to nearly fourteen years of age.†

Corvisart gives the case of a child twelve years old, in whom, on dissection, there was found an aperture in the septum of the ventricles, large enough to admit the extremity of the little finger. From the appearance of the aperture, there was good reason for believing that it was congenital.‡

Dr. Hunter relates the case of a patient who reached his thirteenth year, in whom, on dissection, the pulmonary artery was found very small, and an opening of the size of the thumb led from the right into the left ventricle. This patient had been in ill health since his birth—had been subject to fits from his earliest years, during which his complexion became of a dusky hue. He died in one of these paroxysms.§

Where the heart consists only of one auricle and one ventricle. This is a rare malformation. Mr. Burns says there is only one case on record, and that is by Mr. Wilson. This was in a child who died seven days old, and whose body was brought to the Theatre of Windmill-street for dissection. In this case there was one vessel which originated from the ventricle, and divided into two branches—the one to the lungs, and the other to the rest of the body.‖

Another case, however, is recorded by Billard. This child lived fifteen days. During this period it was affected with cyanose—had frequent syncopes and fits of threatened suffocation, in one of which it died.¶ This malformation would seem to be inconsistent with the long continuance of life.

Where the aorta arises from both ventricles. Corvisart gives a case from Sandifort, in which the subject died at the age of twelve years. During this period, it had from its second year been attacked with all the symptoms denoting disease of the heart, of which it died. On dissection, it was found, that besides the existence of the foramen ovale, and dilatation of the right ventricle, the aorta, instead of rising from the left ventricle only, had a mouth in each of the ventricles.**

In two cases recorded by Mr. Burns, the persons led a most miserable life, and were subject on every trivial exertion, to those paroxysms

* Baillie's Morbid Anatomy, p. 24. Medical Observations, vol. vi.

† Medical Transactions, vol. iii. ‡ Corvisart, p 207 ; also, p. 229.

§ Observations on some of the most frequent and important Diseases of the Heart, &c. By Allan Burns, p. 20. Baillie, p. 23. ‖ Ibid. p. 27.

¶ Traité des Maladies des Enfans, &c. Par C. M. Billard. P. 701. (2d edition.)

** Corvisart, pp. 231, 232. (American edition).

which are produced by a mixture of venous and arterial blood. At last they died dropsical.*

Another case is recorded by Dr. Ray of Eastport, in the state of Maine. The child lived to the age of thirteen months. During the first five months of its life, nothing peculiar was perceived about it but a slight blueness of the ends of the fingers, the eye-lids, root of the nose and mouth—after this it suffered occasional paroxysms, resembling severe colic, attended with a dry suffocative cough. In the intervals of the paroxysms, the child appeared to be perfectly well. On dissection, the ascending aorta and arch were found dilated to four times the capacity of the descending portion. The foramen ovale was open, and both ventricles communicated with the aorta, the aorta being placed astride the two ventricles. The ductus arteriosus was also open, and terminating in a cul-de-sac in the wall of the left ventricle—no pulmonary artery could be discovered.†

Where the pulmonary artery is impervious at its origin. This is by no means common. A case, however, is related by Dr. Hunter, which terminated fatally on the thirteenth day.‡

Malformations of the respiratory organs. These, although not very common, are sometimes met with. Cases are recorded in which the thoracic parietes have been so deficient and imperfect, as to leave the heart and lungs naked. Under such circumstances, it is evident that life cannot long be protracted. In some cases, the thorax may be distorted in such way as to interfere greatly with the due expansion of the lungs, and of course with the proper performance of the function of respiration. It is clear, however, that this may exist to a very considerable extent, and yet life be continued for a number of years.

Where a congenital deficiency exists in the *diaphragm*, so as to admit the passage of some portion of the abdominal viscera into the cavity of the thorax, the danger is more impending, and it is hardly possible that life can be long continued.

Malformations of the alimentary canal. These have been observed in every portion of this tract, from the mouth to the anus. The mouth has sometimes been found wanting, or obliterated; in other cases, there has been an absence of the œsophagus. An instance of this kind is reported by Dr. Sonderland. The child at birth was appearently well formed, but rejected every thing that was introduced into its mouth in the way of nourishment. It died on the eighth day. On dissection, the cardiac orifice of the stomach was found wanting, and this part of the stomach was adhering to the diaphragm. The œsophagus was entirely wanting, and the pharynx terminated in a cul-de-sac.§

The *stomach* is subject to malformations as regards shape and displacements. These, however, do not interfere with the continuance of life, provided the orifices of this organ be free.

Malformations of the *intestinal canal* are numerous and various.

* Burns's Observations, p. 13.

† The Medical Magazine, conducted by A. L. Pierson, J. B. Flint, and E. Bartlett, Boston, vol. ii. p. 317. ‡ Burns's Observations, &c. p. 25.

§ Billard, p. 285.

Those which are particularly worthy of notice in this connexion, are those in which the canal is obliterated, or interrupted, or contracted. Dr. Schæfer relates the case of a child, which died on the seventh day after birth. On dissection, the *duodenum* was found terminating in a cul-de-sac, and a complete interruption thus existed in the intestinal canal. This child, during its life, had passed neither meconium nor urine, and vomited matter of a liquid brown character.* Another case, of a similar character, is reported by Billard. In this case, the child died on the third day. It had not passed any meconium, and had vomited freely a yellowish fluid.†

The most common of these malformations, however, are those of the *rectum*. In some cases, there is simply a contraction and closure of the anus; in other cases, the rectum itself is partly deficient, and terminates in a cul-de-sac; while in others again, the rectum terminates in the bladder, or in the vagina.‡ Now, in all these cases, the life of the child must be lost inevitably in a very few days, unless the difficulty can be relieved by an operation.

3. *Various diseases, which may be either congenital, or occur immediately after birth.*

This is the last class of causes to which the death of a new-born infant may be attributed, and which requires to be accurately discriminated from the effects of criminal violence.

Morbus cæruleus. Cyanosis. This is commonly known by the name of the *blue disease*, from the peculiar colour of the skin which characterises this affection. The part more particularly affected, is the face. During crying or any other effort on the part of the child, the colour becomes much deeper. Besides the peculiar colour of the skin, the symptoms are, disordered circulation, disturbed respiration, and diminished temperature of the whole body. Now and then the symptoms are all aggravated, and the patient is attacked with the most distressing paroxysms of laborious breathing, fainting, palpitation, and suffocation. It is during these paroxysms that life is generally in danger, and frequently is lost. Concerning the causes of this curious affection, there is some difference of opinion. Formerly it was supposed to be invariably owing to the foramen ovale remaining open. This, however, is not the case, inasmuch as it has been found to be associated with a number of malformations of the heart and large blood vessels.§

From what has been already stated in relation to these malformations, it is easy to appreciate the kind of danger to which a new-born infant is subject, in whom they may be found to exist. While in some cases death may take place in a few hours or days after birth, in others again existence has been protracted for many years. As, however, life is always in danger in these cases, the just and certainly humane con-

* Billard, p. 363. † Ibid. p. 364.

‡ Ibid. pp. 367, 370. Baillie's Morb. Anat. p. 114. Campbell's Mid. p. 571.

§ For a condensed, but excellent view of this subject, see a Dictionary of Practical Medicine, by James Copland, M.D. vol. i. p 199. (American edition).

clusion in a case of alleged infanticide, and where this disease might be urged as the cause of death, would be to admit that it might be so, provided said malformations were actually found on dissection, and provided no other cause of death could be detected.

Organic diseases of the heart and bloodvessels. By Billard, a case is recorded of a child, who, from birth, was affected with frequent syncope, difficult breathing, discoloration of the nostrils and lips, and disordered circulation. It died, after suffering in this way about two months. On dissection, the heart was found almost as large as a hen's egg, with dilatation of the right auricle and ventricle.*

Another curious and unique case is recorded by the same author, of a child who had an *aneurism of the ductus arteriosus.* It died on the fourth day, and betrayed no symptoms during life of the existence of this aneurism. It was about the size of a cherry pit.†

Pericarditis. By Billard, this disease is supposed to be more common in new-born infants, than at any other period of life. In seven hundred autopsic examinations which he made at the Foundling Hospital of Paris, he found seven well marked cases of pericarditis ; two of these were in children who died on the second day after birth. In one, an infant two days old, he found the adhesions of the pericardium so solid as to lead to the belief that the disease was of long standing, and must have commenced while the fœtus was still in utero.‡

Pneumonia and pleuritis. There is every reason to believe that these affections, though rare, may sometimes exist in the fœtal state. Billard states, that in three infants who died on the first day after birth, he found the texture of the lungs so altered, as to lead to the belief that it must have commenced antecedent to birth. In two cases, the left lung was hepatised at its base.§ In these cases, there was no doubt that this condition of the lungs interfered with the establishment of respiration, and was the cause of death.

Inflammation of the *larynx* has not been observed as occurring in the fœtal state. Billard, however, states that he has frequently observed in fœtuses born before the time, a congestion of blood about these parts. The mucous membrane of the larynx and trachea was of a violet colour, and at the same time there was an extravasation of blood extending even into the bronchiæ. He presumes there must have been in these cases, a great determination of blood to those parts in the last moments of intra-uterine life, or during the act of delivery.‖

With regard to affections of the lungs, it is also to be recollected, that infants are occasionally liable to be attacked with many of them immediately after birth, and they may prove fatal in a few days. In all cases of this kind, however, the appearances on dissection will throw light upon the cause of death.

Diseases of the alimentary canal. Billard states, that in two cases in which new-born infants died a short time after birth, he found ulcerations in the œsophagus, which, from their appearance, must

* Billard, p. 589. † Ibid. p. 591. ‡ Ibid. pp. 595, 703.
§ Ibid. p. 521. ‖ Ibid. p. 494.

have been developed during intra-uterine life, and which, from the progress they made after birth, must have hastened their death.*

The same author relates cases in which there was every reason to believe that *inflammation of the stomach* existed previous to birth, and was the cause of death after birth.†

Ramollissement of the intestines has also been noticed by Billard, in children who have died a short time after birth.‡

Having thus ascertained that the child was born alive, and that its death was owing to violence, we are next to inquire into the relations of the child with the supposed mother. As already stated, the questions here to be investigated are the following.

1. Has the woman been actually delivered? The signs of delivery have already been discussed in a previous part of this essay.

2. Do the signs of delivery in the mother correspond as to time, &c., with the appearance of the child?

The great object of this inquiry is, to determine the length of time which has intervened between the birth of the child and its death, with the view of comparing this with the signs of delivery in the reputed mother. This is to be done by examining the following points:

(*a.*) The state of the foramen ovale.
(*b.*) The state of the ductus arteriosus.
(*c.*) The state of the ductus venosus.
(*d.*) The state of the umbilical cord.
(*e.*) Whether putrefaction has yet commenced.

By comparing these observations with the signs observed on the female, a rational opinion can easily be formed, whether any incongruity exists between them, and the inference of course is obvious.

Circumstantial evidence. Although this does not strictly appertain to a medical discussion of the subject, yet there are some points embraced under it, concerning which the testimony of the physician may be required.

1. It may be urged in excuse for a woman on a trial for child murder, that from the uncertainty of the signs of pregnancy, she may have been ignorant of her actual condition, and, therefore, may have been suddenly overtaken with the pains of labour, when it was out of her power to command assistance, and thus the child have lost its life. To all this, a very plain and concise reply may be made. However difficult it may be for a physician to say positively, whether a woman is pregnant or not, yet we can scarcely suppose the woman herself to entertain much doubt on the subject, especially in a first pregnancy, which it almost always is in cases of infanticide. If she has yielded to the solicitations of a seducer, and if she afterwards experiences those changes and developements in her system, which accompany a state of impregnation, she cannot but be conscious of her true situation, and, therefore, any arguments drawn from this source ought to have no weight.

* Billard, p. 687. † Ibid. pp. 311, 689. ‡ Ibid. p. 691.

2. It may be suggested in vindication of the woman, that the delivery was so rapid that it was out of her power to procure assistance, or make the necessary preparations for preserving the child's life. In cases of first pregnancy and delivery, it is not very probable that the labour would be accomplished so speedily. The necessary dilatation of the parts would require a length of time sufficient to give her proper warning of the impending event. In succeeding labours, it is possible that it might occur. Dr. Wm. Hunter relates a case of this kind, which occurred in his own practice.* The physician should, therefore, always inquire if this be a first child, or if she has had others previously. Other circumstances relating to the delivery should also be investigated. It is not impossible that a woman may be delivered while standing, and the child have fallen upon the floor, and thus its death have been occasioned.† Such cases are, however, extremely rare, and should be admitted with great caution. In speaking of the accidental causes of the death of the child, I have already noticed this subject.

3. It may be urged in the defence of a female accused of destroying her child, that she may have been labouring under puerperal mania; in other words, that she was insane. A case of this kind appears actually to have occurred, and is related by Dr. Paris. "In the year 1668, at Aylesbury, a married woman of good reputation being delivered of a child, and not having slept many nights, fell into a temporary frenzy, and killed her infant in the absence of any company; but company coming in, she told them she had killed her infant, and *there* it lay; she was brought to gaol presently, and after some sleep she recovered her understanding, but marvelled how or why she came thither. She was indicted for murder, and upon her trial, the whole matter appearing, it was left to the jury with this direction, that if it did appear that she had any use of reason when she did it, they were to find her guilty; but if they found her under a frenzy, though by reason of her late delivery and want of sleep, they should acquit her; that had there been any occasion to move her to this fact, as to hide her shame, which is ordinarily the case of such as are delivered of bastard children and destroy them; or if there had been jealousy of the husband that the child had been none of his; or if she had hid the infant, or denied the fact; these had been evidences that the frenzy had been counterfeit. But none of these appearing, and the honesty and virtuous deportment of the woman in her health being known to the jury, and many circumstances of insanity appearing, the jury found her not guilty, to the satisfaction of all who heard it."‡ On this case

* Observations on the uncertainty of the Signs of Murder in the case of Bastard Children. Medical Observations and Inquiries, vol. vi.

† Lafosse once saw in a hospital a woman, who, feeling the first pains of labour, imagined that they arose from a different cause, and rose to go to stool. Half of the infant was immediately born; but happily there was sufficient time to receive it, and prevent its fall.

‡ 1 Hale's Pleas of the Crown, p. 36.

Dr. Paris justly remarks, "had this woman been of doubtful character, though innocent, she might have been executed for want of medical evidence to prove the nature and frequency of puerperal insanity."*

Of the method of conducting examinations in cases of infanticide.

In every case of infanticide, so much depends upon the testimony furnished by the physician, that it becomes a sacred duty on his part, to investigate, with the umost fidelity and impartiality, every circumstance which may aid him in coming to a satisfactory and enlightened decision. The labour of such investigation is doubtless great and unpleasant; but unless submitted to by the professional witness, he certainly cannot be considered as qualified to give his evidence in a case which involves the life of a fellow being.

External examination of the child. This should embrace the following particulars:

(*a.*) Every thing relating to its external appearance, shape, conformation, condition as to putrefaction, spots, ecchymosis, &c.
(*b.*) Its size, including not merely the size of the whole body as to length, but the dimensions of the head and of the thorax.
(*c.*) Its weight.
(*d.*) The condition of the umbilical cord.

Internal examination. This should include,

1. The condition of the respiratory organs:

(*a.*) The dimensions and shape of the thorax.
(*b.*) The situation of the diaphragm.
(*c.*) The colour of the lungs.
(*d.*) Their volume.
(*e.*) Their shape.
(*f.*) Their situation.
(*g.*) Their consistence or density.
(*h.*) Their absolute weight.
(*i.*) Their specific weight.

2. The condition of the organs of circulation:

(*a.*) The foramen ovale.
(*b.*) The ductus arteriosus; its dimensions and shape.
(*c.*) The ductus venosus.
(*d.*) The state of the umbilical vessels.

3. The condition of the abdominal organs:

(*a.*) The liver; its weight.
(*b.*) The stomach and intestines; particularly the large intestines, with a view of ascertaining the presence or absence of the meconium.
(*c.*) The state of the urinary bladder.

4. The condition of the brain and spinal marrow.

Mode of conducting the dissection of a child.

It will be found most convenient to commence the dissection with the mouth and the cavities leading to the chest. An incision should

* Paris and Fonblanque's Medical Jurisprudence, vol. iii. pp. 129, 130.

first be made from the under lip to the top of the sternum, and another along the lower edge of the inferior maxillary bone; after which, the integuments are to be dissected back. The lower jaw is then to be divided at its symphysis, and the two portions separated. By bending the head back, we shall now be able to obtain a complete view of the cavity of the mouth. The position of the tongue should now be examined. If any foreign matters are found in the mouth, they should be especially observed and noted. In short, every unnatural appearance, whether morbid or artificial, should be carefully investigated and recorded.

The larynx and trachea must next be laid open. If any fluid is found, it should be specially examined.

So much of the œsophagus as can now be seen, is also to be examined.

The abdomen is next to be examined. The first incision is to be continued down to the lower part of the sternum, and from this point, an incision made through the integuments to the spine of the ilium on each side. The triangular flap thus made, is then to be turned down, and the umbilical vessels to be examined and tied. The diaphragm is to be observed, whether it be much arched towards the thorax or otherwise. The viscera of the abdomen are next to be inspected, and every thing peculiar in their appearance or condition to be noticed. The ductus venosus should be examined, whether it be pervious, and contain any blood. After tying the vessels leading to the liver, it should be taken out and weighed. The whole of the intestinal canal, with the stomach, should be taken out, after having tied the two ends. The contents of the stomach are to be critically investigated. If there is any suspicion of poison, the ordinary tests for ascertaining it should be resorted to. The state of the gall bladder and urinary bladder should be inquired into, whether they be empty or not. Lastly, it should be seen whether there be any meconium in the intestinal canal.

In opening the thorax, the ribs and sternum must be divided in the ordinary manner; and in doing this, a scissors will be found a much more safe and convenient instrument than a scalpel. Having exposed the thorax to view, the general appearance, position, and colour of the lungs are to be remarked.

The trachea is now to be divided as near as possible to the lungs. The aorta and venæ cavæ are to be tied and cut beyond the ligatures. The lungs should then be taken out and weighed, and after this, subtected to the experiments already detailed in a previous page. The heart is next to be examined, and it should be particularly noted whejher the auricles and ventricles are filled with blood; the state of the ductus arteriosus should be ascertained; and lastly, whether the foramen ovale be still open. As the death of an infant may not unfrequently be caused by injury inflicted on the spine, it becomes necessary to examine this part also. A longitudinal incision should be made from the occiput to the sacrum—the muscles to be separated and turned back. By means of strong scissors, the vertebræ are then to be divided on each side, The posterior part of the spine thus separated, may easily be removed, and the whole canal exposed for examination.

In opening the head, an incision should be made from the lower part of the frontal bone down to the second or third cervical vertebra, and another at right angles to this from ear to ear. By dissecting back the integuments thus divided, the cranium will be completely exposed. The cranium should now be carefully examined, to see if there be any fractures, punctures, wounds, &c. The bones are next to be removed, and the most convenient method of doing this will be to separate them by a scissors along their membranous connexion with each other. Great care should be taken not to occasion any laceration during the dissection.

The substance of the brain must be carefully investigated, and every deviation from the natural and healthy state observed. Although this examination of the brain can throw no light upon the question whether a child has been born alive, yet it may aid us materially in detecting the cause of its death.

Having completed the dissection, the inferences to be drawn from the information thus obtained, must be obvious. They have been so fully explained in the former part of this chapter as to render unnecessary any recapitulation.

This completes the examination of the child.

Examination of the mother. The business of the physician, however, does not end here—he must also investigate the condition of the reputed mother. And the points to be ascertained here, as we have already stated, are—

1. Whether she has been recently delivered.

2. Whether the signs of the delivery correspond with the appearances detected on examination of the child.

ILLUSTRATIONS OF EXAMINATIONS AND REPORTS.

1. *Report proving the crime of infanticide.**

We, the undersigned, doctors of medicine or surgery, of the faculty of ——, inhabitants of the town or parish of ——, canton of ——, arrondissement of ——, department of ——, upon the requisition of ——, made known to us by Mr. N., bailiff, went there this ——— day of the month of ———, year ——, hour ——, with Messrs. N. N., in the house of ——, situated in the street of ——, No. ——, story ——, room ——, to visit there the corpse of a child of the —— sex, which had been found in the morning under a heap of dirt, in the yard of the said house, and to ascertain the cause of its death.

Arrived in the house and room designated, they presented to us the said body, wrapped in coarse rags of woollen stuff much worn, and moth-eaten.

After having stripped it, we observed that there was attached to the umbilicus, a portion of the umbilical cord, still fresh, without any ligature, and about five inches in length, of which the open extremity was very visibly unequal and fringed; which convinced us that the cord had been broken or torn by force.

* This report is taken from Capuron's Médecine Légale, p. 494.

The said body was still covered over with the unctuous and whitish substance that almost all children have at their birth; this substance was mixed, in some places, principally on the head, shoulders, and buttocks, with dust and blood.

To enable us to examine the said body with care, we had it washed and carefully dried. We observed afterwards that it was large, fat, well formed, exempt from putrefaction and fœtor. Its whole length was nearly twenty inches, and its weight about seven pounds.

The whole of the surface of the trunk was soft and of a pale colour except on the back, where we remarked an ecchymosis or violet stain, unequally circumscribed and oblong, about three and a half inches in length, and two inches in width, which did not extend beyond the adipose tissue—of which we assured ourselves by dissection.

The flesh of the limbs was soft, and all the joints flexible; the left elbow and the thumb of the corresponding hand slightly excoriated, as well as the external part of the knee, and the heel of the same side.

The face was of a livid colour, the right cheek of a very deep brown, and deeply infiltrated with blood, of which we assured ourselves by two incisions; the eyelid, the eye, the forehead, and the temple of the side, were ecchymosed and blackish.

The skull was very soft on the right side, changed its form by the slightest pressure, and sank down when it was placed on the opposite side. The skin on the temporal region of the right side, from the top to the neck, and from the forehead to the occiput, was brownish; and through this skin could be distinguished, by the fingers, the fluctuation of a fluid which seemed to have separated it from the bones. We convinced ourselves, by means of an incision, that it was an effusion of blood, partly coagulated, which extended over all the parietal bone, and upon the squamous portion of the temporal bone. The first of these two bones, in its middle and superior part, was entirely detached from the neighbouring bones, as well as from the pericranium, and from the dura mater. It was also fractured in two places and in two ways, viz. directly from the third superior of its anterior edge to the corresponding point of its posterior edge, and obliquely from the parietal swelling to the temporal bone. This last bone was equally broken in its superior edge, and its articulation with the lower jaw was so altered that we could neither distinguish its form or structure.

The other parts of the body presented no appearance of lesion externally. We observed, only on the left side of the chest, at a half inch from the sternum, between the second and third rib, a small round wound, half a line in diameter. A similar wound existed on the left side of the neck and immediately above the shoulder. But neither penetrated beyond the skin, as we proved by dissection.

On opening of the head, we found the right lobe of the brain covered with blood, and completely disorganised; it had no longer its natural form, structure, or consistence. We found also at the basis of the skull, about two ounces of serum.

On opening the chest, we perceived no defect of conformation in the organs; the heart and the large vessels were gorged with blood, the lungs developed and of a rose colour. After having detached,

wiped, and weighed these last organs, we placed them in water; at first entire, afterwards by pieces, which we pressed hard in a linen, and they swam equally in both cases.

On opening the abdomen, the viscera presented no alteration nor deformity; the large intestine was filled with meconium, and the bladder contained a little urine.

After all these observations, we conclude and declare that the child whose body we examined, was of full term, strong and well made; which is attested by its volume, weight, dimensions, and its exterior conformation.

That it was born alive, which is proved by the ecchymosis and infiltration of the face, as well as by the effusion of blood below the integuments of the skull.

That it has completely respired, as we proved in examining the state of the lungs, and in placing them in water, when they completely floated.

That it died shortly after its birth; which is also proved by the adhesion of a portion of the umbilical cord to the umbilicus; by the unctuous and whitish substance with which the skin was covered, and by the meconium with which the large intestine was filled.

That it had not been long dead; which is proved by the absence of fœtor and of every mark of putrefaction; by the softness and freshness of the flesh, and by the flexibility of the joints.

That the death of the child could not be the effect, either of a hæmorrhage by the umbilical cord; which is proved by the engorgement of the heart and of the large vessels;—nor of suffocation; which is proved by the absence of any alteration in the chest and lungs;—nor of any natural or ordinary cause, which is proved by the marks of violence impressed on the head and face, which attest, on the contrary, a violent death;—nor of a fall on the skull, where we observed fractures of which the situation, the form, the number, and direction, prevent us attributing it to this cause.

Finally, that the death of this child is the effect of blows or external violence, given a short time after its birth, on the right side of the head and of the face; the only cause to which we could attribute the fractures of the skull, the effusion of blood in this cavity, and the disorganisation of the brain.

In testimony of which, we have drawn up the present report, which we closed at the house of ———, in presence of ———, and which we certify to be correct.

Made ——— day, month, and year.

Signed.

2. *Report on a case of infanticide in consequence of omitting to tie the umbilical cord.**

I, the undersigned, doctor in medicine, and physician of the Hospital of Trevoux, report, that in consequence of a request from the magistrate to go to the commune of ———, to visit the body of

* Manuel de Médecine Légale. Par Briand. P. 314.

a new-born child, which the mayor of that commune declared that he would not permit to be buried, until the cause of its death had been proved, I repaired to said commune on the 5th of November, 1811, and made inquiries of the female in whose possession I found the body of the child. In reply to my interrogatories, she stated that she had received the said child the day before, at five leagues distance from that place, in a clandestine manner from M. * * * enveloped in a strong covering, and with an order to depart instantly. That during her journey, not hearing it cry, she put it to the breast; she found, however, that it scarcely breathed and would not suck, and on her arrival with it, in spite of all her care, the child was dead. On examining the child's clothes, she found them all bloody, and the blood appeared to come from the umbilical cord. After this information, I proceeded to examine the body of the child, and found it to be a male, seventeen inches long, and only four pounds in weight, having its nails and hair like a child at the full time. The skin, both of the face and of the whole body, was of the colour of white wax—the lips were of the same colour, instead of being rosy—the limbs were flaccid and pliable, and the lower part of the belly very projecting. On examining carefully the whole surface of the body and all the external cavities, no trace of violence of any kind could be discovered. The state of the umbilical cord, however, struck me particularly. It had a ligature upon it, but so loose that the handle of a bistoury could be run between the cord and the ligature. On measuring the cord I found it cut off clean at three inches from the umbilicus. I now proceeded to open the chest. The lungs and heart were such as they ordinarily are in children who have respired, but of a very pale colour. Having detached the viscera for the purpose of making experiments on the lungs, the following things were observed: 1. In separating the heart and lungs from the chest, not a single drop of blood was perceived, nor was there any during the dissection. 2. The lungs pressed between the hands and cut with a knife, crepitated throughout their whole extent. They were also perfectly healthy. 3. On putting the heart and lungs connected together in a bucket of water at the temperature of 10° Reaumur, the whole floated perfectly. 4. The quantity of blood found in the heart and large bloodvessels, after having opened them, was only two ounces. The cavity of the abdomen and its contents were then examined, but presented nothing peculiar, with this exception, that the liver was much paler than common, and the large vessels, dissected and followed up even to the extremity of the cord, contained not a drop of blood. The urinary bladder and the intestines were found empty; the first of urine and the second of meconium.

From these various observations, I draw the following conclusions: 1. That the child in question was born at the full term, alive, and in a sound state. 2. That it must have performed a great number of full and complete respirations, and that it must have lived several hours. 3. That it did not receive any violence, properly so called, such as blows, contusions, &c., which could have caused its death.

4. That its death was the result of hæmorrhage from the umbilical cord, and that it is probable that the flat string which loosely surrounded the extremity of the cord, was placed there as a ligature, after life had already been entirely extinguished by the hæmorrhage.

3. *Report of a case of recent delivery.**

We the undersigned, professors of the faculty of medicine, &c. ——, at the request of the commissary of police of the division of Luxembourg, went with him this day (Sunday), 12th November, 1809, at 10 o'clock in the morning, to a house occupied by Me. Catherine Tillard, for the purpose of visiting her daughter Nanette Tillard, who was supposed to have been delivered of a child on Thursday morning the 9th of this month, and to give evidence concerning her situation.

We found the said Nanette Tillard in bed, and from the examination which she underwent, we made the following observations:

1. Her face was somewhat pale—her eye heavy, and slightly discoloured.

2. Her pulse was febrile, full and fluctuating—the skin was soft and pliable—a little heated, and with a moisture on it, which had the acid odour which is peculiar to women in childbed.

3. The breasts were tumid and painful; milk had already issued from the nipple, as we convinced ourselves by examining the stains on the linen of the patient: moreover, in squeezing the breast gently, we expressed a milky fluid well marked by its colour and consistence.

4. The abdomen was soft—the skin was loose, wrinkled, covered with little shining reddish, whitish lines, crossing each other in different directions, running chiefly from the region of the groins and of the pubis to the umbilicus; a brownish line was also visible, running from the pubis to the umbilicus, and we perceived that the median line of the abdominal muscles had experienced considerable extension, as was ascertained by the irregularity of its course in running the end of the finger over it, especially on the side towards the umbilical region; finally, through the parietes of the abdomen, we felt the body of the womb, which was voluminous, hard, and round, at a little distance from the umbilicus, and contracted itself very distinctly under the hand while pressing it.

5. A whitish fluid, mixed with blood, issued from the genital organs, which had the colour and the strong odour peculiar to parturition, as we convinced ourselves by examining the linen under the patient.

6. The genital organs were slightly tumefied, and very much dilated in their whole extent; the orifice of the womb was relaxed and soft—it gave passage to the bloody whitish fluid just mentioned; it was so pliable, and so much dilated, that we could easily have introduced several fingers.

7. Finally, we found by examination that the pelvis was large, wide, and well constructed for an easy delivery.

From these different observations, we affirm,

* Considérations sur l'Infanticide. Par Lecieux. P. 68.

1. That Nanette Tillard had been delivered three or four days at the furthest, which is satisfactorily proved by the condition of the breasts—the secretion of the milk in them—the smell of the perspiration—the nature of the discharge from the genital organs—the state of the womb, of the abdomen, and of the genital organs.

2. That no disease or affection other than delivery, could produce all these effects combined, which we have observed.

3. That, from the formation of the pelvis, Nanette Tillard could be delivered easily and promptly.

Part III.

Of Infanticide in its relations to medical police, including a history of legislation on the subject, and an examination of the effects of foundling hospitals.

Infanticide, which at one period prevailed so universally and without restraint among the most polished nations of the world, is now considered, in all enlightened countries, as a crime of the deepest dye. Mankind, on this subject, have vibrated from one extreme to the other: and it is not to be questioned, but that in the present day, many an innocent female is wantonly sacrificed to suspicion and prejudice. The *principle*, however, which now guides the moral judgment of society on this subject, is, undoubtedly just; for it is a crime which presupposes the obliteration of those feelings which human nature ought to be most proud of; and which, if countenanced, or but slightly punished, would lead to the most dreadful consequences.

That a young female of character and reputable connexions, and possessed of tender sensibility, may have been betrayed by the arts of a base seducer, and when reduced to a state of pregnancy, to avoid the disgrace which must otherwise be her lot, may stifle the birth in the womb, or after it is born, in a state of frenzy, imbrue her hands in her infant's blood, in the expectation of throwing the mantle of oblivion over her crime, is a case which too frequently occurs; but even such a case, with all its palliations, cannot be considered as less than wilful murder, and as such demands exemplary punishment.

It is not, however, enough for a wise legislation merely to punish crimes after they are perpetrated; it should also adopt the most effectual means of preventing their commission altogether. In the language of a philosopher, it may be said, that "the punishment of a crime cannot be just, if the laws have not endeavoured to prevent that crime by the best means which times and circumstances would allow."*

* Beccaria's Essay on Crimes and Punishments, p. 104. (New York edition.)

With regard to infanticide, it is impossible to suggest any method of arresting it completely, unless there be a total reformation of that corruption of manners which lies at the root of the evil. Next to this, the dread of severe punishment is the most effectual preventive. Foundling hospitals were also founded with this intent; whether they have this tendency, I shall consider presently, after having enumerated the laws enacted by different nations for the purpose of preventing and punishing this crime.

1. *Laws against criminal abortion or fœticide.*

Although the *Jewish* code specified nothing relative to criminal abortion, or to the murder of the new-born infant, yet it decreed, that if a pregnant woman should be *accidentally* injured in a fray between two men, so that she proved abortive, without any injury to her own person, the punishment was a fine, such "as the judges might determine." If the woman received any personal damage, the law of retaliation was then to operate—an eye for an eye, and a tooth for a tooth, &c. If she lost her life, death was the punishment.*

After the *Romans* began to consider the procuring of abortion as a crime, they denounced punishments against the authors of it. These, as has been already noticed when considering the animation of the fœtus, varied with the changes that took place in the philosophical sentiments of the nation. In the year 692, a council, convened in the palace of the emperor at Constantinople, ordained that it should be punished with the same severity as homicide.†

In *France*, the Roman law was adopted, and practised upon, until the Revolution. Their parliaments frequently condemned midwives to be hanged for procuring abortion in girls; and physicians, surgeons, and others guilty of this crime, were subjected to the same punishment.‡ The French code of 1791, commuted the punishment to twenty years imprisonment in chains. The penal code of the empire, adopted by Napoleon in 1810, contains the following provisions against this crime: "Every person who, by means of aliments, beverages, medicines, acts of violence, or by any other means, shall procure the untimely delivery of a pregnant woman, although with her consent, shall be sentenced to *confinement* (reclusion)."

"The same punishment shall be inflicted upon the mother who shall make use of such means, if they are followed by abortion."

"Physicians, surgeons, apothecaries, and other officers of health, who shall prescribe or administer such means of abortion, shall, if a miscarriage ensue, be sentenced to hard labour for a limited time."§

The criminal code of *Austria*, established in 1787, by Joseph II., in which the punishment of death is totally abolished, decrees, that "a woman with child, using means to procure abortion, shall be punished

* Exodus, xxi. 22, 23. † Foderé, vol. iv. p. 383. ‡ Ibid. p. 348.

§ Article 317. For a translation of the whole code, see Walsh's American Review, vol. ii.

with imprisonment for not less than fifteen, nor more than thirty years, and condemnation to the public works; augmented, when married."

"Accomplices advising and recommending abortion—imprisonment not less than one month, nor more than five years, and condemnation to the public works. The punishment to be increased, when the accomplice is the father of the infant."*

"The laws of *Germany* punish with from two to six years imprisonment, a woman (or her aiders, &c.) who, by potions or other means, shall have wilfully produced abortion, within the first thirty weeks from the time of conception; and the penalty is protracted to eight, or at the utmost to ten years, when such a crime has been committed within the last month of pregnancy.

The laws of *Bavaria* enact similar measures.

In the *Italian* code it is established, "that if a woman has used means with the intent to produce abortion, and this shall *not* have taken place, she is to be punished by imprisonment for a period of from six months to one year; but if abortion has been the consequence of such means, the imprisonment is to be of from one to five years' duration. The same penalties, but with exacerbations, are enacted against the father of the fœtus, if he has been an accomplice in the crime. Finally, the delinquent who, against the will of the mother, shall have caused abortion, or have made an attempt to cause her abortion, is to be punished by from one to five years' severe imprisonment; and if the life of the mother has thereby been brought into danger, or her health injured, the duration of the penalty shall be from five to ten years."†

The *English* law is thus stated by Blackstone. "If a woman is quick with child, and, by a potion or otherwise, killeth it in her womb; or if any one beat her, whereby the child dieth in her body, and she is delivered of a dead child, this, though not murder, was by the ancient law *homicide*, or manslaughter. But the modern law doth not look upon this offence in quite so atrocious a light, but merely as a heinous misdemeanour."‡ "But if the child be born alive, and afterwards die in consequence of the potion or beating, it will be *murder*."§ By a subsequent law, enacted in 1803, called the Ellenborough act, it was ordained, that "if any person shall wilfully and maliciously administer to, or cause to be administered to, or take any medicine, drug, or other substance or thing whatsoever, or use, or cause to be used or employed, any instrument, &c., with intent to procure the miscarriage of any woman, *not being*, or not being *proved* to be *quick* with child at the time of committing such thing, or using such means, then, and in every such case, the person so offending, their counsellors, aiders, and abettors, shall be, and are declared guilty of felony, and shall be liable to be fined, imprisoned, set in and upon the pillory, publicly or privately whipped, or transported beyond the sea for any term not exceeding fourteen years."‖ The

* Treatise on the Police of London. By P. Colquhoun, LL.D. P. 656. (Seventh edition.)

† London Medical and Physical Journal, vol. xliii. p. 96.

‡ Blackstone's Commentaries, vol. i. p. 129. § Ibid. Note by Christian.

‖ Statutes at Large, 43 George III. cap. 28. Male's Medical Jurisprudence, p. 114.

same act ordains, that administering medicines, drugs, &c., with the intent to procure abortion *after quickening*, shall be punishable with death.

On examining these provisions, it will be seen that there was a striking omission in the English law, against the procuring of abortion, *after a woman is quick* with child. The statute prescribed death as the punishment for administering any noxious or destructive substance, with an intent to destroy the child, and yet inflicted no punishment when the same was actually procured by mechanical violence. This defect of the statute was illustrated in a trial (already alluded to in a previous part of this essay) which took place in England, in 1808. One Pizzy, a farrier, and another person (a female), were indicted for administering a noxious and destructive substance to one Ann Cheney, with intent to produce miscarriage. It was proved by the deposition of Cheney herself, that repeatedly during her pregnancy she had taken medicines from the accused without producing any effect, and finally, that a few days before her delivery he took her up stairs alone, and introduced an instrument into her body. This was repeated, as the first attempt had not succeeded, and, accordingly, after the last one, she had never felt the child move. The jury, however, acquitted the prisoners, expressing themselves not fully satisfied with the evidence, to convict. On the trial, the counsel for the prisoner even objected to receiving that part of the evidence which related to his manual operations, as not relevant to the administration of the medicines, which alone constituted the capital crime; and the criminal was tried for giving medicine which had no effect, while the actual perpetration of the crime by mechanical violence, could only be noticed in court as proving the intention with which the medicines were given.* By a late statute, however (9 George IV. chap. 31, passed 27th June, 1828), and intitled "An act for consolidating and amending the statutes in England relative to offences against the person," this omission is provided for, and the whole law is recast. It now stands thus, "If any person, with intent to procure the miscarriage of any woman, then being quick with child, unlawfully and maliciously shall administer to her, or cause to be taken by her any poison or other noxious thing, or shall use any instrument or other means whatever with the like intent, every such offender and every person counselling, aiding, or abetting such offender, shall be guilty of felony and shall suffer death as a felon; and if any person with intent to procure the miscarriage of any woman, not being, or not being proved to be, then quick with child, unlawfully and maliciously shall administer to her, or cause to be taken by her, any medicine or other thing, or shall use any instrument or other means whatever with the like intent, every such offender and every person counselling, aiding, or abetting such offender, shall be guilty of felony, and being convicted thereof, shall be liable to be transported for any term not exceeding fourteen years, nor less than seven years, or to be imprisoned, with or without hard labour, in the common gaol or house of correction, for any term not exceeding three years, and if

* Edinburgh Medical and Surgical Journal, vol. vi. p. 244.

a male, to be once, twice, or thrice publicly or privately whipped (if the court shall so think fit), in addition to such imprisonment."

The law of *Scotland*, on this subject, appears to differ. Mr. Hume, in his Commentaries on the Criminal Law of Scotland, says, that all procuring of abortion, or destruction of future birth, whether quick or not, is excluded from the idea of murder, because, though it be quick, still it is only *pars viscerum matris*, and not a separate being of which it can with certainty be said, whether it would have become a quick birth or not. Since Mr. Hume wrote, a case occurred in the High Court of Justiciary, where the subject was discussed. A surgeon and midwife, indicted for the violent procuring of abortion, were convicted and sent to Botany Bay for fourteen years.*

Mr. Alison, one of the latest writers on Scotch law, states it to be as follows: "If a person gives a potion to a woman to procure abortion, and she die in consequence, this will be murder in the person giving, if the potion given was of that powerful kind, which evidently puts the woman's life at hazard." And again, "administering drugs to procure abortion is an offence at common law, and that equally whether the desired effects be produced or not." Thus cases occurred in 1806 and 1823, where persons were sentenced to transportation for using instruments to procure it; and in 1824, another was condemned to the same punishment, for administering arsenic with a like design.†

In the state of *New York*, the following are at present the laws. The first quoted have reference to the death of the mother, or the unborn quick child; the last, to the procuring of abortion.

"Every person who shall administer to any woman pregnant with a quick child, any medicine, drug, or substance whatever, or shall use or employ any instrument or other means, with intent thereby to destroy such child, unless the same shall have been necessary to preserve the life of such mother, or shall have been advised by two physicians to be necessary for such purpose, shall, in case the death of such child or of such mother be thereby produced, be deemed guilty of manslaughter in the second degree.

"The wilful killing of an unborn quick child, by any injury to the mother of such child, which would be murder if it resulted in the death of such mother, shall be deemed manslaughter in the first degree."‡

The punishment for manslaughter, first degree, is imprisonment in the state prison for a term not less than ten years; for the second degree, not less than four, and not more than seven years.

"Every person who shall wilfully administer to any pregnant woman, any medicine, drug, substance, or thing whatever, or shall use or employ any instrument, or other means whatever, with intent thereby to procure the miscarriage of such woman, unless the same shall have been necessary to preserve the life of such woman, or shall have been advised by two physicians to be necessary for that purpose, shall, on conviction, be punished by imprisonment in a county gaol, not

* Edinburgh Medical and Surgical Journal, vol. vi. p. 249.
† Alison's Principles of the Criminal Law of Scotland, pp. 52, 628.
‡ Revised Statutes, vol. ii. p. 661. Session Laws of 1830, p. 401.

more than one year, or a fine not more than five hundred dollars, or both."*

In the state of *Ohio*, the law against abortion is the following: "If any physician or other person, shall administer to any pregnant woman any drug, &c., or shall use any instrument or other means whatever, with intent thereby to procure the miscarriage of such woman, unless the same shall have been necessary to preserve the life of such woman, or shall have been advised by two physicians to be necessary for that purpose, he shall, on conviction, be punished by imprisonment for not more than one year, or by fine not exceeding five hundred dollars, or by both. If the woman be pregnant with a quick child, such person shall, in case of the death of the child or the mother by such means, be imprisoned in the penitentiary, not more than seven years, nor less than one year."†

In the state of *Connecticut*, the law enacts, that for administering any noxious or destructive substance for the purpose of procuring the miscarriage of a woman quick with child, the punishment, on conviction, shall be imprisonment in Newgate prison during his or her natural life, or for such other term as the court having cognisance of the offence shall determine.‡

In *Missouri*, the administration of poison with an intent to procure abortion, is punished by imprisonment for a term not exceeding seven years, and a fine not exceeding three thousand dollars.§

2. *Laws against the murder of the new-born infant.*

These, in almost all civilised countries, are capital. Previous to the fourth century, the edicts of the Roman emperors against this crime were partial and ineffectual; towards the latter part of that century, however, it was completely prohibited. The following is the article relating to it in the Cod. Justin. lib. viii. tit. 52, de infant. expositis, 1, 2: "Unusquisque sobolem suam nutriat. Quod si exponendam putaverit, animadversioni quæ constituta est subjacebit."‖

The Emperor Charles V. condemned the mother to death only in cases where it could be proved that the child had been born alive.¶ The Caroline code (*Constitutio Carolina*) in such cases ordained, that the guilty person should be tied in a bag with a live cock and a cat, and thrown into a river.**

The following statement of the laws against infanticide and abortion in the middle ages, is given in the Cabinet Cyclopædia of Dr. Lardner.

Among the *Germanic nations* of the middle ages, "death was the penalty of infanticide, generally, even at the time of birth; or if the judge spared the midwife, she lost her eyes." Among the Bavarians, there was a singular provision against abortion: "the pecuniary mulct was not only to be paid *annually* by the man who caused the abortion, but annually by his descendants to the seventh generation; for as the

* Revised Statutes, vol. ii. p. 694.
† American Jurist, vol. xiii. p. 211.
‡ Revised Laws of Connecticut, p. 152.
§ Laws of Missouri, 1825, p. 283.
‖ Beckman's History of Inventions, vol. iv. p. 437.
¶ Foderé, vol. iv. p. 396.
** Male, second edition, p. 271.

child or fœtus had not been baptised, and as its doom was, consequently, everlasting fire, no ordinary penalty should meet such a crime."* Among the Lombards, "in the twelfth century, we find the Lex Pompeia fully in force.† Infanticide was also terribly visited on the wretched mother, who was buried alive, and a stake thrust through her body. Subsequently we find some changes in the mode of punishment, as regarded both parricide and infanticide; sometimes the culprits were dragged by red-hot forceps to the place of execution; but the unnatural mother, even if she were only guilty of producing abortion, was often sewed in a sack, and thrown into a river. In Saxony, even at a late period, a viper, monkey, and dog, were sewed in the same sack; and at a later period, too, in Siberia and Lusatia, the living grave and stake were in use."‡

The *Frisians* allowed the infant to be exposed, or put to death, provided it had not sucked the breast of its mother. §

In 1556, Henry II. of France, made a law condemning to death every woman convicted of having concealed her pregnancy, and put to death a bastard child. This law prevailed until the year 1791,‖ when every thing relating to the concealment of pregnancy was repealed, and death declared to be the punishment of the murder of the child.

The penal code of the French empire enacted, that "every person guilty of assassination, parricide, *infanticide*, or poisoning, shall suffer death."—Art. 302.

Other articles provide against the exposure and abandonment of infants. "Those who shall expose and abandon in a solitary place, a child under seven years of age, and those who may order it to be exposed, shall, on that account alone, if such order be executed, be imprisoned for a term not less than six months, and not more than two years, and fined from sixteen to two hundred francs."—Art. 349.

And "if, in consequence of such exposition or abandonment, the child shall be mutilated or crippled, the act shall be considered and punished as in the case of wounds voluntarily inflicted; and if the consequence be death, it shall be considered and punished as *murder*."—Art. 351.¶

The *Austrian* law provides, that "exposing a living infant, in order to abandon it to danger and death, or to leave its deliverance to chance, whether the infant so exposed suffers death or not, shall be punished by imprisonment for not less than eight, nor more than twelve years; to be increased under circumstances of aggravation."**

In *Saxony*, infanticide is punished with the same severity as parricide; the culprit is put into a bag, with a dog, a cat, a cock, and a serpent, and then thrown into the water.††

Although the *Chinese* have no law prohibiting the exposure of

* Dunham's Europe in the Middle Ages, (Lardner, No. 49,) vol. ii. p. 145.
† Cod. Justin. 1, 9, pr. a. ad. Leg. Pomp. de Par.
‡ Dunham, vol. ii. p. 146.
§ Ibid. vol. ii. pp. 146, 206.
‖ Foderé, vol. iv. p. 365.
¶ American Review, vol. ii. p. 396.
** Colquhoun, p. 66.
†† Specimen Juridicum, etc. p. 44.

children, yet they inflict a slight punishment for the wanton murder of them. The following is the law on that subject: "If a father, mother, paternal grandfather, or grandmother, chastise a disobedient child in a severe and uncustomary manner, so that he or she dies, the party so offending shall be punished with one hundred blows.*

The *English* law on this subject has, within a few years, been materially changed.

By the Stat. 21, Jac. I. c. 27, it is enacted, that "if any woman be delivered of any issue of her body, which being born alive, should by the laws of this realm be a bastard; and that she endeavour privately, either by drowning or secret burying thereof, or any other way, either by herself or the procuring of others, so to conceal the death thereof, as that it may not come to light whether it were born alive or not, but be concealed: in every such case, the said mother so offending, shall suffer death as in the case of murder, except she can prove by one witness at the least, that the child whose death was by her so intended to be concealed, was born dead."†

Upon this statute, Blackstone remarks, "This law, which savours pretty strongly of severity, in making the concealment of the death almost conclusive evidence of the child being murdered by the mother, is, nevertheless, to be also met with in the criminal codes of many other nations of Europe, as the *Danes*, the *Swedes*, and the *French*."‡

This cruel law has since been mitigated. In 1803, an act was passed in that country, which decrees, that "women tried for the murder of bastard children, are to be tried by the same rules of evidence and presumption as by law are allowed to take place in other trials of murder: if *acquitted*, and it shall appear on evidence that the prisoner was delivered of a child, which by law would, if born alive, be a *bastard*, and that she did, by secret burying or otherwise, endeavour to conceal the birth thereof, thereupon it shall be lawful for such court, before which such prisoner shall have been tried, to adjudge, that such person shall be committed to the common gaol, or house of correction, for any time not exceeding two years."

The English law, according to the 9 George IV. chap. 31, stands at present thus—

"If any woman shall be delivered of a child, and shall by secret burying or otherwise disposing of the dead body of the said child, endeavour to conceal the birth thereof, every such offender shall be guilty of a misdemeanour, and shall be liable to be imprisoned, with or without hard labour, in the common gaol, or house of correction, for any term not exceeding two years; and it shall not be necessary to prove whether the child died before, at or after its birth, provided, that if any woman tried for the murder of her child shall be acquitted thereof, it lawful for the jury to find, in case it shall so appear in evidence, that she was delivered of a child, and that she did, by secret burying or

* La Tsing Leu Lee; being the fundamental laws, and a selection from the supplementary statutes of the penal code of China. By Sir George Staunton, F.R.S. —Quarterly Review, vol. iii. pp. 312, 313.

† East's Crown Law, vol. i. p. 228.

‡ Blackstone's Commentaries, vol. iv. p. 198.

otherwise disposing of the dead body of such child, endeavour to conceal the birth thereof, and thereupon, the court may pass such sentence, as if she had been convicted upon an indictment for the concealment of the birth."

In Scotland, "if a woman concealed her pregnancy during the whole period, and shall not call for, or make use of help or assistance in the birth, and if the child shall be found dead or be a missing, she shall be subject to two years' imprisonment."*

In the state of *New York*, we have no particular law concerning this crime, and as the English statutes are not in force, all trials for infanticide must of course be conducted according to the common law, and accessary circumstances can only be considered as proving the intent.

In *Massachusetts*, the mere concealment of a bastard child is punished with a fine not exceeding £50. For concealing the death, whether the child have been murdered or not, the mother is punished by being set on a gallows with a rope about her neck, for the space of one hour, and is further bound to her good behaviour at the discretion of the court. If convicted of the wilful murder of the infant, the crime is murder, and death the punishment.†

In *Vermont*, a law was passed in 1797, punishing with death the murder or concealment of a bastard, if it came to its death by the neglect, violence, or procurement of the mother. This has been repealed, and in the revised laws of that state it is enacted, that if a woman be privately delivered of a bastard, and it be found dead, and if there be presumptive evidence of neglect or violence on the part of the mother, the punishment shall be a fine not exceeding five hundred dollars, and imprisonment not over two years; one or both at the discretion of the court.‡

In *Connecticut*, the law determines, that if a woman conceal her pregnancy, and be delivered secretly of a bastard, she shall be punished by a fine of not more than one hundred and fifty dollars, or imprisonment not over three months. For concealing the death of a bastard, so that it may not be known whether it was born alive or not, or whether it was murdered or not, she is set on a gallows with a rope about her neck for one hour, and imprisoned for not more than one year.§

In *New Jersey*, the concealment of pregnancy, and delivery in secret, is considered a misdemeanor, and punished by fine and imprisonment. Concealing the death of the bastard is also punished by fine and imprisonment.‖

In *New Hampshire*, the concealment of the death of a bastard child is made a crime, and the punishment directed, is imprisonment for not more than two years, or a fine not exceeding one thousand dollars.¶

* Alison's Principles of the Criminal Law of Scotland, p. 151.
† Laws of Massachusetts, 1807, vol. i. p. 222.
‡ Laws of Vermont, 1808, vol. i. p. 349. § Revised Laws, 1821, p. 152.
‖ Digest of the Laws of New Jersey, 1833, pp. 224, 225.
¶ Digest of the Laws of New Hampshire, 1830, p. 149.

In *Pennsylvania*, by the act passed in 1781, the concealment of the death of a bastard child, was conclusive evidence to convict the mother. "And all and every person, who shall counsel, advise, or direct such woman to kill the child she goes with, and after she is delivered of such child, she kills it, every person so advising and directing, shall be deemed accessory to such murder, and shall have the same punishment as the principal shall have." This law has since undergone the following alterations. By the act of 5th April, 1790, the constrained presumption that the child, whose death is concealed, was, therefore, murdered by the mother, shall not be sufficient evidence to convict the party indicted, without probable presumptive proof is given that the child was born alive: and that of the 22d of March, 1794, declares, "the concealment of the death of any such child, shall not be conclusive evidence to convict the party indicted of the murder of her child, unless the circumstances attending it be such as shall satisfy the minds of the jury that she did wilfully and maliciously destroy and take away the life of such child."*

In *Rhode Island*, the law is very similar to that in Pennsylvania.†

In *Delaware*, by a law passed in 1719, the concealment of the death of a bastard child is made a capital offence, except the mother can make proof by one witness at least, that the child whose death was by her so intended to be concealed, was born dead. This, however, was repealed, and I cannot find at present any statute on this subject in the code of that state.‡

In *Georgia and Illinois*, the concealment of the death of an illegitimate child is punished with imprisonment.§

In *Michigan*, the laws as to the concealment of pregnancy, the delivery of the bastard child, and its death, are the same as those in New Jersey.‖

3. *Foundling Hospitals.*

Foundling Hospitals, by providing for the support of illegitimate children, are generally considered as a great means of preventing child murder. The object of these institutions is no doubt commendable, but it is certain that they are not productive of that decided utility which is usually attributed to them. It is not to be denied that some good results from them, but it is by no means commensurate with the abuses to which they give rise. That they encourage illicit commerce between the sexes—discountenance marriage—increase the number of illegitimate children, and consequently the number of exposures—are facts confirmed by the history of almost every foundling hospital

* Remarks on Infanticide by R. E. Griffith, M.D. Chapman's Journal, new series, vol. iv. p. 260. Laws of Pennsylvania, 1803, vol. v. p. 6. Addison's Reports, p. 1. Pennsylvania *v.* Susannah M'Kee.

† Laws of Rhode Island, 1798, p. 597.

‡ Laws of Delaware, 1797, vol. i. p. 67, vol. ii. p. 670.

§ Digest of the Laws of Georgia, 1822, p. 349. Revised Laws of Illinois, 1833, p. 177.

‖ Laws of Michigan, 1820, p. 194.

that has been established. Mr. Malthus states facts of this kind with regard to the Foundling Hospital in St. Petersburgh (Russia.) "To have a child," says he, "was considered as one of the most trifling faults a girl could commit. An English merchant at St. Petersburgh told me, that a Russian girl living in his family, under a mistress who was considered as very strict, had sent six children to the Foundling Hospital, without the loss of her place."* It is not necessary to enter into a laboured course of reasoning, to prove that the effects of these establishments are decidedly injurious to the moral character of a people. It is a position sufficiently self-evident, and as Malthus justly remarks, "an occasional child-murder, from false shame, is saved at a very high price, if it can only be done by the sacrifice of some of the best and most useful feelings of the human heart in a great part of the nation."†

In the language of the Edinburgh Review, "such an establishment (a Foundling Hospital) may safely be termed a great public nuisance, leading to unchaste life and to child-murder, beyond any other invention of the perverted wit of man; for, unless it can receive the fruit of every illicit connexion, which is impossible, it must needs encourage many to enter into such an intercourse, without giving them the means of providing against its consequences."‡

There is, however, another objection to Foundling Hospitals. The history of such establishments proves that they utterly fail of accomplishing their object, which is the preservation of the lives of children. The records of those which have been kept with the greatest care, exhibit the most astonishing mortality.

In Paris, in the year 1790, more than 23,000, and in 1800, about 62,000 children were brought in; and it is estimated, that eleven-thirteenths of all the foundlings perish annually through hunger and neglect.§ It is stated also, that vast numbers of the children die from a disease called l'endurcissement du tissue cellulaire, which is only to be met with in the Foundling Hospital.‖ Of 100 foundlings in the Foundling Hospital at Vienna, 54 died in the year 1789. Subsequent accounts of this hospital, do not represent it in a more favourable light. In a recent description of this institution, it is stated, that "all attempts to rear the children in the hospital itself had failed. In the most favourable years, only 30 children out of the 100 lived to the age of twelve months. In common years, 20 out of the 100 reached that age, and in bad years not even 10. In 1810, 2583 out of 2789 died. In 1811, 2519 out of 2847 died. Like the cavern of Taygetus, this hospital seemed to open its jaws for the destruction of the deserted and illegitimate progeny of Vienna. The emperor Joseph II. frequently visited this hospital in person, and upon one occasion he ordered Pro-

* Malthus on Population, vol i. pp. 368, 369.

† Malthus on Population, p. 370. For further illustrations of this fact see a history of the present condition of public charity in France. By David Johnston, M.D. Pp. 320, 321.

‡ Edinburgh Review, vol. xxxviii. p. 440.

§ Beckman's History of Inventions, vol. iv. pp. 456, 457.

‖ Cross's Medical Sketches of Paris, p. 197.

fessor Boer to make a series of experiments with all kinds of food, that it might be ascertained how far diet had its share in the mortality. Twenty children were selected, and fed with various kinds of paps and soups, but in a few months most of them were dead."*

In consequence of this extraordinary mortaliy, "in 1813, the government enacted that the foundling-house should serve merely as a depôt for the children, till they could be delivered to the care of nurses in different parts of the country." In 1822, under this new system of nursing in the country, the deaths had diminished from 1 to 2, to 1 to $4\frac{1}{2}$.†

In St. Peterburgh and Moscow, the Foundling Hospitals have always been managed with the greatest liberality and care; and yet, in the latter city, during the twenty years subsequent to 1786, when the hospital was first instituted, of 37,000 children received, 35,000 at least are computed to have died. In 1811, the foundlings admitted into the hospitals appropriated to them, were 2517, and the deaths were 1038. In 1812, 2699 were admitted, and the deaths were 1348. In the province of Archangel the proportion of deaths has been still greater: of 417 foundlings admitted in 1812, 377 died the same year.‡

In Palermo, during the year 1823, 597 foundlings were received at the hospital in that place, of whom 429 died.§

In the hospital at Metz, calculation shewed that seven-eighths of the whole number of children perished. In an institution of this kind in one of the German principalities, only one of the foundlings, in 20 years, attained to manhood.‖

The Foundling Hospital of London, exhibits rather a more favourable picture. The average of those who died there under twelve months, in ten years, was only one in six, and for the last four or five years, even less in proportion.¶

The general fact is, however, sufficiently evident, that the lives of the multitudes of children are sacrificed in these hospitals. The causes, too, are evident. In some instances, it arises from the want of nurses, or the mismanagement and cruelty of those that are employed; in others, from the delicacy of the infant—the want of its mother's nourishment—the vitiation of the air—and the contagious diseases to which children are more peculiarly exposed.

But do foundling hospitals diminish the number of infanticides? We have no evidence of such a result flowing from them. From the deleterious influence which they have upon the moral feelings of the female sex, we cannot believe that it is the case. And it is accordingly stated, that after the Foundling Institution of Cassel was established, not a year elapsed without some children being found murdered in that place or its vicinity.**

* Quarterly Journal of Foreign Medicine and Surgery, vol. i. p. 188.
† Elements of Medical Statistics. By F. Bisset Hawkins, M.D. p. 136.
‡ Ibid. p. 137. § Ibid. p. 139.
‖ Beckman on Inventions, vol. iv. pp. 456, 457.
¶ Highmore's History of the public charities in and near London, p. 727. Rees's Cyclopedia, art. *Hospital.*
** Beckman, vol. iv. p. 456.

The following account of the deaths in the different Foundling Hospitals of Europe, will afford ample testimony in support of the opinions already advanced. It is taken from the Edinburgh Medical and Surgical Journal, vol. i. pp. 321, 322.

"In 1751, Sir John Blaquiere stated to the House of Commons of Ireland, that of 19,420 infants admitted into the Foundling Hospital of Dublin, during the last ten years, 17,440 were dead or unaccounted for; and that of 2180 admitted during 1790, only 187 were then alive. In 1797, he got a committee of the same house appointed, to inquire into the state and management of that institution. They gave in their report on the 8th of May, 1797; by which it appeared, that within the quarter, ending the 24th March last, 540 children were received into the hospital, of whom, in the same space of time, 450 died: that, in the last quarter, the official report of the hospital stated the deaths at three, while the actual number was found to be 203: that, from the 25th of March to the 13th of April, nineteen days, 116 infants were admitted; of which number, there died 112. Within the last six years, there were admitted 12,786; died in that time, 12,651. So that in six years, only 135 children were saved to the public and to the world.

"In the *Charité of Berlin*, where some enjoyed the advantage of being born in the house, and of being suckled by their mothers six weeks, scarcely a fourth part survived one month.

"Every child born in the *Hotel Dieu* of Paris, was seized with a kind of malignant aphthæ, called *le muguet*, and not one survived who remained in the house.

"At *Grenoble*, of every 100 received, 25 died the first year; at *Lyons*, 36; at *Rochelle*, 50; at *Munich*, 57; and at *Montpellier*, even 60. At *Cassel*, only 10 out of 741 lived 14 years. In *Rouen*, one in 27 reached manhood; but half of these in so miserable a state, that of 108, only two could be added to the useful population. In *Vienna*, notwithstanding the princely income of the hospital, scarcely one in 19 is preserved. In *Petersburgh*, under the most admirable management and vigilant attention of the Empress Dowager, 1200 die annually out of 3650 received. In *Moscow*, with every possible advantage, out of 37,607 admitted in the course of 20 years, only 1020 were sent out."

In relation to the general effects of foundling hospitals, a most important work has recently been announced, of which only the prospectus has yet appeared, the following notice of which I take from Silliman's Journal of Science and the Arts. In collecting materials for this work, the author* has travelled over the greater part of Europe. According to this author, it is chiefly in Catholic countries that foundling hospitals are found. "Austria has many such institutions; Spain reckons 67; Tuscany, 12; Belgium, 18; but France, in this respect, excels other countries—she has no less than 362. Protestant countries, on the contrary, have suppressed the greater part of those which had been specially founded for this purpose."

* M. De Gouroff, Rector of the University of St. Petersburgh, Counsellor of State, &c.

To form an idea of the advantage of the Protestant system over that of the Catholic countries, the author states, that "in London, the population of which amounts to 1,250,000, there were, in the five years from 1819 to 1823, only 151 children exposed; and that the number of illegitimate children received in the 44 workhouses of that city, of which he visited a large number in 1825, amounted, during the same period, to 4668, or 933 per annum; and that about one-fifth of these are supported at the expense of their fathers. By a striking contrast, Paris, which has but two-thirds of the population of London, enumerated, in the same five years, 25,277 *enfans trouvées*, all supported at the expense of the state."

To ascertain the contagious influence of these houses on the abandonment of new-born children, Mayence had no establishment of this kind, and from 1799 to 1811, there were exposed there 30 children. Napoleon, who imagined that in multiplying foundling hospitals, he would multiply soldiers and sailors, opened one in that town on the 7th November, 1811, which remained until March 1815, when it was suppressed by the Grand Duke of Hesse-Darmstadt. During this period of three years and four months, the house received 516 foundlings. Once suppressed, as the habit of exposure had not become rooted in the people, order was again restored; and in the nine succeeding years, but seven children were exposed.*

LIST OF BRITISH AND AMERICAN CASES AND TRIALS FOR INFANTICIDE.

1. Willian Pizzy and Mary Codd, tried at Bury St. Edmunds, 1808, for feloniously administering a certain noxious and destructive substance to Ann Cheney, with intent to produce miscarriage. In this case, the abortion was perfected, not by the medicine, but by the subsequent introduction of an instrument into the uterus. — Edinburgh Medical and Surgical Journal, vol. vi. p. 244.

2. Charles Angus, indicted and tried at Lancaster, 1808, for the murder of Margaret Burns, of Liverpool. In this case, the prisoner was charged with endeavouring to procure an abortion, by means of an instrument, and also by the administration of drugs, which terminated in the death of the female. This is a most important and interesting case, well worthy of being studied. — See Annual Medical Register for 1808, vol. i. p. 143. Edinburgh Medical and Surgical Journal, vol. v. p. 220. A vindication of the opinions delivered in evidence by the medical witnesses for the Crown, on a late trial at Lancaster for murder, p. 88: an able pamphlet, written by John Rutter, M.D. of Liverpool. Paris and Fonblanque, vol, ii. p. 176. A full account of this case is also given by my brother, in the chapter on *Delivery*, in this work.

3. The case of Phillips, tried in January 1811, for attempting to procure abortion in Hannah Mary Goldsmith, by giving savine. — Paris and Fonblanque, vol. iii. p. 86.

4. The case of Robin Collins, tried at Chelmsford assizes, 1820, for administering steel filings and pennyroyal water, with the intent to procure abortion. — Ibid. p. 88.

5. The case of Margaret Tinkler, indicted at Durham in 1781, for the murder of Janet Parkinson, by having inserted wooden skewers into the uterus, for the purpose of producing abortion. — Ibid. p. 72. Principles of Forensic Medicine. By J. Gordon Smith, M.D. P. 326. East's Pleas of the Crown, Tit. *Murder*.

6. Sarah Hill, for infanticide. — Edinburgh Medical and Surgical Journal, vol. xi. p. 77.

7. Mary Eastwood, for infanticide. — Ibid. p. 78.

* American Journal of Science and the Arts, vol. xvii. p. 393.

8. Case in Scotland, for infanticide.—Edinburgh Medical and Surgical Journal, vol. xxi. p. 231.

9. Sarah Little, for infanticide, reported by P. J. Martin, surgeon.—Ibid. vol. xxv. p. 34.

10. Bease and Elliot. Infanticide.—Ibid. vol. xxxv. p. 456.

11. Margaret Patterson. A case of infanticide, examined and reported by David Scott, M.D. of Cupar-Fife, Scotland, accompanied with remarks by Professor Christison of Edinburgh. This is a highly interesting case, and altogether the best reported one in the English language.—Ibid. vol. xxvi. p. 62.

12. Case of alleged infanticide at Aberdeen, 1804. The child died from inability on the part of the mother to aid it after birth.—Paris and Fonblanque, vol. iii. p. 126, taken from Burnett's Treatise on the Criminal Law of Scotland.

13. Case of infanticide at Aylesbury, in 1668. The woman murdered her child in a state of temporary insanity, and was acquitted on that ground.—Ibid. p. 129.

14. Mary Baker, reported by Dr. Robinson of Bridport, England, for infanticide.—London Medical Repository, vol. xxii. p. 346.

15. Case of infanticide, reported by W. Chamberlaine, surgeon in London.—London Medical and Physical Journal, vol. vii. p. 283.

16. Case of infanticide, reported by Mr. F. H. Ramsbotham.—London Medical Repository, vol. xxi. p. 344. Godman's Journal of Foreign Medicine and Surgery, vol. iv. p. 532.

17. A woman indicted and tried for infanticide, at the Sussex assizes, England, 1825.—Johnson's Medico-Chirurgical Review, vol. ix. p. 239.

18. Eliza Maria Jones, for infanticide. Reported by Professor Amos.—London Medical Gazette, vol. x. p. 375.

19. A case in London, of infanticide.—Lancet, vol. ix. p. 339.

20. Susanna Powell. Trial for infanticide at Schenectady, State of New York, in 1810.—Report of the trial of Susanna, a coloured woman, before the Hon. Ambrose Spencer, Esq., at a court of oyer and terminer, held at Schenectady, 23d October, 1810, on a charge of having murdered her infant bastard male child. By Henry W. Warner, 1810.

21. A trial for infanticide, October 1831, in Jefferson county, Ohio, before the supreme court. Reported by John Andrews, M.D.—American Journal of Medical Sciences, vol. ix. p. 257

22. Trial of Hannah Hall, for murdering her illegitimate child, in the county of Chester, Pennsylvania, in 1833. Reported by Isaac Thomas, M.D.—Ibid. vol. xiii. p. 565.

CHAPTER IX.

LEGITIMACY.

1. Of the ordinary term of gestation—whether uniform or not. Causes that may produce mistakes in the reckoning of females. Variation observed among animals in the term of gestation. Causes which, it is supposed, may vary it in the human species—physiological explanations of this. 2. Premature delivery. Within what period a mature child should be deemed legitimate. 3. Protracted delivery. Remarkable cases of it in ancient Rome, Germany, France, and England. Gardner peerage case—Opinions of distinguished accoucheurs on this subject. Cases. 4. Laws of various countries on the subject of legitimacy—Roman, ancient French, Prussian, modern French, and Scotch laws.—Decisions under these. Want of positive law in England and America. English cases. Remarks on this subject. 5. Questions relating to paternity and filiation. Paternity of children where the widow marries immediately after the death of her husband. Cases in the Roman, English, and American courts. English law on this subject. Similitude and colour as evidences of paternity. Cases.

The reproach that I have incurred of treating the present subject with levity, has induced me carefully to revise what I had written. I trust that on this point at least, I shall not again deserve censure; but I have at the same time to avow, that on the main question, my sentiments are unaltered. The sense, however, of what is due to my readers, will prompt me to give a fair and full abstract of the facts and arguments on both sides of this interesting controversy. The following division will be pursued:

1. Of the ordinary term of gestation.
2. Of premature delivery.
3. Of protracted delivery.
4. Of the laws on the above subjects. And,
5. Of some questions relating to paternity and filiation.

1. *Of the ordinary term of gestation.*

By the common consent of mankind, the term of gestation is considered to be ten *lunar* months, or forty weeks—equal to nine *calendar* months and a week.* This period has been adopted, because general observation, in cases which allowed of accurate observation, has proved

* It is very important to recollect the distinction between *lunar* and *calendar* months. Some of the diversity of statement that exists, has originated from inattention to this. Nine calendar months may be from 273 to 275 days; ten lunar months are 280 days.

its correctness.* It is not, however, denied that differences of one or two weeks have occurred, Dr. William Hunter, in answer to a question put to him on this subject, replied, that "the usual period is nine calendar months (thirty-nine weeks); but there is very commonly a difference of one, two, or three weeks."†

It is important to understand why this difference occurs, or, in other words, to explain on what facts the calculations of females and their medical attendants are founded. I apprehend that these have not been sufficiently considered in the discussions on this subject.

Dr. Lyall, in his publication on the Gardner Peerage case, mentions four circumstances, and probably either one or more have influence in the reckoning of almost every case. They are, 1. Certain peculiar sensations experienced by some females at the time of conception, or within a few hours, or a day, or two or more days, after the fruitful coitus. 2. The cessation of the catamenia. 3. The period of quickening. 4. A single coitus. If we review these, we shall find a certain degree of uncertainty to attach to all. There are some females who are not conscious of ever experiencing the first—the last is not applicable to married females—while the period of quickening (as we have shewn in a previous chapter) varies sufficiently to render it perfectly nugatory, in a calculation to be made like the present.‡ There remains, then, only the cessation of the catamenia, and this indeed is the point from which most females date the period of conception. The exact time generally taken is the middle period between the last appearance of the menses and that in which they would have recurred, if pregnancy had not supervened. Some, however, calculate from the first week after the cessation.

But even this is liable to doubt and to mistake. We have mentioned that some females have bloody discharges during the early months of pregnancy, and although medical men may consider these as altogether distinct from the product of menstruation, yet the female makes no such discrimination. This, however, if ending in the birth of a child at the usual period, might lead to the belief of its being a

* Take the following case by Dr. Montgomery, as an example; "A lady who had been for some time under our care in consequence of irritable uterus, went to the seaside at Wexford in the month of June 1831, leaving her husband in Dublin, a temporary separation being considered essential to the recovery of her health. They did not meet until the 10th of November, on which day he went to see her, and being engaged in a public office, he returned to town next day. The result of this visit was conception: before the end of the month, she began to experience some of the symptoms of pregnancy; and when she came to town on the 22d of February she was large with child, and had quickened on the 29th of January. Her last menstruation had occurred on the 18th of October." She went on well through her pregnancy, and was delivered on the 17th of August, making exactly 280 days from the time of conception. The quickening in this case was very early, being before the completion of the twelfth week.—Cyclopædia of Practical Medicine, vol. iv. p. 87. art. *Succession of Inheritance.*

† Hargrave and Butler's Note 190* to Section 188 of Coke upon Littleton.

‡ It has been suggested that the period of quickening is uniform in the same female, and that by consequence some data might thus be obtained for settling the contested point; but even this is found to be incorrect. Dr. Montgomery (as well as others) mentions cases of variety in time, even so great as a month.

premature case, but on the other hand, the menses may have been suppressed for one or two mouths previous to conception taking place, and here an opportunity is given for adducing an instance of protracted gestation.

In connexion with this, the variety that exists as to the return of the period of menstruation, may assist in leading into error. The common idea is that the menstrual discharge returns every twenty-eight days, or in other words, that there is this time "between the end of one menstrual period and the beginning of another." A practitioner of midwifery in London, in a communication to Dr. Lyall, asserts that this is a mistake—"that the twenty-eight days include both the period and the interval, and that a female who begins to be unwell on the 1st of May, will be again so on the 28th of the same month, and hence ten times in 280 days.* Dr. Ramsbotham, in his lectures on midwifery, makes a similar assertion, that these twenty-eight days are from the commencement of one period to the commencement of another.†

But even if this be granted, it is far from invariable. Dr. Davis observes, that many women menstruate at intervals of from 24 to 20 days, and there are some, indeed, he says, who menstruate twice a month.‡ Dr. Blundell, although he allows the greatest frequency at four weeks, speaks of periods of three weeks and some of five weeks. Mr. Roberton of Manchester, in 100 cases taken without selection, found 61 in which the menses returned monthly, 28 in three weeks, 10 in intervals of varying and uncertain duration, and 1, a healthy woman aged twenty-three, in whom they recurred every fortnight.§

Dr. Gall made inquiries on this point at Vienna, and found that every female had thirteen menstrual periods during the year, so that she who menstruated on the 3d of January, did so for the 14th time on the last day of December. He found among perfectly regular females intervals of 21, 25, or 26 days.‖ Velpeau remarks, that sometimes only 22, 20, 18, or even 15 days supervene. I know a person, says he, who is never more than twelve days free from it, whilst others are regular every thirty-second, thirty-fifth, or even fortieth day.¶ Is it not possible that a female or even her medical attendant, may sometimes reckon the *missed periods* as lunar months, and thus produce a protracted case?

However this may be, we have at least shewn the difficulties attending a precise calculation, and explained why mistakes of two and even three weeks may sometimes occur, without affecting the leading question of a regular term of gestation. If, in connexion with this, we

* Lancet, vol. x. p. 660. † London Medical Gazette, vol. xiii. p. 269.
‡ Obstetric Medicine, p. 252.
§ Edinburgh Medical and Surgical Journal, vol. xxxviii. p. 252.
‖ Elliotson's Blumenbach, p. 465.
¶ Velpeau's Midwifery, p. 87. "It is the opinion of most of the women of this country, that a catamenial month is a month of four weeks." This was Dr. Denman's decided opinion, and also Dr. Sims's, "than whom, perhaps, no physician of any age formed his opinions more independently of the opinions of others."—Davis's Obstetric Medicine, p. 251.

take the general sense of the individuals who are the subjects of investigation, and that of at least a fair proportion of the intelligent and scientific members of the profession particularly conversant in midwifery, we shall find that the prevailing opinion in nearly all countries, is in favour of the above-mentioned regular period.*

There are, however, physiologists who doubt this uniformity, and advance various arguments against it.

The first, and in my view the most important, is drawn from the variety observed in the gestation of animals. The ancients, it appears, were aware of this, and noticed it in their writings. But the individual who has paid the greatest attention to it is M. Tessier. In a memoir presented to the National Institute, he states, that he has been forty years occupied with it, and kept a register of the facts. Out of 160 cows, fourteen calved from eight months to eight months and twenty-six days, 3 at 270 days, 50 from 270 to 280 days, 68 from 280 to 290 days, 20 at 300, and 5 at 308 days; the extremes were thus 67 days. Of 102 mares observed, 3 foaled on the 311th day, 1 on the 314th, 1 on the 325th, 1 on the 326th, 1 on the 330th, 47 from 340 to 350 days, 25 from 350 to 360, 21 from 360 to 377, and 1 on the 394th day; the extremes being 83 days. With sows, the extremes were 15 days: and with rabbits (139 observed), 7 days, varying from 26 to 33 days.†

These facts certainly go to shew that the period of gestation is irregular among animals; and should they be verified by succeeding observers, a strong argument from analogy will be furnished against its uniformity in the human race. It must, however, be recollected, that even if perfectly established, it is only a favourable, and not a decisive proof.‡

But there are causes assigned, by which it is alleged that the ordinary term of gestation may be varied.

Changes in the constitution of the atmosphere. These, it is supposed, sometimes exert an important effect on the uterus. The

* I am peculiarly happy to find that Dr. Anthony T. Thomson is a firm believer in a uniform period of gestation. See his Lectures in London Medical and Surgical Journal, vol. vi. pp. 545, 577.

† Repertory of Arts 1st series, vol. xii. p. 140. This contains a translation of Tessier's Memoir. My former quotations were altogether incorrect, having been copied from Cooper's Tracts.

‡ It is to be regretted that this subject has not been more noticed. I have frequently asked farmers concerning it, and most of them have asserted that the period is very regular. They are not, however, in the habit of making memoranda. I was furnished with the following by one of my pupils at the Western Medical College, Dr. Seth L. Andrews. In seven instances, where his father, the Rev. E. D. Andrews of Pittsford, noticed the period of gestation in cows, the result was as follows:

40 weeks 3 days;
40 weeks 4 days;
40 weeks 5 days;
41 weeks 3 days;
40 weeks 6 days;
40 weeks 3 days;
40 weeks 5 days.

The extremes thus varying only seven days.

authority of Hippocrates is cited, affirming that a warm winter, accompanied with rains and south winds, and succeeded by a cold and dry spring, causes abortions very readily in females who are to be delivered in the spring. Many physicians are said to have verified this observation in later times; and Foderé himself observes, that at Martigues, in 1806, after a warm winter, an epidemic catarrh broke out, and all the pregnant women miscarried.

The constitution and habits of the females, it is believed, vary it. That part of the sex which reside in cities, and lead effeminate lives, are more liable to variations than others differently situated. The nervous system also may be so affected as to cause similar changes.

The womb may at one time be irritable, and at other times passive; and in this way, the ordinary term will not prove constant.*

I will barely remark on these arguments, that experience has refuted, and is constantly refuting them. There is not a practitioner in midwifery who has not, within his own observation, met with cases sufficient to contradict the opinions just advanced.† It frequently happens that females of the most irritable habits and effeminate course of life, proceed to the ordinary period—nay it almost universally is so; and although some may be delivered at the thirty-seventh or thirty-eighth week, yet if gestation be completed much sooner, the size of the child, or the dangers attendant on premature birth, are generally sufficient to prove the nature of the case. As to the effect of epidemic constitutions, it will be observed, that this cannot with fairness be used as a general argument; nor, indeed, does it prove any thing more, than that the state of the weather may be such as to predispose to abortion.

To all this, however, the *argumentum ad hominem* is rejoined, and cases are adduced which certainly appear difficult of explanation, unless we allow that gestation may be protracted. I shall notice some of these in a subsequent section, and shall conclude this by mentioning the theory promulgated by Dr. Power of London (a believer in protracted gestation), in explanation of its supposed occurrence. How far it is to be considered as perfectly original, will be seen by referring to my preceding remarks.

Dr. Power refers first to the change that takes place in the state of the womb during the progress of pregnancy. The neck disappears; the fœtus presses on the mouth, in consequence of the insensible contraction that is going on; and when labour commences, there is "orificial irritation," increased by the large quantity of nerves going to that part. Whatever then will prevent the contents of the womb from irritating its mouth, or interfere with the due application of its insensible contraction, may not only delay labour, but *delay its commencement*

* These arguments are taken from Foderé, a believer in protracted gestation, vol. ii. chap. 8. Merat suggests that the tardy or rapid developement of the neck of the womb may be the cause of the variety that occurs, and the former again to disease, hardness of its fibres, &c.—Dictionnaire des Sciences Médicales, vol. xviii. p. 327, art. *Naissances tardives.*

† The fact that dead children and twins are born at the regular period, is certainly a strong proof of there being a fixed term of gestation.

beyond the usual time. He adduces cases illustrative of this, in some of which, pressure alone appears to have been sufficient, after considerable delay in the natural state, to bring on the phenomena of labour; in others, it has been postponed in consequence of an oblique or improper situation of the mouth of the womb.*

II. *Of premature delivery.*

The question which requires consideration under this section, is whether a child with all the characters of maturity, as we have described them in a previous chapter, can be born before the ordinary term of gestation? And its direct bearing is on the subject of legitimacy. A husband, for example, has been absent from his family, and at the end of seven or eight months after his return, a full grown healthy child is produced. Is the honour of the family to be impeached, or shall we allow that this variation is possible?

There is an intrinsic difficulty connected with this question, which should lead us to be tender in forming our opinions, and this originates from the variety observed in children when born at the full time. They differ in size, general appearance, healthiness, &c.; and sometimes, indeed, we know that eight months' children have been observed larger and healthier than those of nine months. The general appearance, then, should be noticed, but not too much relied on, in forming an unfavourable opinion.

It is an unquestionable fact, that there is in many females a disposition to expel the child before the ordinary term. This not only takes place at the thirty-seventh or thirty-eighth week, when we might suppose that the female had made a mistake in her calculation, but occurs as soon as the seventh month. La Motte, in his Midwifery, mentions of two females who always brought forth at seven months. Van Swieten says he has observed similar cases, and Foderé relates of a female in the duchy of Aost in the same situation.† It will not, however, be contended that these are to be considered as indicating a healthy and regular state of the uterine function, but rather as a consequence of disease.

If the question be confined in the manner already stated, we may derive aid from the appearance of the child, and the condition of the mother; and although it may be deemed *barely* possible that a child born at seven months may *occasionally* be of such a size as to be con-

* See Dr. Power's pamphlet on this subject, "An Attempt, &c.," quoted in the catalogue of books consulted, and also his evidence, on the Gardner peerage case Dr. Lyall pertinently asks (p. 84), why, if this theory be true, does not labour always come on gradually; since the stimulant (orificial irritation) is not applied suddenly, but progressively! Dr. Ramsbotham has recently, in his Lectures on midwifery, suggested in explanation of the difference in human gestation, that there are various periods which elapse during the passage of the ovum through the fallopian tube. He refers, in illustration of this, to John Hunter's case (Transactions of a Society, vol. ii.), where no fœtus could be detected at four weeks, and Sir E. Home's case, where it was seen at one week.—London Medical Gazette, vol. xiii. p. 553.

† Foderé, vol. ii. p. 128.

sidered mature, yet I apprehend that the assertion is most frequently made by those whose character is in danger of being destroyed.

If a mature child (mature not only as to size, but also as to other characters already enumerated as indicative of perfect developement,*) be born before seven full months after the alleged connexion, it ought certainly to be considered as illegitimate.†

III. *Of protracted delivery.*

I propose to devote this section to a statement of some cases that have occurred at various times, and been made the subject of legal investigation, and also to a notice of the opinions of distinguished accoucheurs.

One of the oldest cases on record, is mentioned by Pliny the naturalist. He states, that the Prætor L. Papirius, declared a child born at thirteen months, legitimate, on the ground that there was no certain period for the completion of gestation. The Emperor Adrian, at a subsequent period, as we are informed by Aulus Gellius, declared an infant legitimate, which was born eleven months after the death of its father, on account of the unsuspected and undoubted virtue of the widow. A similar case is mentioned by Godefroy, in his Notes on the Novels of Justinian. A widow was delivered fourteen months after the death of her husband, and her issue pronounced legitimate by the parliament of Paris. It appeared that she had lived with the relatives of her husband during the whole period of widowhood; that they had never observed any impropriety in her conduct; and they also testified to the deep and constant grief she had manifested for the loss of her partner. The parliament of Paris appears, indeed, to have adjudicated on numerous cases of protracted gestation. Foderé gives an abstract of twelve, which I copy to shew the reasons assigned.‡

* See page 188.

† Dr. Montgomery will not allow even this; and states, that he never saw a child, avowedly of six or seven months' growth, that presented an appearance even remotely resembling that of a full-grown and matured fœtus.—Cyclopædia of Practical Medicine, vol. iv. p. 87, art. *Succession*.

Valentini, however, quotes a decision which is very different. The husband had been absent a year, but returned home on the 14th of April, 1656; and on the succeeding 26th of September (five months and twelve days), his wife was delivered of a living child. The Medical Faculty of Leipsic decided that it was legitimate, because the mother had laboured under grief and terror during her pregnancy, and because, at her delivery, she was so weak as to need bathing with wine.—Pandects, vol. i. p. 86.

‡ Foderé, vol. ii. pp. 111—115. In 1578, a child born eleven months after the departure of the husband, was declared legitimate, because the husband might have returned during the interval.

In 1626, a child born eleven months after the death of the husband, was adjudged a bastard, on account of the bad character of the mother.

In 1653, a child born eleven months and three days after the death of the husband, was adjudged legitimate.

In 1632, a child born within four days of ten months after the death of the husband, was pronounced a bastard, on account of the character of the mother, and the constant ill health of the putative father.

In 1649, a child born at ten months and nine days, was judged legitimate, though the father had been absent and paralytic.

Thomas Bartholin relates of a young girl at Leipsic, who, on accusing a person of having seduced her, was confined and strictly guarded. At the end of sixteen months, she brought forth a child, which lived two days.*

In 1638, a female brought forth a child one year and thirteen days after the death of her husband. She suffered with severe labour pains during the whole of the previous month, and the parietal bones of the infant, at birth, were found to be united—no fontanelle being present.

It was also added, that she had always been irregular in her calculations with the seven children she had previously borne. The opinion of the Medical Faculty of Leipsic was required in this case. They replied, that extraordinary cases of protracted gestation, deserving of credit, were related by many authors; that there might be a frigidity of the genital organs, so as to cause a slow increase of the fœtus; and that the long continuance of the labour pains proved this to be a preternatural case. They therefore decided that the offspring was legitimate.†

In another instance, a man named Gans, after being deemed *in extremis* for eight days, died on the 2d December, 1687; and on the 25th of the succeeding October, his wife was delivered of a son. The brothers and sisters of the deceased contested its legitimacy, and an appeal was made to the Medical Faculty of Giessen. They commence their answer, also, by stating extraordinary cases as mentioned by authors, and in this instance decided in favour of its being the child of Gans, because he was weak and feeble at the period of conception, and the mother was of a *frigid complexion;* the fœtus, therefore, would require a longer period to come to maturity.‡

There are also some cases which deserve notice, from the medical controversies to which they have given origin. I shall particularly mention two that occurred in France.

In 1656, a child born at sixteen months after the death of the husband, was declared a bastard.

In 1664, a child born eleven months after the absence of the husband, was adjudged legitimate, from the possibility that he might have had connexion during the interval.

In 1695, a child born at eleven months, declared legitimate, for the same reason.

In 1705, in the case of a child born twelve months and six days after the disappearance of the husband, an interlocutory judgment was pronounced, as some asserted that he was dead, while the female asserted that she saw him nine months previous to delivery.

In 1756, a child born within six days of a year after the death of the husband, declared a bastard. So also with one born at eleven months and seven days.

In December 1779, a child born at eleven months and one day after the husband's death, was pronounced legitimate, on account of the irreproachable conduct of the mother.

* Foderé, vol. ii. p. 183.

† Valentini's Pandects, vol. i. p. 142. In another case, where the child was born eleven months after the death of the husband, the Medical Faculty of Leipsic, on the 2d of April, 1630, declared it illegitimate, because it was born beyond the time assigned by Hippocrates.—Ibid. vol. i. p. 140. Amman, who reports these cases, observes, that he cannot reconcile the conflicting decisions, except by saying that the first of these children would become very rich by the decision, while the other was poor.

‡ Valentini's Pandects, vol. i. p. 144.

Le Sueur, a resident of the city of Caudebec, in Normandy, was struck with apoplexy on the 14th of May, 1771, and died on the 16th. His wife, Maria Rose, had not been pregnant during the six years of their marriage. On the 11th of the succeeding September, she declared herself pregnant; and on the 17th of April, 1772, (eleven months and one day after his death, and eleven months and four days after his illness,) she was delivered of a son. The relatives of the husband contested its legitimacy, and obtained a decree in their favour; but on appealing to the parliament of Rouen, the cause was, in December 1779, decided in favour of the widow. Her claim was defended on the score of character, and on the possibility of protracted gestation. The former seemed to be most unexceptionable, at least the public opinion was strongly in her favour, and the latter was supported by many extraordinary narratives. The work of the celebrated Petit on this subject was quoted, in which he states that many faculties of medicine, forty-seven celebrated authors, and twenty-three French physicians and surgeons, agree in believing that delivery may be delayed to the eleventh and twelfth month; nay, that it is perfectly demonstrated that this frequently occurs.

Among the quotations from the work of Petit, is the following case related by Heister. A female, the wife of a bookseller, in Wolfenbuttel, was delivered thirteen months after the death of her husband. The individuals interested, proposed to contest the legitimacy of the infant, but were deterred on account of her excellent character. So convinced was one Christopher Misnerus who had acted as shopkeeper during her widowhood, of her virtue and probity, that he married her shortly after, and had two children by her, and each of them was born after a gestation of thirteen months.*

Tracy, a naval physician, deposed in this case, that he knew a female who was delivered at the end of fourteen months. She was in delicate health, and both she and her husband informed him, that there had been no connexion since the commencement of her pregnancy.

Dulignac, *chirurgeon major* to the regiment of Asfeld, testified, that with three children which his wife had produced, the term in two had been thirteen and a half months, and in the third eleven months; and that he had recognised the existence of each of the pregnancies at four months and a half, by the most infallible sign — the motion of the child.

Lepecq de la Cloture also gave an opinion in favour of the widow, and quoted similar cases from his own observation. This author dwelt much upon the inertness which grief produces on the uterine organs, and conceived that the languor which sorrow causes, may retard the progress of gestation.†

The following enlisted all the medical talent of France in its discussion. Charles ——, aged upwards of seventy-two years, married

* This case is related at length, with all its proofs, in Schlegel, vol. ii. pp. 99—113. — Wagner's Dissertation.

† Foderé, vol. ii. pp. 185—189, quoted from the *Causes Célèbres.*

Renée, aged about thirty years, at the commencement of the year 1759. They were married nearly four years without having any issue. On the 7th of October, 1762, he was taken ill with fever and violent oppression, which remained until his death. The last symptom was so severe, that he was forced to sit in his bed, nor could he move without assistance. In addition to these, he was seized with a dry gangrene of the leg on the 21st; and with this accumulation of disease, he gradually sunk, and died on the 17th of November, aged 76 years. Renée had not slept in the chamber during his illness; but about three and a half months after his death, she suggested that she was pregnant, and on the 3d of October, 1763, (within four days of a year since the illness of her husband, and ten months and seventeen days after his death,) she was delivered of a healthy, well formed, and full sized child. The opinion of Louis was asked on this case, and he declared that the offspring was illegitimate. Had he rested at this, even the advocates of protracted gestation might probably not have murmured, as the circumstances were rather too powerful for the interposition of their favourite doctrines. But he took occasion, in his consultation, to attack the opinion generally, and to deny the possibility of the occurrence of such cases. Among the arguments which he adduces, are the following: that the laws of nature on this subject are immutable; that the fœtus, at a fixed period, has received all the nourishment of which it is susceptible from the mother, and becomes, as it were, a foreign body; that married females are very liable to error in their calculations; that the decision of tribunals in favour of protracted gestation, cannot overturn a physical law; and finally, that the virtue of females in these cases, is a very uncertain guide for legal decisions. "If we admit," says he, "all the facts reported by ancient and modern authors, of delivery from eleven to twenty-three months, it will be very commodious for females; and if so great a latitude is allowed for the production of posthumous heirs, the collateral ones may, in all cases, abandon their hopes, unless sterility be actually present."*

This reasoning appears to me to carry great weight, and Mahon, in his chapter on this subject, adds several sensible remarks in confirmation of it. He observes, that if the doctrine be true that the children of old people are longer in coming to maturity, it would have been confirmed by experience, which it is not. Grief also, and the depressing passions, are much relied upon as possessing a delaying power; but certainly these are more apt to produce abortion, than protracted gestation. He accounts for the mistakes of married women, by suggesting that the menses may be suppressed, not only from disease, but from affections of the mind, or accidental causes, which do not immediately impair the health; while the increase of volume in the abdomen may originate from this, or from numerous other causes. Towards the conclusion of his remarks, he states a difficulty, which, I believe, cannot be readily overcome. If the doctrine be allowed, how

* Louis's Mémoire contre Légitimité des Naissances prétendues tardives. Le Bas attacked this Memoir, and Louis replied in a supplement. Several other physicians, I believe, took part in the controversy.

shall we distinguish a delayed child from one that is born at nine months: and by what means are we to detect fraud in such cases? Certainly, as far as we can judge from the narratives given, the infants born after protracted gestation were not distinguished for size, or other appearances of maturity.*

The above cases would be incomplete, were I not to add to them one that recently came before the House of Lords in England, and in its progress excited the greatest interest.

The Hon. Alan Hyde (afterwards Lord) Gardner, a captain in the British navy, was married to Miss Adderly, at Fort St. George in the East Indies, in 1796. On the 8th of December, 1802, Mrs. Gardner bore a child, which appeared to be the fruit of an illicit intercourse between her and Henry Jadis. An action for criminal conversation was instituted by Lord Gardner against Mr. Jadis, in the Court of King's Bench, and he obtained a verdict of £1000 damages. He then procured a sentence of divorce in the Consistory Court of the Bishop of London, and the marriage was formally dissolved. Mr. Jadis married Mrs. Gardner in 1805; and the child just alluded to, was acknowledged as their offspring, and took the name of Henry Fenton Jadis, which he bore until the commencement of the present suit, when he assumed that of Henry Fenton Gardner, and claimed, through his guardians, to be the rightful heir to the title and estates of the now deceased Lord Gardner. This nobleman had married a second time with the Hon. Miss Smith, daughter of Lord Carrington, on the 10th of April, 1809; and a son, Alan Legge Gardner, also a claimant of the peerage and estates, was born on the 29th of January, 1810. Lord Gardner died in London, January 5, 1816.

The following were the facts on wnich the claim of Henry Fenton Jadis was founded: "In 1802, Lord Gardner, who was then captain of the ship Resolution, arrived off Portsmouth, and was joined by his first wife who remained on board with him about three weeks, and then took her departure for London on the 30th of January. It appears, however, that the Resolution did not sail till the 7th of February, and that some communication took place between the ship and the shore by means of boats. Lord Gardner sailed for the West Indies, and returned home on the 11th of July, in the same year."

On these, the following questions came up before the committee of the House of Lords. Could a child, born on the 8th of December, have been the result of sexual intercourse, either on the 30th of January or anterior to it, being in the first case 311 days? Or could a child, born as above, have been the result of intercourse on the 7th of February, being 304 days; or, lastly, could a child, thus born and living to manhood, have been the result of intercourse on or after the 11th of July, being a period two or three days short of five calendar months? The last was not much discussed, and the medical testimony was principally confined to the others, making it thus a question of protracted gestation.

Seventeen medical gentlemen, some of them the most distinguished

* Mahon, vol. i. pp. 133, 135, 198, 203.

accoucheurs in London, were examined. I shall arrange their testimony with reference to their belief, or disbelief, in the doctrine under investigation.

Drs. Gooch and Ralph Blegborough, Sir Charles M. Clarke, Dr. D. D. Davis, Professor of Midwifery in the London University, and Mr. R. P. Pennington, may be considered as not crediting it.

Dr. Gooch considered the usual period of gestation, where it could be accurately calculated, to be nine calendar months (39 weeks), as from the 25th of May to the 25th of December. When the statement of Dr. William Hunter was urged to him, that he (Dr. Hunter) "had *known* a woman bear a living child in a perfectly natural way, fourteen days later than nine calendar months, and *believed* two women to have been delivered of a child alive in the natural way, above ten calendar months from the time of conception,"* Dr. G. professed the highest respect for the character and talents of Dr. Hunter, but entertained doubts as to the accuracy of these cases—he should like to know the grounds on which the opinions were formed, and how far they depended on the testimony of the females. He stated that he had been for many years physician to two Lying-in Hospitals. In one of these, there are two wards kept for single women, "so that cases frequently occurred, in which I had an opportunity of calculating accurately the length of pregnancy." Young females, he added, in very respectable situations, are often seduced: the *intercourse is single, and there is no motive whatever for mistating the fact.* It would appear, that Dr. Gooch relied much for his opinion on these cases, and did not believe that the obvious objection to such testimony (viz. that the confession of more numerous connexions would give a suspicion of general incontinence), would lie in the instances which he had seen.†

Dr. Blegborough had been in practice in London thirty-four years. He considered thirty-nine weeks as the period of gestation, and forty as the greatest extent. Mechanical obstructions, as from malconformation, might delay birth for five or six days: but in that case, it is uniformly attended with hazard either to mother or child, or both. He had grounded his calculations on the peculiar sensations experienced by females. They have fainted, and have been extremely ill, so as to induce their friends to send for a professional man. On proper inquiry, they will declare certain sensations, by which we know that conception has taken place, and was the cause of the feelings experienced. Upon calculating from that time, he had, in such instances, invariably found that he had been right in his surmises, and that labour had taken place certainly not later, in any instance, than forty weeks from that period. Dr. B., however, conceded, that these

* This answer is taken from Hargrave and Butler's Note to Coke upon Littleton, as already quoted.

† In his Midwifery, p. 135, Dr. Gooch remarks,—"In general, impregnation takes place a day or two after the last menstrual period. I reckon nine calendar months. If a lady says she was taken unwell on the 17th of June, and continued so four days, I add one more, and from this (the 22d) I reckon nine calendar months, viz. the 22d of March, and in a large majority of cases, I am right." He adds, however, that pregnancy may occur at any time during the period, and thus cause some variation.

sensations do not necessarily follow immediately upon sexual intercourse, but said that they did so frequently.

Dr. Davis considered nine calendar months as the period of gestation, and he inclined to a day, or two days, short of that period, rather than beyond it. He had met with a few cases in which patients had reckoned from a single coitus, and in all these, birth took place at the 39th week. "I cannot say exactly on what day"—but some at its conclusion, and others within it.

Sir Charles M. Clarke considered forty weeks as the full period. He observed, in answer to various questions, that he never knew a case in which fatigue and exhaustion had caused protracted gestation. He could understand that they may accelerate, but could not see how they could retard. In several instances (twenty at least) that had come under his observation, the fact of the last intercourse had been stated to him by the parties themselves, and on this he had founded his calculations. In no case had the forty weeks been exceeded.

If the calculation be founded on the suppression of menses, he deemed that the safest mode would be to calculate from its middle period; *i. e.*, fourteen days from the last menstruation.

Mr. R. R. Pennington had been an accoucheur 37 years, and had never known gestation protracted beyond three or four days after forty weeks, and forty weeks is the usual term. He formed his opinion from the time of conception, and this again from circumstances mentioned by the females.

It will thus be seen, that of the five witnesses that disbelieved in protracted gestation, three founded their calculations on the occurrence of a single coitus, and the remainder on peculiar sensations experienced. They differ in their terms, thus:

Dr. Gooch says 39 weeks, or 271 to 277 days:
Dr. Blegborough, 39 to 40 weeks, 273 to 280 days:
Dr. Davis, 39 weeks, 271 to 273 days:
Sir C. M. Clarke, 40 weeks, 280 days:
Mr. Pennington, 40 weeks, 280 to 283 days.

On the other side, the following medical witnesses gave testimony: Drs. A. B. Granville, Conquest, Blundell, Merriman, Power, Hopkins, Dennison, H. Davis, and Elliotson, and Messrs. Sabine, Chinnocks, and Hawkes.

Dr. Granville gave it as his opinion, that the *usual* or *ordinary* period of gestation is comprised between the 265th day, subsequent to impregnation, and the 280th, or 40 weeks; but he believed that gestation might be protracted. The most prominent case mentioned by him in proof of this, was that of his own wife. She passed her menstrual period on the 7th of April, and on the 15th of August afterwards, she quickened. Labour was expected in the early part of January, and accordingly pains came on; but they again subsided, and she was not delivered until February 7th; that is, 306 days, if we reckon from the day before the next expected menstruation, or 318 days, if from the middle of the two periods.

Dr. G. also stated, that he was attached to two of the most extensive Lying-in Institutions in London; had seen much practice in them,

and had particularly and carefully registered cases, taking all the leading circumstances of their history from the individuals admitted, on presenting their letters of recommendation. According to these registers, he had "known a case of 285 days from the latest period of supposed impregnation; taking, as the point of departure, the last day of the month previous to the missed period, that is, say 28 or 30 days after the last menstruation: Also cases of 290, 300, and 315 (but this Dr. Granville afterwards stated that he considered a case of 310) days."

In answer to the question, whether he believed it possible, that a child should be begotten on the 30th of January, and born at an interval of 311 days, viz. on the 7th or 8th of December, he said, *I am aware of no circumstance that can render it impossible.*

I should also add, that an inquiry was attempted into some of his registered cases, but technical difficulties were interposed, and on the whole, they were not satisfactory, even one where a female was examined in *propriâ personâ.**

Dr. Conquest had practised for thirteen years, and although the majority of cases are completed within the ninth calendar month, yet he certainly had met with instances which far exceeded that date. In not fewer than twenty cases, there had been very confident assertions on the part of the women, that they had exceeded the time; and in two or three instances he had taken great pains to satisfy himself, and was very sure of it. In one female, who was so certain of being confined at the anticipated time that she had her nurse in the house, the period was exceeded nearly *five* weeks. This female had borne six children. "At that time (says Dr. Conquest) I disbelieved all the cases I had previously heard; I had been in the habit of laughing at them as a public lecturer; but so strong was the evidence, from the most minute investigation of this case, that I was compelled to admit the accuracy of this woman's statement, and my former convictions were very much shaken." It is remarkable, that at her subsequent confinement, this female again exceeded her calculation by four weeks.

In another instance, a lady who had borne nine children, and had been able five times to determine exactly the day on which she should be confined, exceeded the time by a month and two days. She brought forth the largest child Dr. Conquest had ever seen, after a very protracted labour.

* Dr. Granville afterwards resumed the discussion of this subject at the Westminster Medical Society, in December 1829. He stated, that the cases to which he had referred, were capable of the most satisfactory proof, and ought not to have been rejected or trifled with on the examination. In several instances, the reckoning had been made from the last day of the lunar month immediately succeeding the last appearance of the menses, and which then extended severally to 292, 298, 299, 302, 313, 317, and 324 days. "A lady whom he had attended this year, living with her husband, and who had never, when not pregnant, been irregular in her menses, calculated her pregnancy from midway between the 28 days, which elapsed between her previous menstruation, and the period when she ought to have menstruated again; and she then fixed upon the conclusion of ten calendar months for the day of her confinement. She proved perfectly correct; and on inquiring the reason for fixing on so protracted a period, she said that her three former children were born after a similar interval. Even supposing the conception to have taken place at the very end of the first lunar period, still the protraction must have extended two weeks at the least."—Lancet, N. S. vol. v. p. 418.

On inquiring as to the probable causes of protracted gestation, Dr. Conquest stated, that he had seen instances in which an occasional loss of blood during pregnancy appeared to interfere with the process. Mental emotions will also protract the period. He believed that eleven months had been exceeded.

On cross-examination, Dr. Conquest stated, that his calculation as to the time of birth, was founded on the time of *quickening*. He deemed this much more certain than that from menstruation. Quickening takes place from the 16th to the 20th week; but when a woman has quickened at a certain time, then, he believed, with scarcely an exception, she invariably quickens at the same period afterwards.*

Now in the females mentioned by him, the first had qnickened with six children exactly at the termination of the 16th week, reckoning from the non-appearance of the menstrual discharge, and the period when she supposed herself to become pregnant. "This woman is an excessively irritable woman, physically and mentally; and she affirms most confidently, that she invariably suffers much constitutional disturbance within one week after impregnation, and that the acts of intercourse are so seldom with her husband, that she has in every case been able to date with correctness, with the exception of the two (protracted) cases, and then she took the same data as the ground of her opinion."

In the second case, the opinion was deduced from the absence of menstruation and quickening. She quickened at the seventeenth week, and twenty-eight weeks from that to birth made forty-five weeks.

Dr. Conquest was asked whether he had known a woman menstruate during pregnancy. He replied, "I think a woman does not menstruate, in the common acceptation of the term. I know a woman will lose blood periodically, but I believe these are all cases in which the extremities of certain arteries terminate below the uterus, in the upper parts of the vagina; and I believe, that in by far the majority of cases of reported menstruation, if the discharge is examined by one or two tests, it will be found to be blood, and not the menstrual secretion, which differs materially from blood."

Dr. Blundell had personally known but one case in which pregnancy was prolonged beyond nine calendar months. This female became pregnant on the 9th of August, and was delivered on the 23d of May (287 days.) Dr. Blundell saw her a few days after impregnation—there were symptoms of irritation about the bladder and adjacent parts, and the catamenia were absent. He had no doubt that these symptoms arose from impregnation.

This witness professed himself a believer in protracted gestation, from this case; from the observations of Tessier on brutes, shewing that it actually occurs with them; and the observations of others on the human subject.

Dr. Merriman had practised midwifery for thirty years. The

* This opinion of Dr. Conquest requires confirmation. Dr. Montgomery (Cyclopædia of Practical Medicine, vol. iii. p. 479,) says, "At this moment, I am in attendance on a lady who has, in seven successive pregnancies, felt the child for the first time in the sixth month, and once in the seventh month."

ordinary period of gestation is about forty weeks; but in his own experience, he had known cases to exceed this—some 285 days, some 287, two or three 296, one 303, and one 309 days. The last was of a lady who had borne six or seven children. "She always calculated her reckoning from the last day on which her monthly period ceased. On this occasion she was perfectly well on the 7th of March; and from some circumstance, which I did not press to know, she said she supposed herself to have conceived on the 8th of March." This lady was delivered on the 11th of January, being 309 days.

On cross examination, Dr. Merriman was asked how he had calculated his protracted cases. He answered, "*From the time at which the last appearance of the menstruation ceased; from the termination of the monthly period.*" In the last case, the female had menstruated on the 7th of March; and both females were married, and lived with their husbands. It was very properly asked, whether the intercourse which produced conception, might not have been at any time previous to the next period; and if so, whether, allowing it only to have occurred in the middle between the two menstruations, most of the cases would not be brought to the usual term of forty weeks, while the rest might be referred to it by admitting the opinion that pregnancy took place just before the expected menstrual period? Deduct 28 days from 309, and the result exceeds forty weeks by only *one day*. Dr. Merriman readily allowed the correctness of all these inferences. He threw out an idea, that impregnation is by no means so common the day before the expected term of menstruation, as it is the day after the menstruation has ceased.*

Dr. Power had practised midwifery for thirteen years. He was decidedly of opinion that gestation may be extended to eleven calendar months, if not longer. He had met with from thirty to fifty cases in which it exceeded the ordinary term, and some in which it went to the period just named. His opinion is deduced from the statements of the females as to the period of menstruation and the time of quickening, and also from physiological reasoning, an account of which I have already given in page 332.

Drs. Hopkins, Dennison, and H. Davis, were believers in protracted gestation, but their examinations did not elicit any very positive facts.

Dr. Elliotson had, at a former period, delivered lectures on Forensic Medicine in London; and the result of his examination for this purpose, of works by eminent men on the point in question, led him to believe it possible.

Mr. Sabine spoke of the case of his own wife. Her last menstruation was on the 14th of September; she quickened in the second

* Dr. Merriman, at a period subsequent to the above trial, published his observations in detail. They are contained in the Medico-Chirurgical Transactions, vol. xiii.; and the following abstract from his paper deserves insertion here.

"When I have been requested (says he) to calculate the time at which the accession of labour might be expected, I have been very exact in ascertaining the last day on which any appearance of the catamenia was distinguishable, and have reckoned forty weeks from this day, assuming that the 280th was to be considered as the legitimate day of parturition. The subjoined table shews how often this day was

week of January, and was delivered on the 14th of August; being a ten months' case, if we date from the 14th of October; or ten months and a half, if from the middle of the period.

Mr. Chinnocks related the case of a female who exceeded her calculation eighteen days, but the particulars were not sufficiently investigated.

Lastly, Mr. Hawkes, an accoucheur from Oakhampton in Devonshire, spoke of some cases of 41 and 42 weeks, but no definite facts were given by him. He, however, advanced an idea, that pregnancy

deviated from, and what was the actual number of days from the day of menstrual intermission to the birth of the child."

A Table of the births of 114 *mature children, calculated from, but not including, the day on which the catamenia were last distinguishable.*

At 255 days, 1		At 262 days, 2
256 — 1		263 — 2
259 — 1		264 — 4
—		265 — 1
3 in 37th week.		266 — 4
		—
		13 in 38th week.

At 267 days, 1	At 274 days, 4	At 281 days, 5
268 — 1	275 — 2	282 — 2
269 — 4	276 — 4	283 — 6
270 — 1	277 — 8	284 — 1
271 — 2	278 — 3	285 — 4
272 — 2	279 — 3	286 — 3
273 — 3	280 — 9	287 — 1
—	—	—
14 in 39th week.	33 in 40th week.	22 in 41st week.

At 288 days, 5	At 295 days, 1	At 303 days, 1
289 — 2	296 — 2	305 — 1
290 — 2	297 — 2	306 — 2
292 — 4	298 — 4	—
293 — 2	301 — 1	4 in 44th week.
—	—	
15 in 42d week.	10 in 43d week.	

From this table, Dr. Merriman thinks it fair to infer that conception is affected more commonly soon after the catamenial period has intermitted, than immediately before the recurrence of that discharge. On a few occasions, he observes, the period of delivery, dated from the last appearance of the catamenia, has exceeded 44 weeks, or 308 days. The first is the case mentioned in the text. The lady has, in ten pregnancies, borne eleven children; and on all these occasions, became pregnant almost immediately after the monthly discharge. In addition to the facts stated above, he observes that the child was larger than most of her former ones, and the labour was longer. In reply to the objections made on his examination, he urges that she was correct in reckoning from this datum in all her former pregnancies, and again in a succeeding one.

Another was that of Mrs. N. who was unwell in November 1822. She recovered on the 15th, and had no subsequent appearance. Her labour took place on the 5th of October, 323 days from the day of intermission.

A third was a female aged upwards of forty, who had not borne a child for more than nine years. She was unwell for the last time in March 1823. She hoped from this that she had passed the critical period; but shortly after, she began to enlarge in size. As this increased, it was feared that ovarian disease might be present. Dr. Merriman, however, on examination at a period when the catamenia had not recurred for twelve months, found her pregnant. She was safely delivered on the 27th of September, 1824.

continued longer with males than females; assigning 280 days for the latter, and 290 for the former. But, said the Solicitor General, suppose the child is an *hermaphrodite*—what then is the time? He answered, "*that I should take between the two.*"

Several females were also examined as to their own experience on this subject, but the result was not definite or satisfactory.

Such was the medical testimony in the famous Gardner peerage case. I need scarcely add, that it was little heeded in the decision—that was founded on the well-established adultery of the mother of Jadis; and the son of Lord Gardner by Miss Smith, obtained the peerage.*

I have, to a certain degree, anticipated the concluding purpose of this section, viz. to present the opinions of distinguished accoucheurs. It would, however, be incomplete, were I not to add some more of these, and for a reason which must probably ere this have occurred to the reader. Many of the cases now enumerated, have the stamp of adultery on them. It is in vain to urge such as conclusive in favour of protracted gestation. I come now to some which appear unexceptionable in this respect.

The first I shall quote, is from Dr. Dewees of Philadelphia. "The husband of a lady, absent seven months in consequence of embarrassments, returned clandestinely one night; and his visit was known only to his wife, his mother, and Dr. Dewees. She was within one week of her menstrual period, which was not interrupted, but the next one was. In nine months and thirteen days (forty-one weeks) from the date of the visit, she was delivered of a healthy child."†

In a subsequent edition, he observes, "I have had every evidence this side of absolute proof, that it has been prolonged to ten calendar months, as an habitual arrangement in at least four females; that is, each went one month longer than the calculations made from an allowance of ten or twelve days after the cessation of the last menstrual period, and from the quickening, which was fixed at four months. Besides, a case within a short time has occurred in this city, where the lady was not delivered for full ten months after the departure of her husband for Europe: yet so well, and so justly too, did this lady stand in public estimation, that there did not attach the slightest suspicion of a sinister cause."‡

Professor Desormeaux gives the following case as occurring in a patient whom he attended. "A lady, the mother of three children,

* For the details of this case, I am indebted to Dr. Lyall's "Medical Evidence relative to the duration of Human Pregnancy, as given in the Gardner Peerage Case," first and second editions. See also Cyclopædia of Practical Medicine, art. *Succession*. The medical student will find remarks on this testimony in the Edinburgh Medical and Surgical Journal, vol. xxvii. p. 109, and Medico-Chirurgical Review, vol. ix. p. 170.

† Dewees's Midwifery, p. 170. If February be included in the above-mentioned term, it will be 283 days; if not, 285 or 286 days.

‡ Dewees's Midwifery, p. 130, third edition. I must be pardoned in asserting, that the case adduced by Prof. Dewees, from the fourteenth volume of the New England Journal of Medicine, is not applicable to the present subject. The female became pregnant April 1, 1822; suffered much from sickness, and died undelivered, May 1824. On dissection, the uterus was found diseased—bearing marks of inflam-

became deranged after a severe fever. Her physician thought that pregnancy might have a beneficial effect on the mental disease, and permitted her husband to visit her, but with this restriction, that there should be an interval of three months *between each visit;* in order that, if conception took place, the risk of abortion from further intercourse might be avoided. The physician and attendants made an exact note of the time when the husband's visit took place. As soon as symptoms of pregnancy began to appear, the visits were discontinued. The lady was closely watched all the time by her female attendants. She was delivered at the end of nine calendar months and a fortnight, and Desormeaux attended her.*

Dr. Hamilton, professor at Edinburgh, says, " In one case, many years ago, the lady exceeded the tenth revolution of the menstrual period by twelve days: another lady exceeded it by sixteen; and another by twenty-four days. The latter menstruated on the 1st of August, and was not delivered until the 28th of June. Another lady, the mother of a large family, exceeded her period by above a fortnight, on the 4th of March, when her husband went to England, where he resided for some months; but she was not delivered till the 6th of December."

Professor Burns observes, " On the other hand, it is equally certain, that some causes which we cannot explain or discover, *have the power of retarding the process*, the woman carrying the child longer than nine months, and the child when born being not larger than the average size. How long it is possible for labour to be delayed beyond the usual time, cannot be easily determined. The longest term I have met with, is ten calendar months and ten days, dated from the last menstruation. In the case of one lady who went this length, her regular menstrual period was five weeks; and, in her other pregnancies, she was confined exactly two days before the expiration of ten calendar months after menstruation."†

mation, and a full grown fœtus was discovered. If we thus bring in the agency of disease, we at once decide the question, and all reasoning on the healthy state of the parts, and the consequences *naturally* resulting, is at an end.

Cases somewhat resembling the above, are mentioned by Mr. Cullen, of a female who bore her child thirteen months from the time of her last menstruation; when delivered, it measured between nine and ten inches, and weighed six ounces.—London Medical Gazette, 1829. Also by Dr. Homans of Boston, of a female who supposed herself pregnant in September 1827; had all its symptoms for several months, but between the sixth and seventh, there was a great diminution of size, which continued until the ninth month. At this time she had regular labour pains, which continued for twenty-four hours, when they ceased, and she returned to her usual occupations. In September 1828, she was seized with uterine hæmorrhage and labour pains; and a fœtus, one and a half inch long, with a placenta, was expelled. —Boston Medical and Surgical Journal, vol. ii. p. 372.

* Dr. Granville, in Lancet, N. S. vol. v. p. 418.

† Quoted in Cyclopædia of Practical Medicine, art. *Succession*, vol. iv., p 90. Dr. Hamilton thinks, " that if the character of the woman be unexceptionable, a favourable report should be given for the mother, though the child should not be produced till *near ten calendar months after the death or sudden absence of the husband.* He used to say in his lectures, that in his own practice, he never knew a woman to exceed the eleventh menstrual period."—Note by Dr. Lyall, in his Gardner Peerage Case, p. 43.

Velpeau knew a woman who computed that she was four months gone when she came to his amphitheatre. He distinctly felt both the active and passive motions of the fœtus. Appearances of labour took place at the end of the ninth month, but they were soon suspended, and did not return for thirty days. She then languished a whole week before she was delivered; so that, in fact, this took place on the 310th day.*

Some other striking cases might be added to the above, but enough, I presume, have been given.

To the long list, already noticed, of believers in the doctrine of protracted gestation, must be joined the names of Haller, Zacchias, Petit, Harvey, Mauriceau, Smellie, and a host of what may, by distinction, be called the elder writers. Among the physicians of our own day, may be mentioned the names of Foderé, Capuron, Richerand, Osiander, Sprengel, Adelon, Orfila, Madame Boivin, Ryan, Montgomery, and Campbell.†

* Velpeau's Midwifery, p. 246.

† Those who wish to examine this subject further, are referred, in addition to the authorities already quoted, to Foderé, Metzger, Louis, Valentini, Schurigius's Dissertation in Schlegel, vol. iv. p. 232.

Among individual cases, I may mention Dr. Collins's, at Liverpool, in 1824, which he considered an eleven months' pregnancy — founded on the last appearance of the menses, but particularly on an examination of the os uteri, which he found, at what she called her eighth month, with difficulty distinguishable from the body of the uterus. At the end of the ninth, it was in some degree open, flat, and stretched. She had repeated pains, but these went away, and she was not delivered until two months after. She had been greatly distressed during her pregnancy, and Dr. Collins is disposed to ascribe much to this cause.—Edinburgh Medical and Surgical Journal, vol. xxv. p. 145. There are, however, some doubts as to the precise length of this gestation. (See Lyall, and Medico-Chirurgical Review, vol. ix. p. 212.) Also a case by P. C. Blackett (London Medical and Surgical Journal), of a female, who, in the beginning of December 1820, was seized with retchings and sickness in the morning, vertigo, pain and tension in the breasts. During four successive pregnancies, she had a regular monthly discharge, and in about two weeks after the above retchings, she had this again, and it continued monthly, until she was confined. She expected this in September 1821, but no signs of labour appeared. In October, she was seized with pain in the region of the liver; and during the use of remedies, experienced motion for the first time. On the 23d of December, 1821, she was delivered of two male infants, with separate placentæ, and each weighed about eight pounds.—Boston Medical and Surgical Journal, vol. ix. p. 153. By Dr. Ryan, of a female who menstruated the last week in February 1826, quickened in July, but instead of being delivered in November, had spurious pains through it and the two succeeding months. The child was not born until February 28, 1827.—Medical Jurisprudence, p. 146. Dr. Campbell, in his Midwifery, states, that he has seen protracted cases 11, 13, and 18 days beyond nine calendar months. He adds, that the oftener an individual is impregnated, the more likely is the gestation to be prolonged. "In females who are pregnant for the first time, gestation seldom exceeds nine months more than a week."—P. 71.

In opposition to the above examples, I add the following, recently reported by Professor M'Keen, of Bowdoin College. He was consulted in a case of retroversion of the uterus, of the most obstinate nature. It had probably occurred nearly a year previous to his visit. After a patient and well-managed application of means, the complaint was in a great degree removed. During all this time she had been at Topsham, the residence of Professor M'Keen, eight miles from her home. She now wrote for her husband, and on Saturday the 31st of May, he arrived, and she returned with him in the afternoon. On the 23d of February succeeding (8 calendar months and 24 days, or 270 days) she was safely delivered of a son.—Boston Medical and Surgical Journal, vol. xii. p. 264.

IV. *Of the laws of various countries on the subject of legitimacy.*

The Roman law did not consider an infant legitimate, which was born later than ten months after the death of the father, or the dissolution of the marriage.* Such was also the French law prior to the Revolution.

In 1634, a case was decided by a majority of the judges of the supreme court of Friesland, by which a child was admitted to the succession, though not born till three hundred and thirty-three days from the husband's death, and what increases the latitude of the decision, is that the husband was for some time a valetudinarian, and for fourteen days before his death, confined to his bed.†

The Prussian civil code declares that an infant born three hundred and two days after the death of the husband, shall be considered legitimate, and a case has occurred, where one born three hundred and forty-three days after the death of the husband, was adjudged a bastard by the *legislative commission* of that country.‡

The civil code now in force in France contains the following provisions. The child born in wedlock has the husband for its father. He may, however, disavow it, if he can prove, that, from the three hundredth to the one hundredth and eightieth day before its birth, he was prevented, either by absence or some physical impossibility, from cohabiting with his wife. An infant born before one hundred and eighty days after marriage, cannot be disavowed by him in the following cases. 1. When he had knowledge of his wife's pregnancy before marriage. 2. When he assisted at the act of birth, and signed a declaration of it. 3. When the infant is declared not capable of living. Lastly, the legitimacy of an infant born three hundred days after the dissolution of the marriage, may be contested.§

It will be observed, that by the last section, the child born after three hundred days, is not positively declared a bastard, but *its legitimacy may be contested.* And Capuron in remarking on this, observes, that it would probably be deemed legitimate, if no legal investigation should take place.‖

The following case was adjudicated under its provisions:

Catherine Berard was married on the 25th of July, 1806, to François Chappellet, who, about six months after, was seized with a pleurisy, and languishing with it about eight days, died on the 20th of January, 1807. On the 3d of December of the same year, and three hundred and sixteen days after his death, she was delivered of a child, of which she declared the deceased Chappellet the father. An application was made to the court at Chambery for the property to which this birth entitled her, and it was resisted by the relatives of the husband, on the

* Foderé, vol. ii. p. 111.

† Hargrave, ut antea. This case is quoted from Johannes a Sandes' (himself a senator of the court) Collection of Adjudications made by it. In Paris and Fonblanque, vol. iii. p. 216, the original case, including the arguments and authorities adduced even at that time in favour of protracted gestation, is given in the original Latin.

‡ Metzger, pp. 427, 429.

§ Code civil, sections 312, 314, 315, quoted by Capuron and Foderé.

‖ Page 231.

ground of illegitimacy. She pleaded their cruel usage during her widowhood, the state of poverty and sorrow to which she was reduced by their treatment, and the fact, that at the expiration of nine months, she had experienced labour pains, which continued until the middle of the tenth—as explanatory of this protracted gestation. The court, after quoting the article in question from the Napoleon code, argued that it gave the child a *provisionary* legitimacy, until the contrary was proved by concurring facts and circumstances. They further observed, that the term of gestation in this case did not exceed that allowed by many celebrated physicians as possible; and remarked, that the widow must have been in a state of sorrow and languor, in consequence of the treatment of her relatives, and thus the increase of the fœtus was probably retarded. Accordingly, on the 14th April, 1808, a decree was pronounced, declaring the child legitimate. An appeal was taken from it to the court of appeals at Grenoble. M. Mètral, the advocate for the mother, advanced in his pleadings most of the arguments which we have already noticed—such as the variety in the period of gestation, quoted numerous cases from medical authors, and urged the decisions of the French courts as precedents in the present instance. The modesty and good conduct of the mother was not forgotten, nor the fact, that she had experienced labour pains at the end of nine months. The court, in their *arrêt textuel*, observe, that, as the 315th article of the Napoleon code declares that the legitimacy of the child born three hundred days after the dissolution of marriage may be contested, it by implication destroys its claim in a disputed case, and affixes a term, beyond which gestations are to be deemed illegitimate. Again, the 228th and 296th articles of the same code, forbid a widow or divorced female to marry, until ten months after the dissolution of marriage. Here again the term of three hundred days appears to be pointed out as the most extensive period allowed to pregnancy. The father, also, by the 312th article, is permitted to disavow the child, if he proves a physical impossibility of cohabiting with his wife for ten months previous. The court contend, that the contesting of the legitimacy on the part of the relatives, is equivalent to a disavowal on the part of the putative father, and conclude with remarking, that any extension beyond the term of three hundred days, must prove dangerous to morals and the repose of families. They therefore declared the child in question illegitimate.*

The Scotch law is concise and decisive. "To fix bastardy on a child, the husband's absence must continue till within six lunar months of the birth, and a child born after the tenth month is accounted a bastard.†

The English law, on which our own is founded, does not prescribe

* Causes Célèbres. Par Maurice Mejan. Vol. vi. pp. 93—120.

† Erskine's Institutes of the Laws of Scotland, quoted in the Edinburgh Medical and Surgical Journal, vol. i. p. 334. Dr. Campbell (Midwifery, p. 71) disapproves of the first part. "The latter period I conceive to be no more than just, but the former certainly affords too great a latitude. There is not a well-authenticated case on record, of a child being reared, when born in the middle of the seventh month, far less the conclusion of the sixth. I think six months and three weeks is the earliest period that ought to be admitted."

a precise time. There are, however, some decisions, which will shew the ordinary course of adjudication. In the eighteenth year of Edward the First, Beatrice, the wife of Robert Radwell, was delivered of a son, eleven days after forty weeks. The husband had been seriously ill, and had no access to his wife for one month before his death. The child *was presumed* to be a bastard, and judgment was given accordingly. Gilbert De Clare, earl of Gloucester, died on the 30th of June of the 7th of Edward the Second, and on the 29th of January of the 9th year (within one day of a year and seven months), his sisters and co-heirs prayed livery. The countess pled that she was big with the earl, which was accordingly found *per inquisitionem*. The question hung in deliberation, nor did they obtain livery till the 10th of Edward. In another case, during the 18th year of Richard II. Andrews, the husband, died of the plague. His wife, who was a lewd woman, was delivered of a child forty weeks and ten days after the death of the husband. Yet the child was adjudged legitimate and heir to Andrews, for *partus potest protrahi* ten days *ex accidente*.*

These, I believe, are all the cases on record, until that of *Foster and others* v. *Cook*, tried in the English Court of Chancery. Henry Cook died on the 14th of January, 1780, and on the 9th of November, 1780, following (forty-three weeks except one day), his widow was delivered of a son. A trial was held, and the jury found this posthumous child to be the heir-at-law.†

Within a few years, the Gardner Peerage Case, and the following, are all that I can find mentioned in the English law books.

"In the *Observer*, Sunday newspaper, for September 9, 1827, a trial for seduction, *Anderton* v. *Whitaker*, is reported. The following evidence is stated to have been given by the female: 'It was on the 8th of January, that I had the intimacy with the defendant, but never had any before or since.' The child was born on the 18th of October, 284 days from the time of conception.‡"

I have already mentioned, that, like the English, we have no law on this subject, and I can find no American cases that have been adjudicated, except one, which probably belongs most properly to the next section, and is there given.§

* These cases are taken from Hargrave's and Butler's Notes on Coke upon Littleton.—Note 190, on sect. 188. There is a more full report of the case of Andrews, in Croke Jac. p. 541. It is stated, that "the husband's father abused her, and caused her to lie in the streets; and three physicians (two of them doctors of physic) made out that the child came in time convenient to be the child of the dead party; and that it is usual for a woman to go nine months and ten days, i. e. solar months at 30 days, and not lunar months. And that by reason of want of strength in the woman or child, or from ill usage, she might be a longer time, viz. to the end of ten days or more. And the physicians further affirmed, that a perfect birth may be at seven months."

† Brown's Chancery Cases, vol. iii. p. 349.

‡ Dr. Merriman, in Medico-Chirurgical Transactions.

§ In a former edition, I stated that cases of protracted gestation are rarely heard of in England and America, and that they appear to have occurred most frequently in countries where the administration of justice was arbitrary, or at least fickle and unsteady. I observe that Dr. Graves contradicts this, (New York Medical Journal, vol. ii. p. 135,) so far as it relates to this country. It may be so, but I was not aware of it.

Messrs. Hargrave and Butler, in commenting on the early English cases, observe, that "these precedents, so far from corroborating Lord Coke's limitation of the *ultimum tempus pariendi* (forty weeks) do, upon the whole, rather tend to shew, that it hath been the practice in our courts to consider forty weeks merely as the more *usual* time, and consequently not to decline exercising a discretion of allowing a longer space, where the opinion of physicians or the circumstances of the case have so required."* If, then, a contested case should ever arise in our courts, the opinion of medical men must be brought forward to decide it. What that opinion is, my readers have seen in the present and former sections. A majority of writers, at least, are believers in protracted gestation.†

And now I may be permitted to inquire, whether it is intended to give this belief its full force and application? Is it intended, that in a case tainted with the suspicion of adultery, nay its certainty, a child shall be legitimated, although born eleven months after absence or sudden death? Will physicians, like Dr. Granville, in the Gardner Case, tell the court, that they see nothing impossible in this? If so, and the knowledge of this opinion extends among the community, where will be the security of succession? Or even waving this, what must be its effects, when generally understood, on public morals?

Being in the minority, I am not authorised to propose any positive rules. I may, hoewver, quote some remarks from believers in this doctrine, that deserve every consideration.

"At the same time, we must add, that the cases which to us appear to carry with them the fullest demonstration of their truth, are those in which the ordinary term was not exceeded by more than three or four weeks."‡

"If the possibility or probability of its being prolonged, is conceded; it does not follow, that, in actual practice, judgment should go upon the *general probability* of the event, as a fact in physiology. On the contrary, since, in the abstract, more disorder would be occasioned in society, by admitting the general principle as adequate to decide special cases, than by rejecting it altogether, we conceive that if a definite period is not fixed by law, proof of the special probability, or improbability, should be required in each case."§

* Blackstone, however, intimates, that a child born after forty weeks, is illegitimate. He cites Britton for this; but the co-editors remark, that even this writer seems to extend it in some degree beyond forty weeks.

† I have already mentioned the punishment for rape in Egypt, under the present Pacha. It is taken from a Communication on the present state of Legal Medicine in Egypt, by M. Hammont, Director of the School of Veterinary Medicine, at Abou-Zabel, and addressed (March 1833) to Dr. Leuret. The following is what he says on our present subject. "A man is absent one, two, three, or four years, and on his return finds his wife pregnant, or children born to him during that time. He accuses her of infidelity; she denies it. The cause is brought before the tribunals. The judges, after hearing both sides, and weighing the merits of the case, gravely decide, that children may continue four years in the womb of the mother. *Après cinq ans, il n'en est plus ainsi.*"—Annales D'Hygiène, vol. x. p. 204.

‡ Montgomery, in Cyclopædia of Practical Medicine, art. *Succession.*

§ Edinburgh Medical and Surgical Journal, vol. xxvii. p. 114. The whole of the article from which this extract is taken, is well worthy of an attentive perusal. It is a review of the evidence in the Gardner Case.

If these opinions are acted upon, it may prove a happy circumstance, that we have no laws on the subject. Juries will generally dispose justly in suspicious cases.

V. *Of some questions relating to paternity and filiation.*

These form a proper supplement to the present chapter, from their connexion with its leading subject.

It might be supposed that common decency, as well as a proper respect for the opinions of mankind, would prevent those sudden marriages which sometimes takes place immediately after the death of a former husband. There have, however, been females in all countries, who have disregarded these restraints, and united themselves to a second partner before the "first brief week of mourning is expired." Besides the injury that such cases produce on the public manners, there is a difficulty which may arise in a legal view. *She may be delivered of a child at the expiration of ten months from the death of the first husband;* and the question then occurs as to the paternity of the infant.

The Romans endeavoured to prevent this, by forbidding the widow to marry until after the expiration of ten months; and this term was prolonged, by the emperors Gratian and Valentinian, to twelve. This law has been imitated in the present French code, which also forbids the marriage before ten full months have elapsed since the dissolution of the previous one.*

But if these laws are transgressed, or if there be no laws (as in England and our own country) against such precipitate connexions, whom shall we declare to be the father of the child? I will answer this, by citing some cases, and then mentioning the laws in force respecting it.

About the period when the plague broke out in Naples, one Antoine, aged forty, married Jeronime, a young lady, and, on the second day after, died of that fatal disease. Aniello, a relative and intimate friend of the widow, having obtained the necessary dispensation, married her immediately afterwards. She was delivered of a child two hundred and seventy-three days after the consummation of the marriage with Antoine, and two hundred and sixty-eight after her union with Aniello—being in the one case, thirty-nine weeks, and in the other, thirty-eight. The question, *Who was the father of this child?* was put to Zacchias.

In order to solve the difficulty, he canvassed the condition of the two husbands, the mother, and the child. Antoine, he observes, was of a feeble constitution, and his marriage was a forced one, and contrary to the wishes of the female, who was attached to Aniello. The latter was strong and robust. The wife stated that the consummation

* Foderé, vol. ii. p. 205. "The same constitution," says Blackstone, "was probably handed down to our early ancestors from the Romans, during their stay in this island, for we find it established under the Saxon and Danish governments. *Sit omnis vidua sine marito duodecim menses.*"—Blackstone, vol. i. p. 457. It was the law before the Conquest.

of the first marriage was attended with a discharge of blood, which she attributed to menstruation—that in the interval of her widowhood, it had slightly returned, but never after the second marriage. Now, from this, it might be supposed, that as menstruation had not returned regularly since the first marriage, the pregnancy was caused by Antoine. Zacchias, however, supposes that the sanguineous discharge was the consequence of defloration, and that as she received the advances of her first husband with disgust, the suppression might arise from mental uneasiness. He attaches no importance to the fact, that if the child was the son of the second husband, the period of pregnancy would fall short of nine months, and thinks it sufficiently counterbalanced by the youth of the parties. He, therefore, decided, that it was the child of Aniello.*

In another case, a widow married shortly after the husband's death, and in the fifth month of her second marriage, was delivered of a son who survived. He was baptised by the name of the second husband, and when he arrived of age, claimed to be acknowledged as his son, and to be supported accordingly. The tribunal of the Rota, after taking the advice of physicians and lawyers on the subject, decided that he was not the offspring of the second marriage, on the ground that a five months' birth was not *viable*, or could not have survived.†

There are also some English cases on record. In the 18th of Richard the Second, a woman, immediately after the death of the first husband, took a second, and had issue born forty weeks and eleven days after the death of the first husband. It was held to be the issue of the second husband. In another instance, "Thecar marries a lewd woman, but she doth not cohabit with him, and is suspected of incontinency with Duncomb. Thecar dies—Duncomb within three weeks of his death marries her, and two hundred and eighty-one days and sixteen hours after his death, she is delivered of a son. Here it was agreed, 1. If she had not married Duncomb, without question the issue should not be a bastard, but should be adjudged the son of Thecar. 2. No averment shall be received that Thecar did not cohabit with his wife. 3. Though it is possible, that the son might be begotten after the husband's death, yet being a question of fact, it was tried by a jury, and the son was found to be the issue of Thecar.‡

The English law on this subject is thus explained by Blackstone and Coke. "If a man dies, and his widow soon after marries again, and a child is born within such a time, as that by the course of nature, it might have been the child of either husband, in this case, he is said to be more than ordinarily legitimate, for he may, when he arrives at years of discretion, choose which of the fathers he pleases."§

* Zacchias, Consilium, No. 73. See also No. 75, for a somewhat similar case.

† Zacchias, Decisiones Sacræ Rotæ Romanæ, No. 45.

‡ Hargrave's notes, *ut antea*. See also Croke Jac. p. 686, for an account of the same case.

§ Blackstone, vol. i. p. 456. Hargrave, as already quoted, and also in note 7 to fol. 8 *a*, intimates a doubt respecting the above doctrine, and suggests that one of the cases quoted would lead to the opinion, that "*the circumstances of the case, instead of the choice of the issue, should determine who is the father*." This certainly would seem to be the most correct mode of adjudicating.

The following is the only American case that I have been able to find.

Michael Redlion, by his last will and testament, bequeathed to his son Christian, a considerable sum of money, the issues of which were to be paid to him during life, and at his death, the principal to go to his children: but if he died without lawful issue, then the same was to go to the other children of the said Michael. Christian was married to Catherine Stout in the spring of 1825, and died on the 1st of November, 1825. His widow Catharine married to Thomas Woolverton, the defendant, on the 16th of March, 1826, and on the 14th of September, 1826, the said Catharine had a son born, who is now living. The question for the jury was, who was the father, the first or the second husband? Christian Redlion committed suicide, and from his death to the birth of the child was ten months and fourteen days, and from the marriage of Woolverton to the birth of the child, six months. The plaintiffs were brothers of the deceased, and entitled to the above principal in case of his dying without issue. The court charged the jury in favour of the plaintiffs and against the child, and the jury brought in a verdict accordingly.*

It has also been suggested, that the resemblance of the child to the supposed father, might aid in deciding these doubtful cases.† This, however, is a very uncertain source of reliance. We daily observe the most striking difference in physical traits between the parent and child; while individuals, born in different quarters of the globe, have been mistaken for each other. And even as to malconformations, although some most remarkable resemblances in this respect have been noticed between father and child, yet we should act unwisely in relying too much on them.‡ There is, however, a circumstance connected with this, which, when present, should certainly defeat the presumption that the husband or the paramour is the father of the child; and that is, "when the appearance of the child evidently proves that its father must have been of a different race from the husband (or paramour), as when a mulatto is born of a white woman whose husband is also white, or of a black woman whose husband is a negro."§ It was on this principle that a curious case was decided in New York some years since.

Lucy Williams, a mulatto woman, was delivered, on the 23d of

* John and Jacob Redlion *v.* Woolverton. Hazard's Register of Pennsylvania, vol. vii. p. 363, June 4, 1831.

† See Zacchias, vol. i. p. 146; and Valentini's Pandects, vol. i. p. 148. *De Similitudine Natorum cum Parentibus.*

‡ "Dr. Gregory, in his lectures, used to relate to his class, in order to convince them of the resemblance which so generally exists between parents and children, that having been once called to a distant part of Scotland, to visit a rich nobleman, he discovered, in the configuration of his nose, an exact resemblance to that of the Grand Chancellor of Scotland in the reign of Charles the First, as represented in his portraits. On taking a walk through the village after dinner, the doctor recognised the same form of nose in several individuals among the country people; and the nobleman's steward, who accompanied him, informed him that all the persons he had seen were descended from the bastards of the Grand Chancellor."—Paris and Fonblanque's Medical Jurisprudence, vol. i. p. 220.

§ Edinburgh Medical and Surgical Journal, vol. i. p. 335.

January, 1807, of a female bastard child, which became a public charge. On examination according to our laws, she stated that Alexander Whistelo, a black man, was the father of it; and he was accordingly apprehended, for the purpose of obtaining from him the necessary indemnity for its expenses. Several physicians were summoned before the police justices, who gave it as their opinion that it was not his child, but the offspring of a white man. Dr. Mitchill, however, thought it possible, nay probable, that Whistelo was the father. In consequence of this diversity of opinion, the case was brought up for trial before the mayor, recorder, and several aldermen, on the 18th of August, 1808. It appeared in evidence, that the colour of the child was somewhat dark, but lighter than the generality of mulattoes; and that its hair was straight, and had none of the peculiarities of the negro race. Many of the most eminent members of the medical profession were examined, and they all, with the exception of Dr. Mitchill, declared that its appearance contradicted the idea that it was the child of a black man. Dr. Mitchill, for various reasons (for which I refer to the account of the trial), placed great faith in the oath of the female, and persisted in his belief of its paternity, although he allowed that its appearance was an anomaly. The mayor (The Hon. De Witt Clinton) and the court decided in favour of Whistelo.*

It will do, however, to extend this rule too positively with what may be called *mixed breeds.*

Parsons gives an account, in the Philosophical Transactions, of a black man married to an English woman, of whom the offspring was quite black. In a similar case, the child resembled the mother in fairness of features; and indeed the whole skin was white, except some spots on the thigh, which were as black as the father.

White, in his work on the *Gradation of Man*, mentions a negress who had twins by an Englishman: One was perfectly black, its hair short, woolly, and curled; the other was white, with hair resembling that of an European.

So also Dr. Winterbottom knew a family of six persons, one half of which was almost as light-coloured as mulattoes, while the other was jet black. The father was a deep black, the mother a mulatto.†

* See a pamphlet, entitled "The Commissioners of the Alms House *v.* Alexander Whistelo, a black man; being a remarkable case of bastardy, tried and adjudged by the mayor, recorder, and several aldermen of the city of New York, &c." New York, 1808. The main scope of Dr. Mitchill's argument appears to have been, that as alteration of complexion has occasionally been noticed in the human subject (as of negroes turning partially white), and in animals, so this might be a parallel instance.

"Dr. Mitchill's opinion on Whistelo's case, does not seem entitled to much greater estimation than that of a poor Irish woman in a recent London police report, who ascribed the fact of her having brought forth a thick-lipped, woolly-headed urchin, to her having eaten some black potatoes during her pregnancy."—Dunglison's Physiology, vol. ii. p. 316.

† Edinburgh Encyclopædia, art. *Complexion.* Lawrence's Lectures, p. 259.

It may be well also to refer, in this place, to the changes of colour that take place in the new-born black infant. At birth, it sometimes cannot be distinguished from the white; its hair has not yet its peculiar make, and we can only notice the tendency to dark on some parts of the body. In a few days, however, the change commences on the countenance, and gradually extends over the body. Cassan (On

"The offspring of a black and white," says Lawrence, "may be either black or white, instead of being mixed; and in some rare cases it has been spotted."

CHAPTER X.

PRESUMPTION OF SURVIVORSHIP.

1. Of the survivorship of the mother or child, when both die during delivery. Cases that have been decided in Germany—in France—in the State of New York. 2. Of the presumption of survivorship of persons of different ages, destroyed by a common accident. Laws on this subject—Roman—Ancient French—Napoleon code—English. Cases that have occurred under each—General Stanwix—Taylor—Selwin. Propriety of having fixed laws on this subject. Difficulty in settling presumptions.

This interesting as well as intricate question, has frequently been the subject of legal inquiry. It is agitated when two or more individuals have died within a very short period of each other, and no witnesses have been present to notice the exact instant of dissolution. Accidents, also, such as fire, or a shipwreck, may destroy persons, and the disposition of their property will depend on ascertaining the survivorship of the one or the other. It is not to be supposed that medical science can solve the difficulty; but it may, in these extreme instances, where no aid can be derived from facts, assist in laying down certain principles. I shall endeavour to suggest some of these, while relating such cases as I have been enabled to obtain. They may serve as a guide for future investigations.

The subject will be advantageously considered, 1. As to the survivorship of the mother or child, when both die during delivery; and 2. As to the survivorship of persons of different ages, destroyed by a common accident. This last may seem to include the first; but the distinction which I wish to make, will be readily understood.

1. *Of the presumption of survivorship of mother or child, when both die during delivery.*

The Imperial Chamber of Wetzlar were consulted, at the conclusion of the seventeenth century, concerning the case of a mother and child, who, some years previous, had both died during delivery. There were no facts on which an opinion could be founded, and the naked question was presented. They decided, for *physical reasons*, that the mother had died first; and the commentator, in noticing this case, remarks,

Superfœtation, p. 56,) has well remarked, that these successive changes may prove very useful, when a dead black child has been found, in deciding how long it has lived.

that undoubtedly these physical reasons were, 1. that the mother was exhausted by the labour; and 2. that the infant would not have died, until deprived, by the death of the mother, of its nourishment.*

It is questioned by medical jurists whether this decision is correct, and there are certainly many reasons to be assigned why the presumption should be against the child. Its life may be early endangered by a difficult or slow delivery. There may be a pressure on the umbilical cord, or the placenta may be partially detached, and its death ensue during the consequent hæmorrhage. If the parturition be complicated with convulsions, the probability certainly is that the infant will first die. So, also, if it be very large, or if it be prematurely born. The only exceptions which have been suggested in favour of the survivorship of the child are the following—when the mother is delivered of twins, she may bring forth the first, and die before the second is born; and again, when she is labouring under an acute disease. We know that the offspring is sometimes healthy, although the mother sinks during the delivery.†

A due comparison of these arguments, I imagine, will lead to the opinion that the presumption of survivorship is with the mother; for I will again mention, that in these cases, no person is supposed to have been present to witness the death of the parties, and such a length of time has also elapsed, that all examination, as well as inquiry into facts, are precluded.

A case that occurred to Pelletan may be mentioned in this place, although the consideration of it partly belongs to a previous chapter, (*on the viability of the infant.*)

A female at the eighth month of pregnancy died of a disease, which the physicians styled anasarca complicated with scurvy (*anasarque compliquée de scorbut.*) A surgeon immediately performed the cæsarean operation, and extracted the child. In his *procès verbal*, he states, that after tying the umbilical cord, and removing the mucus from its mouth, he observed pulsations at the region of the heart, and also found that it preserved a sufficient degree of warmth. It expired, however (he adds), three quarters of an hour after the decease of its mother. Six witnesses were also present at the operation, four of whom stated that they applied their hands to the breast and felt the pulsation. The other two had not observed it.

Pelletan was desired to examine this testimony and to give an opinion whether the child had actually survived its mother. He remarks that there are certain causes of death which may destroy the mother while the life of the infant may be preserved; of this nature, are sudden accidents, as drowning, a blow on the head, or violent hæmorrhage. Fœtal life is even compatible with some inflammatory complaints, but

* Valentini's Pandects, vol. i. pp. 3, 11. The statement given of this case by Foderé, and after him by Capuron, is not correct. The chamber assign no reasons except "*causis physicis*," and it is the editor who explains them. There is evidently a mistake in the references to Valentini by Foderé (vol. ii. p. 96); and it is of such a nature that one might be led to suspect that he had not minutely examined the Pandects.

† Foderé, vol. ii. p. 94. Capuron, pp. 135—148.

the probability is certainly against the surviving of the child, when the mother dies from a lingering and wasting disease. For this reason, and also because it does not appear to have arrived at the full time, he was of opinion that the child had died in the womb. As to the signs of life, even if they were fully substantiated to have been present, he conceives them equivocal — the pulsation and heat were probably the remains of fœtal existence. And if the surgeon was correct in believing that the heart beat for three quarters of an hour, he was certainly blamable in not using means to promote respiration. But the probability is, that he was deceived.

For these reasons, Pelletan gave it as his opinion that the mother survived the child.*

I have been favoured with a communication on this subject by the Hon. De Witt Clinton. Some years since, he informs me, a case embracing the succession to a large landed estate, was tried in one of our courts under the following circumstances. The mother and child both died during delivery. If the latter was found to have survived, the father, by our law, was the heir; if the former, her relatives became entitled to the property. On the trial, it was proved that the child was born alive; and the question of the priority of death was then decided against the parties claiming as heirs of the mother.

II. *Of the presumption of survivorship of persons of different ages, destroyed by a common accident.*

It will readily be observed, that if a father and son, or a husband and wife, perish in one common accident without witnesses, disputes may arise concerning the disposition of their property. Provision has accordingly been made in several codes for the avoidance of such difficulties. I shall give a concise sketch of these, interspersed with cases, to shew the course of legal decisions on this curious subject.

The earliest *Roman law* on this point, directs the order of succession when persons of different ages die in battle. If two individuals of this discription fell at the same time, he who had not arrived at the age of puberty, was to be deemed to have died first; but if a father and a son arrived at his majority, lost their lives together, the son was considered to have survived the father. In process of time, this provision was extended to all cases, where the precise period of death was unknown, and it was decreed, that in the case of a husband and wife, the former should be adjudged the survivor.†

The spirit of these laws guided the decisions of the continental tribunals for many ages, and Zacchias, in his elaborate discussion on this question, cites cases from several jurisconsults, which were settled according to the dicta of the civil code. The mother, in one instance, was shipwrecked with her young infant, and in another, she, with her

* Pelletan, vol. i. pp. 322—341.

† Digest, lib. 34, tit. 5, *de rebus dubiis.* "Cum pubere filio mater naufragii periit, cum explorari non posset, uter prior extinctus sit, humanus est credere, filium diutius vixisse. Si mulier cum filio impubere naufragio periit, priorem filium necatum esse intelligitur," &c.

two children, also young, was killed by lightning. In both these, the parent was deemed the survivor.*

Our author also, in his *Consilia*, relates two cases, which deserve mention in this place.

A number of individuals perished by the fall of a building; and among these, a father aged sixty, and his son aged thirty. The bodies were found ten hours after the accident. That of the father was uninjured; but on the head of the son, there was a severe wound. The heirs of each put forth their claims, and Zacchias was consulted by the judges on the case. After a long comparison between the strength and state of health of the parties, he comes to the conclusion that the son survived the father. Being aware, however, that the wound in question was supposed to have accelerated the death of the former, he endeavours to avoid this difficulty, by suggesting that it was not necessarily mortal, nor of a nature to destroy his strength immediately; while the suffocation was so much more urgent a cause of death, that the father, from his valetudinarian state, and his advanced age, would first be destroyed by it.†

The propriety of this opinion is controverted by Foderé, and with considerable show of justice; for certainly a wound of the head, and of so severe a nature, may safely be considered the most sudden destroyer of life under the above circumstances.‡

In another instance, a man and his family had eaten very copiously of poisonous mushrooms. They were all taken ill, and the domestics were sent to obtain assistance. Before they could return, the husband and wife had both expired. This couple, two years previous, had made an agreement, that whoever survived should possess the sum of two thousand crowns, and on the disposition of this, a dispute necessarily arose. Zacchias, when consulted, gave his opinion, that the husband had survived the wife. His reasons were the following. The husband, though sixty years of age, was robust and healthy; and, from the deposition of the servants, appears to have eaten but few of the mushrooms. The wife, on the contrary, although only forty, was asthmatic, and subject to affections of the stomach. She had eaten largely of the mushrooms, and, added to these, other indigestible food. A poison, therefore, which acts violently on the organs of respiration, would soonest destroy one already diseased in those parts.§

Foderé objects to this decision, that the opinion of the poison acting on the organs of respiration is altogether hypothetical, and it probably is so, but certainly the general course of reasoning appears correct.

The *ancient French law*, in its adjudications, generally followed the Roman. In 1629, a mother, with her daughter aged four years, was drowned in the Loire. The parliament of Paris, on appeal, decided that the youngest had died first. Some years after, however, an opposite decision was pronounced by the same body. The mother (*Bobie*), and her two children, one aged twenty-two months, and the other eight years, were murdered secretly in the night. The husband

* Zacchias, vol. i. pp. 440, 441.
† Consilium, No. 51.
‡ Foderé, vol. ii. pp. 320, 321.
§ Consilium, No. 85.

claimed the property of his wife, on the ground that the children had survived, and the parliament adjudged it to him.* The discrepancy in this case is very naturally explained by Foderé. Murderers would first destroy those whom they most dreaded, and afterwards proceed to the completion of their intended enormities.

Ricard, a celebrated advocate of the seventeenth century, has preserved a very curious case on this subject.

In 1658, a father and son perished in the famous battle of Dunes; and at noon the same day, the daughter and sister became a nun, whereby she was dead in law. The battle commenced at that very hour. It was inquired which of these three survived, and it was decided that the nun died first. Her vows being voluntary, were consummated in a moment; whereas the death of the father and brother being violent, there was a possibility of their living after receiving their wounds. It was then necessary to decide between them, and after some disputation, it was agreed to follow the Roman law, and to declare, that the son being arrived at the age of puberty, survived the father.†

In 1751, a merchant, aged fifty-eight, with his wife, aged fifty, and his daughter of twenty-seven years, was drowned, with many others, in endeavouring to cross the Seine in a small vessel. The question of survivorship was raised by the relatives, and an opinion was given on the case by the celebrated Lorry.‡ He observes, that three causes probably conspired to accelerate the death of these individuals—fright, excessive coldness of the water, and any disease that might be present. Throughout the whole of his argument, he appears to proceed on the supposition, that the younger female was menstruating, and hence that cold water, by checking it, would hasten her death. But this is not stated in any part of the case, and it certainly is very questionable whether, as he would seem to insinuate, that state of fulness of the system which menstruating females have, would accelerate the suffocation produced by drowning. If his argument means any thing, it is certainly directed to this point; and we have then to compare the probable state of a female of fifty who is beyond the menstruating period, and another labouring under that function. Certainly it will not counterbalance the difference in age and strength. He, however, gave it as his opinion that the daughter died first. But the parliament of Paris, by a decree of the 7th of September, 1752, admitted the presumption of survivorship to her, and ordered a disposition of the property accordingly.§

It thus appears that, for a length of time, the provisions of the Roman law were followed in France. But a curious distinction was made. The legal tribunals regulated the descent of property by them, but would not apply them to cases where legacies were bequeathed,

* *Causes Célèbres*, quoted by Foderé, vol. ii. p. 218.

† Foderé, vol. ii. p. 220. Smith, p. 382.

‡ This opinion, or "*Consultation de Médecine*," is published at full length in Mahon, vol. iii. p. 152. It is signed by Doctors Payen and Lorry, but was written by the latter.

§ Foderé, vol. ii. pp. 220, 316.

and for this reason: it is necessary (say they) that a man should have heirs, but it is not necessary that he should have legatees; and accordingly, when testator and legatee died at the same time, the property passed to the heirs. The lieutenant of a vessel bequeathed the sum of two thousand francs to his captain, by a will which he made before going to sea. Both captain and lieutenant were lost in the same vessel, and when a law case was raised as to the legacy, the property was adjudicated in the manner above stated.*

The *present French law* on this subject is contained in the following sections of the civil or Napoleon code:—

"If several persons, naturally heirs of each other, perish by the same event, without the possibility of knowing which died first, the presumption as to survivorship shall be determined by the circumstances of the case, and in default thereof, by strength of age and sex.

"If those who perished together, were under fifteen years, the oldest shall be presumed the survivor.

"If they were all above sixty years, the youngest shall be presumed the survivor.

"If some were under fifteen, and others above sixty, the former shall be presumed the survivor.

"If those who have perished together, had completed the age of fifteen, and were under sixty, the male shall be presumed the survivor, where ages are equal, or the difference does not exceed one year.

"If they were of the same sex, that presumption shall be admitted which opens the succession in the order of nature — of course the younger shall be considered to have survived the elder."†

Although these provisions are in the main founded on correct physiological principles, yet there are some objections of weight pointed out by Foderé. The clause that adjudges the survivorship to those under fifteen, when they and persons above sixty perish together, is certainly imperfect, since it may include infants of one, two or three years. These certainly would expire the soonest. And again, no provision is made for the case when persons under fifteen and under sixty perish together, although this may possibly be met by the last section.

The *English law* appears to have no provisions on the subject, except so far as the civil law is incorporated with it. There are, however, some cases which deserve mention.‡

In 1766, General Stanwix and his daughter set sail in the same vessel from Ireland for England. They were shipwrecked, and not a single person on board was saved. The representative of the father

* Foderé, vol. ii. p. 221.

† Civil Code, secs. 720, 721, 722—quoted by Foderé, vol. ii. p. 222, and Smith, p. 379.

‡ The most ancient case, I presume, in English jurisprudence, is that of Broughton *v.* Randall. According to Croke (Elizabeth, 502), the father and son were joint tenants; they were both hanged in one cart, but the son was supposed to have survived the father, since, as was deposed by witnesses, he appeared to struggle longest. The jury (in Wales) gave a verdict in favour of dower to the son's wife. There is a shade of doubt, or at least a discrepancy in this case, as, according to Noy, the *father* moved his feet after the death of his son.—Paris's Medical Jurisprudence, vol. i. p. 390.

to his personal estate, was his nephew, and the representative of the daughter, was her maternal uncle. These parties brought the case into chancery. On behalf of him whom the general's survivorship would have benefited, it was argued, that the ship being lost in tempestuous weather, it was more than probable that the general was upon deck, and that the daughter was down in the cabin (as is almost ever the case with ladies in these situations), and of course subject to more early loss of life than her father, who, as a man of arms and courage, was, it was asserted, more able and more likely to struggle with death than a woman, and in which he might probably have been assisted by the broken masts and other parts of the rigging.

On the other side it was contended, that the general was old, and consequently feeble, and by no means strong enough to resist the shocks of such a terrible attack; that the daughter was of a hale constitution, and though of the weaker sex, yet being younger than her father, was proportionably stronger, and from the circumstance of youth, more unwilling to part with life, and that the probability of survivorship was therefore infinitely in favour of the daughter.

A second wife of General Stanwix also perished with him, and her representative brought forward a separate claim to the disputed property.

The court, however, finding the arguments on all sides equally solid and ingenious, waved giving any decision, and advised a compromise, to which the several claimants agreed.*

The following case was tried in the Prerogative Court, Doctor's Commons, in 1815:—

Job Taylor, quarter-master sergeant in the royal artillery, had made a will, in which he appointed his wife, Lucy Taylor, sole executrix and sole residuary legatee. Having been for some time in Portugal on foreign service, he was returning home with her on board the Queen Transport, when the vessel, in Falmouth Harbour, struck upon a rock, in consequence of the violence of the weather, and sunk almost immediately afterwards. Nearly three hundred persons on board perished, and among them, Taylor and his wife. Taylor died possessed of property to the amount of £4000, and a bill in chancery was filed by the next of kin of the wife against those of the husband, to ascertain who was entitled to this property, but the proceedings were at a stand for the want of a personal representative of the husband. Both parties,

* Fearne's Posthumous Works, pp. 38, 39. This case appears to have attracted the attention of Mr. Fearne, and he accordingly prepared arguments for the purpose of seeing what could be advanced on both sides, with some appearance of reason; and after his death, they were published in the above collection. The scope of the argument in favour of the representative of the daughter, is, first, to overthrow the probability that they both died at the same instant, and next, to strengthen the rule of the civil law, that the child shall be presumed to have survived the parent. The argument in favour of the representative of the father, is aimed against the propriety of allowing any weight to presumption, and it urges the known fact, that the father died possessed. This, it is conceived, should destroy a claim founded on the uncertain, unknown possession of a niece. (See pp. 35—72.) Both these *arguments* deserve an attentive perusal.

See also, vol. i. Blackstone's Reports, p. 640. Rex *v.* Dr. Hay.

therefore, applied to the court for letters of administration generally, or that the court would suspend granting any to either party during the dependence of the chancery suit, and in the mean time grant a limited administration. This latter prayer was, however, abandoned, on understanding that the court could not grant a limited administration, where a general one might be granted and was applied for; and the present question, therefore, was, to whom the general administration should be granted—whether the next of kin to the husband as dying intestate, his wife not having survived so as to become entitled under his will, or the representatives of his wife, as his residuary legatee, she having survived so as to become entitled under that character.

It appeared from the affidavits exhibited on both sides, that at the time the accident happened, Lucy Taylor was below in the cabin, and her husband on deck. The water was rushing in fast, and he offered large sums to any one who would go below and save her, but finding none would venture, he descended himself, and the vessel immediately afterwards went to pieces. The bodies of Taylor and his wife were found close together, and it further appeared that she was a woman of a very robust constitution, and in the habit of enduring great fatigue by the management of the officer's mess, as well as that of a great many of the soldiers; whilst he was rather sickly, and had been latterly much afflicted with an asthma.

It was contended on the part of the husband's next of kin, that by the principles of the Roman civil law, which had been adopted into the law of the country, and were in fact the only principles governing a case of this kind, it was laid down, that where two persons perished together in a common calamity, and it became a question which of the two was the survivor, the presumption of law should always be in favour of the person possessing the more robust constitution and greater strength, as being thereby the better fitted to struggle with the difficulties of his situation, and resist for a longer time the operation of death. Thus, when the father and son shall perish together, the presumption of the survivorship is in the favour of the son if above the age of puberty, but of the father if under: the same as to a mother and daughter; and as to husband and wife, the presumption is in favour of the husband. This, however, like all other legal presumptions, was liable to be repelled by evidence to the contrary, but in this case it was contended, from the situation of the wife at the time the accident happened, that it was most probable she had perished before her husband descended to her rescue. Upon both grounds, therefore, both of principle and of fact, the court must conclude that the husband was the survivor, and accordingly grant the administration to his next of kin.

On the part of the wife's next of kin it was contended, that the presumption of the law alluded to was only applicable to cases where parties perish together in such a manner as to preclude the possibility of obtaining any evidence as to which of them was the survivor. Where, however, evidence as to that fact was produced, as in the present case, the case must be decided upon that evidence only. Here it appeared the parties had perished by the same accident, and their

bodies were afterwards found together; and that the common course of nature had in this instance been inverted, by the wife being the most strong and robust of the two. The court must, therefore, necessarily conclude that she was the survivor, and accordingly grant the administration of her husband's effects to her representatives.

Sir John Nicoll observed, that this case presented itself for decision under very singular circumstances. He recapitulated them, and observed, that the question as to the limited administration had not been gone into; but that with respect to general administration, the counsel had argued upon the legal presumption of survivorship, and whether or not that presumption was sufficiently repelled by the facts in evidence. He agreed to the doctrine that had been laid down, of the presumption being in favour of the husband; but it was a necessary preliminary question, upon whom the burden of proof rested. The administration to the husband being the point in issue, his next of kin had *primâ facie* the first right to it; but there being a residuary legatee, this right became superseded. The parties claiming under this latter character were not residuary legatees themselves specifically, but merely derivatively from one who was. They were, therefore, one step further removed from the property. The presumption of law was certainly always in favour of the heir at law with regard to freehold, and equally so of the next of kin with regard to personal property; the statute of distribution disposing of an intestate's property among his next relatives, solely upon the presumption that such was his intention, unless the contrary should be expressed. It was, therefore, incumbent upon the representatives of the wife, in this case, to prove her survivorship, as the party in whom the property vested, and from whom in consequence they derived their claim to it. He then entered into an explanation of the facts in evidence, and was of opinion that they were insufficient to repel the presumption of the husband's having survived the wife, which the court was bound to assume, from the circumstance of their having been overwhelmed by one common calamity, and having perished together; observing, in particular, that though the wife might be very active and laborious in her domestic duties, yet the natural timidity of her sex might prevent exertion in the moment of danger; whilst the husband, on the other hand, though labouring under the bodily affliction of an asthma, might still retain his manly firmness in resisting impending destruction, particularly as, from his situation in life, he must have often faced death in various shapes. He was, therefore, in no degree satisfied by the proofs in the cause, that the wife survived the husband, and should, therefore, decree the administration to his next of kin. In thus deciding the law, however, he did not mean to affirm positively which of the two was the survivor, but merely that there was not sufficient proof that it was the wife, to repel the presumption of law that it was the husband. The administration was accordingly granted to the husband's next of kin.*

* Taylor and others *v.* Diplock (2 Phillimore's Reports, 261). In a note to this case, that of Wright *v.* Sarmuda, or Wright *v.* Netherwood (1793), is also given from MS. notes. The question of survivorship, however, is not so much brought in (the husband, the second wife, and the children by both wives, all were lost at sea,)

A later case is on record, viz. that of Mason v. Mason, which came before Sir William Grant, the Master of the Rolls, in March, 1816. The father, a middle-aged man, embarked with his son on board a vessel in India, on a voyage to England. The ship was lost, and all on board perished. In favour of the son, the civil law and the Napoleon code were cited; but it was replied, that as the father's will bequeathed certain property to each of his children "who should be living at the time of his death," it required positive proof, and not presumption. The opposite party cannot prove that the son survived. The master of the rolls appears to have been of opinion against the son, but he finally sent to a jury, to try whether Francis Mason was living at the death of the testator.* The result of this I have not been able to find.

To these I will only add the following. Mr. Selwyn, of the war-office, with his lady, perished in the disastrous accident to the Rothsay Castle steam-boat, (1831). By his will, he appointed Mrs. Selwyn his executrix; and in case she should die in his life-time, other executors were appointed. The circumstances of their death raised the question, whether the contingency provided for in the will had occurred, and whether the wife's representatives, or the executors named in the event of her prior death, were to take administration.

The case came before the English Prerogative Court, November 7, 1831. The court said, that in other similar cases, it had been held, as both parties might be supposed to have perished together, that the wife could not have survived the husband; but in this case, the words were "in case she should die in my life-time." The presumption was, that the husband, as the strongest of the two, survived the longest: and as it was the clear intention of the testator, that the representatives of the wife should not take the administration, and as there was no attempt on the part of those representatives to establish an intestacy, the court decreed probate to the executors.†

In reviewing these cases, it may probably appear to some that physical principles will never be sufficient to decide them with any degree of probability. This, indeed, is the opinion of some medical jurists, as Belloc, Orfila, and Duncan.‡ Others again, and, in particular, Zacchias, have laid down rules for judging in all the various kinds of accidents that may occur. Thus, in those dead from hunger, the young should be supposed to have first perished, then infants, and lastly old men; and as to sex, women, probably, survive. In cases of drowning, a dissection and examination of the organs immediately acted upon, may lead to correct opinions; while in those found dead from noxious exhalations, we should examine the relative situations of

as that of the revocation of the will. The following remark of the judge (Sir William Wynne) may, however, be quoted:—"I desired the priority of the death of the parties to be considered. I always thought it the most rational presumption that all died together, and that none could transmit rights to another."

* Merivale's Chancery Reports, vol. i. p. 308.

† London Atlas Newspaper. This case (*in re* Selwyn) is reported in 3 Haggard's Ecclesiastical Reports, p. 748. See also Colvin v. King's Proctor, 1 Haggard, p. 92.

‡ Belloc, p. 161. Edinburgh Medical and Surgical Journal, vol i. p. 334. Orfila's Leçons, vol. i. p. 535.

the bodies to the noxious air, and the state of thoracic capacity. In all cases, the state of health should, if possible, be ascertained; and apoplectic habits should always be deemed to have been the earliest sufferers.*

Dr. Beatty has lately considered these *probabilities* more in detail, in a valuable Essay in the Cyclopædia of Practical Medicine.† As to *age*, he concedes, that in general, very young persons, and those far advanced in age, sink more readily than adults and those in the middle stage of life. I have been, however, struck with the difficulty of forming positive opinions even on this, from an incident related by Burckhardt. In giving an account of a caravan coming in want of water in the Nubian desert, he says, that "the youngest slaves bore the thirst better than the rest; and that while the grown up boys all died, the children reached Egypt in safety."‡ Dr. Beatty agrees, that under similar circumstances, the *male* will survive longer than the female; but suggests several qualifying circumstances, which should enter into the estimate. The greater liability of the weaker sex to fainting, and their ability to preserve life longer, without marked arterial circulation, may, in many cases, tend to their preservation. As to *habit* and variety of constitution, all such that have a tendency to affections of the head and lungs, should be deemed the first victims, in case the causes of death are of a description to affect these. And the *moral condition* must not be overlooked. The brave survive the fearful and the nervous.

If we turn to the causes by means of which a number of persons may have been simultaneously destroyed, we shall find our data far from being numerous or settled. Dr. Beatty observes, that if a positively deleterious gas, such as sulphuretted hydrogen, or carbonic acid gas, has been the agent of suffocation, it may be presumed that death was rapid in all, and occurred at nearly the same time. A late writer, however, in the Annales d'Hygiène, affirms, that from numerous observations, made for a long period, on persons dead from asphyxia, (and the context shews that he principally means carbonic acid gas by this), the *female adult* survives longer than the *male adult*. The strongest individuals die first.§

From the experiments of Dr. Edwards, it would seem that if death be caused merely by atmospheric air becoming deficient in oxygen, the adult will perish sooner than infants or very young persons. The dreadful mortality in the Black-Hole of Calcutta, shews how rapidly this cause acts on the male in the vigour of life.

Heat and *cold* operate differently on the same description of persons. The male and the adult have repeatedly sunk under their sufferings, in traversing the deserts of Egypt and Syria, while the young have escaped. Cold, on the contrary, will earliest destroy the infant and the young.

* Zacchias, lib. v. tit. 2. quest 12. He also adds, that when persons are destroyed in a fire, those that are suffocated expire before those who are burnt to death. See Foderé, vol. ii. pp. 228—332. Smith, p. 330.

† Vol. iv. p. 97. art. *Survivorship*.

‡ Library of Entertaining Knowledge. The Menageries, vol. i. p. 296.

§ Annales d'Hygiène, vol. x. p. 173.

Such are some of the inferences drawn from positive facts, and from physiological researches. If they are deemed too few, or too contradictory, it still remains to determine, whether we should not have some positive rules to guide us. I cannot doubt the propriety and necessity of this.* And in adopting any as law, such as approach the nearest to natural justice, will be the best. The provisions of the French code, with some modifications, appear to be best adapted for administering equitably in the majority of cases that may occur.†

CHAPTER XI.

AGE AND IDENTITY.

1. Notice of some questions in which the testimony of medical men may be required, as to the age of an individual—the age at which he is considered capable of committing certain crimes. The period of absence that is considered as presumptive proof of a man's death. Decisions on this subject in England—Scotland—States of New York and South Carolina. Age beyond which pregnancy is deemed impossible. The Douglas cause. Laws on this point—cases. 2. Identity. Cases where physicians may be required to identify individuals by physical marks. Remarkable instances in France—Martin Guerre—Francis Noiseu—Sieur De Caille—Baronet—Sieur Labbe. English cases. Effects of age in altering the personal appearance. Case of Casali. Remarkable case of disputed identity in New York.

Age is a subject of copious discussion with many of the older writers on medical jurisprudence, and even Foderé has enlarged on it in an extended manner. I can, however, conceive but very few cases in which a physician can be called on to give an opinion concerning it. There are laws in all civilised countries, defining the various periods, such as minority, majority, &c.; and if the registers or testimonials to prove these are wanting, it is difficult to suggest any physical proofs

* I cannot, however, agree with a writer in Brande's Journal, vol. iii. p. 41, who proposes that in *all cases*, the order of nature should be presumed to have taken place, and that the child, whatever be its physical powers or age, should be deemed to have survived the parent. Certainly this is not warranted by observation or deduction.

† The following remark will shew, that the necessity of enactments is elsewhere acknowledged. "With regard to cases of comparative unfrequency, indeed our law is culpably careless. We have shewn ourselves no friends to codifying; but we contend that every ascertained doubt should be disposed of without delay," —London Law Magazine, vol. ii. p. 549.

on which a medical man, more than any other individual, can venture to pronounce decisively.*

There are, however, exceptions to these remarks, as the readers of these pages must have noticed. It is often of the highest importance to ascertain the age of a fœtus, or a new-born child; but the proofs of these have been more properly, we conceive, investigated in another place. There are also some points in the age of individuals, which deserve consideration in a treatise on MEDICAL POLICE, such as the proper period for contracting marriage, and the division of life into the different terms of infancy, youth, manhood, and old age.

It is proper, notwithstanding, to make some suggestions relative to this subject.

1. In the English and in our own laws, certain periods of life are prescribed, before which, individuals shall not be deemed guilty of particular crimes. Thus a male infant under the age of fourteen, is considered incapable of committing a rape. But it deserves notice, that occasionally, though of course rarely, there are cases of *early puberty*, where the strength and ability are fully sufficient to complete this crime, under certain circumstances. Instances are related where the generative functions have appeared perfect at a very early age, and every mark of manhood has been present.† Whether in a case of

* It appears, however, that in certain cases where doubt exists as to the age of an individual, *he is to be brought into court, to be inspected by the judges*, whether he be of full age or not. If the court has, upon inspection, any doubt of the age of the party, it may proceed to take proofs of the fact. — Blackstone, vol. iii. p. 332. See Poyntz's case in Croke's James, p. 230. Also Sliver *v.* Shelbach (1 Dallas's Pennsylvania Reports, 166.)

† Instances of premature puberty are numerous both in the male and female. Of the former I may refer to those related by Drs. White and Breschet and Mr. South in the Medico-Chirurgical Transactions, vol. i. p. 276. vol. ii. p. 446. and vol. xii. p. 76. The subjects were each about three years of age. Ballard mentions a case that lately occurred in Paris, where a female attributed her pregnancy to a boy ten years old. Instances of infantile menstruation are related by Dr. Wall, Medico-Chirurgical Transactions, vol. ii. p. 116. and by Sir Astley Cooper, ibid. vol. iv. p. 204. also by Meckel, Lancet, N.S. vol. iii. p. 264. Dr. Davis, in his Obstetric Medicine, pp. 236, 728, has collected a number of cases, with references to many others. For other cases of precocity in either sex, see Stalpart, vol. i. p. 336. London Medical and Physical Journal, vol. xxvii. p. 522. Chapman's Journal, vol. ii. p. 198. Philosophical Transactions, vol. xix. p. 80. vol. xlii. p. 627. vol. xliii. p. 249. London Medical Repository, vol. xvii. p. 353.

A case, by Dr. D'Autrepont, of a female child, in Monthly Journal of Foreign Medicine, vol. i. p. 185, from a German Journal.

A case, by Mr. Thomas Smith, in Scotland, Brewster's Edinburgh Journal of Science, N.S. vol. i. p. 26.

Menstruation at nineteen months, case by Dr. Diffendach (from Meckel), North American Archives, vol. i. p. 70.

A case near London, by Dr. Burne, Midland Medical and Surgical Reporter, vol. i. p. 137.

A case in New Jersey (male), by Dr. Johns, New York Medical and Physical Jonrnal, vol. ix. p. 237; and one at Quebec, in a female, by Dr. Tessier, vol. ix. p. 240.

A recent case, by Dr. Le Beau of Louisiana, of infantile menstruation.— American Journal of Medical Sciences, vol. xi. p. 42.

A remarkable case of menstruation at one year, and pregnancy at nine. On the 20th of April, 1834, this female, aged ten years and thirteen days, was delivered of a female child weighing 7¾ pounds. This occurred in Hickman county, Kentucky,

this kind, the premature powers of the individual should not be considered, instead of his actual age, is a question for legislators. While the period is positively fixed by law, no question can be raised concerning it.*

2. Metzger suggests another point which may occasionally require the opinion of a physician, viz: *How long a period of absence shall be considered as presumptive proof of a man's death?*†

There are some law cases which may be quoted in elucidation of this. In Benson *v.* Oliver, in the court of exchequer, 5 George II. 1732, before Chief Baron Reynolds. "Upon trial of an issue directed by the court of exchequer, the deposition of a witness examined in 1672, was offered to be read, without any evidence of his being dead, relying upon the presumption from length of time, which would entitle the reading of a deed at that date. The chief baron refused to let it be read, saying, a deed had some authenticity from the solemnity of hand and seal. He said, if proper searches or inquiry had been made, and no account could be given of him, he would have admitted it at such a distance of time."‡ Again, in Dixon *v.* Dixon, where a legatee had been abroad twenty-six years, and had not been heard of for twenty-five years, the master of the rolls said he would presume him to be dead.§ Chancellor Kent, in this state, has decided, that ignorance in a family of the existence of one of the children who had gone abroad at the age of twenty-two, unmarried, and had not been heard of for upwards of forty years, is sufficient to warrant the court or jury, to presume the fact of his death without issue.‖

In Scotland I find the following stated. "Eighteen years' absence, and being holden and reputed dead, was found a sufficient probation to take off the presumption of life.¶ And in 1830, the court of session granted a sum of money to legatees which had been settled on them by a person who went to India in 1805 and who had not since been heard of. Bail was, however, required to repay in case of his return," &c.**

and is related by Dr. D. Rowlett of Waisborough, in that state. Transylvania Journal, vol. vii. p. 447.

* By the civil law, minors under the age of ten and a half, were not punishable for any crime; from ten and a half to fourteen, if found to be *doli capaces*, they were, but with many mitigations, and not with the utmost rigour of the law. The exception *nisi malitia suppleat ætatem* must be noticed in many criminal cases, and is approved by our own and the English law. See Edinburgh Encyclopædia, art. *Crimes*.

† Metzger, p. 242. ‡ Strange's Reports, vol. ii. p. 920.

§ Brown's Chancery Cases, vol. iii. p. 510. "Where no account can be given of a person, the presumption of the duration of life (in England) ceases at the expiration of seven years from the time he was last known to be living."—Phillips' Law of Evidence, p. 152. See also Doe *v.* Jesson, 6th East's Reports, p. 80, and Dean *v.* Davidson (3 Haggard's Ecclesiastical Reports, 554), Doe *dem.* Knight *v.* Nepean, —2 Neville and Manning's Reports, 219.

‖ M'Comb, executor of Ogilvie *v.* Wright.—Johnson's Chancery Reports, vol. v. p. 263.

¶ Decisions of the Court of Session, vol. iii. p. 435.

** Edinburgh Law Journal, vol. i. p. 101. "In Scotland, so far as marriage is concerned at least, a man is presumed to be dead who is not heard of for seven years; in which case, his wife may form a new union, by proclaiming and calling on her

The French code is very cautious on this subject. It requires thirty-five years of absence, or one hundred years since the birth of the absent person, before the heirs can demand a division of his property, and be put in definitive possession of it.*

In the state of New York, the presumption of the duration of life is reduced to the period of five years, provided the party has not been heard of during that time, and marriages are allowed to be contracted after the period stated;† but the space of seven years is adopted in the act for the more effectual discovery of the death of persons, upon whose lives estates depend.‡

South Carolina. "An absence from the state for seven years, without being heard of, raises the legal presumption of the death of the husband."§

3. A third subject discussed under this title has been, *the age at which pregnancy is possible, and beyond which it cannot occur.* The last was much canvassed in the famous Douglas cause, tried some years since in England. Its leading incidents, were as follows: Lady Jane Douglas was married August 10th, 1746, to Col. Stewart. She became pregnant, and this fact was notorious in January 1748, and on the 10th of July, 1748, being *in her fiftieth year*, she was delivered of twins at Paris. Of these, one, named Sholto, did not survive to manhood—the other, Archibald, did. Lady Jane, after their birth, miscarried.

In process of time, the father and mother both died. Their positive declarations had convinced the Duke of Douglas, and he left his dukedom and other estates to his nephew and their son, Archibald, who was the appellant in the cause. The Duke of Hamilton appears to have conducted the prosecution, and at all events, the claim was opposed on the ground that they were suppository children. The cause came up for final adjudication in the House of Lords, in 1769, when Lord Chancellor Camden and Lord Chief Justice Mansfield gave opinions in favour of the appellant. The following extracts from that of Lord Mansfield are interesting, both in reference to the point under consideration, and to one noticed in another part of this work, *Resemblance of children to their parents.*

"Lady Jane became pregnant in October 1747, at the age of forty-nine years, a thing (says he) far from being uncommon, as is attested by physicians of the first rank, and confirmed by daily experience. It is further proved, that the elder child, the appellant, was the exact picture of his father, and the child Sholto as like Lady Jane as ever child was like a mother.

husband to appear at the cross of Edinburgh, and, as he may be in a distant country, or at sea, it is necessary to give him a fair opportunity of hearing the summons, the law wisely provides that he shall also be summoned at the shore and pier of Leith. I am not aware that the law applies in cases where property is concerned."—Dunlop.

* Code Civil, sect. 129. See the whole chapter.

† Revised Laws, vol. i. p. 113, and Revised Statutes, vol. ii. p. 687.

‡ Revised Laws, vol. i. p. 103, and Revised Statutes, vol. i. p. 749.

§ American Jurist, vol. xii. p. 152, quoted from 1 Hill's South Carolina Reports, 8. Boyce *v.* Owens.

"I have always considered likeness as an argument of a child's being the son of a parent, and the rather, as the distinction between individuals in the human species is more discernible than in other animals; a man may survey ten thousand people before he sees two faces perfectly alike, and in an army of a hundred thousand men, every one may be known from another. If there should be a likeness of features, there may be a discriminancy of voice, a difference in the gesture, the smile, and various other things: whereas a family likeness runs generally through all these, for in every thing there is a resemblance, as of features, size, attitude, and action. And here it is a question, whether the appellant most resembled his father, Sir John, or the younger, Sholto, resembled his mother. Many witnesses have sworn to Mr. Douglas being of the same form and make of body as his father; he has been known to be the son of Colonel Stewart by persons who have never seen him before, and is so like his elder brother, the present Sir John Stewart, that except by their age, it would be hard to distinguish the one from the other.

"If Sir John Stewart, the most artless of mankind, was actor in the *enlèvement* of Mignon and Sanry's children, he did in a few days what the acutest genius could not accomplish for years. He found two children, the one, the finished model of himself, and the other, the exact picture, in miniature, of Lady Jane. It seems nature had implanted in the children, what is not in the parents: for it appears in proof, that in size, complexion, stature, attitude, colour of the hair and eyes, nay, and in every other thing, Mignon and his wife, and Sanry and his spouse, were *toto cælo* different from and unlike to Sir John Stewart and Lady Jane Douglas." The House of Lords decided in favour of the appellant, five Peers only dissenting.*

I have incidentally noticed this subject in a former chapter, and mentioned some cases of births in females of an advanced age.† As

* Collectanea Juridica, consisting of tracts relative to the law and constitution of England.—London, 1792, vol. ii. p. 386. The appellant was afterwards created Lord Douglas, and died in his 80th year, Dec. 26. 1827. In a brief biography of him, it is stated that his mother's father was 51 years old and upwards when she was born, thus being born in 1646, and exhibiting an interval of 181 years between the birth of the grandfather and the death of the grandson.—Annual Biography and Obituary, for 1829, vol. xiii. p. 433.

Frequent allusions to this cause will be met with in Boswell's Life of Johnson. Boswell was a great stickler for Lord Douglas.—See Croker's Boswell, American edition, vol. i. pp. 246, 312, 447, &c. In the Scotch court of session, the judges were divided, eight for the Duke of Hamilton and seven for Mr. Douglas, and on this the appeal was brought to the House of Lords. I am indebted to Mr. Rich of London, for procuring for me, recently, "A summary of the Speeches, Arguments, and Determination of the Right Hon. the Lords of Council and Session in Scotland, upon the important cause wherein the Duke of Hamilton and others were plaintiffs, &c. By a Barrister-at-Law, 8vo. London, 1767."

† Vol. i. p. 183. If such cases present themselves in legal investigations, the proofs in favour of maternity should be clear and decisive. Probably, the most remarkable instance on record (*if true*) is that related by the Bishop of Sens, in the Memoirs of the French Academy of Sciences for 1710, of a man in his diocess, at 94, and a woman at 83, having a child.—Memoirs of Literature, vol. vii. p. 78.

Pliny says that Cornelia, of the family of Scipio, bore a child at 60.—Paris's Medical Jurisprudence, vol. i. p. 173.—He mentions other cases. In Dodsley's

to premature pregnancy in European countries, the most astonishing instance probably is given by Meyer, of a Swiss girl becoming a mother at nine years of age.* Concerning this and similar cases, we can only say, that they are examples of precocity, resembling those which occasionally occur in the other sex.

"The English law admits of no presumption as to the time when a woman ceases to have children, though this enters into most other codes."†

In Scotland, there appears to be a similar provision: "A daughter, suing for her provision, which was due to her, failing heirs male of the grantor's marriage, was repelled, the father and mother being both alive—though the father had even been for a long time furious, and the mother past fifty."‡

The subject of identity seems to have a connexion with the one we have noticed, and like it, may occasionally require the opinion of physicians.

Cases have not unfrequently arisen, both in civil and criminal courts, where the question at issue has been, *whether an individual be really the person whom he pretends or states himself to be.* The controversy in such instances must originate from the resemblance that exists between him and another person; and that this has often been most striking, we have not only the testimony of antiquity, but the experience of all who have had opportunities of extensive observation. The title of one of the chapters of Pliny's Natural History, is *Cases of Resemblance*, and he enumerates several persons who could hardly be distinguished from each other—the great Pompey from the plebeian

Annual Register for 1775, is the following: "June 25, 1775. The wife of Mr. Ladenberg, wine-merchant in Castle Street, Leicester Fields, in the 54th year of her age, was brought to bed of twins. Mrs. L., though married upwards of thirty years, never had a child before." Other cases are related in the Cyclopædia of Practical Medicine, vol. iii. p. 491. During the present year (1833), a case has occurred in the English courts, in which the leading question appears to be, whether it is possible for a woman to have a fourth child thirty years after the birth of her first-born? or in other words, whether this could occur at the age of fifty-one? Dr. Epps mentioned the case at the Westminster Medical Society, and it was allowed that if she had continued to menstruate up to the required time, there was no physical reason why conception might not take place at any period during the interval.—Lancet, N. S. vol. xii. p. 45. I presume this is the case of Andrews *v.* Lord Beauchamp, in the Vice-Chancellor's Court, lately mentioned in the newspapers.

* Brendal, p. 76. Metzger, p. 480.

† The law is thus laid down in Reynolds *v.* Reynolds—Dickens' Reports, vol. i. p. 374—on a motion to divide a legacy among all the children living at the decease of a father. The father was sixty-two, and the wife of the same age, and infirm, and therefore there was no probability of their having more children. Sir Thomas Clarke, master of the rolls, said, that though it might be improbable, yet it was not impossible, and would have denied the motion, but the father consenting, and the other children consenting, that their respective shares should stand as a security to answer what any after-born child, should there be one, might be entitled to, the court granted the motion.

So also in Leng *v.* Hodges, decided in 1822.—Jacob's Chancery Reports, p. 585—a fund was paid to persons entitled to it, subject to the contingency of a female, now of the age of sixty-nine, having children, on their recognisance to refund in case of that happening.

‡ Decisions Court of Session, vol. i. p. 332.

Vibius — the consuls Lentulus and Metellus — and the impostor Artemon from Antiochus, king of Syria.

When cases in which the identity of an individual is contested, come before a court, the difference of opinion that exists, will generally be of such a nature as to render the duty of the tribunal trying and difficult. This subject is calculated to excite attention, to awaken discussion, and to cause great positiveness of opinion on one or the other side. Every feeling of the heart is enlisted, and the oaths of individuals must necessarily be of the most discordant and opposite nature. It may be stated generally, that in such instances, the advice of the physician may assist in leading to the detection of falsehood, and the establishment of truth. If there be any thing like positive data, which cannot deceive, he can aid in their developement: and they must be drawn from a source which naturally falls under his province.

The narrative of a few cases will prove the most instructive notice that I can give of this subject.

The most celebrated, probably, that has ever occurred, if not in Europe, at least in France, is that of Martin Guerre, brought before the parliament of Toulouse, in 1560. Its incidents are so extraordinary, that many have deemed it a fictitious narrative.

Martin Guerre had been absent from his home for the space of eight years. An adventurer named Arnaud Dutille, who resembled him, formed the design of taking his place, and actually succeeded so far, as to be received by the wife of Martin as her husband, and to take possession of his property. Children were born to this union; and he lived three years in the family, with four sisters and two brothers-in-law of Martin, without their suspecting his identity. It became, however, a subject of dispute. Several hundred witnesses were examined, and of these, thirty or forty swore that he was the real *Martin Guerre;* nearly the same number, that he was *Arnaud Dutille;* while others deposed, that the resemblance between the two men was so great, that they could not decide whether the prisoner was an impostor or not. The perplexity of the judges on this occasion was very great; but in spite of many things that weakened his cause, they were on the point of deciding in favour of Arnaud, when the arrival of the true Martin developed the deceit. Even when confronted, the impudence and effrontery of Dutille was such as to lead many to doubt, until the brother and sisters of the absent person fully recognised him.

I am unable to say whether physical resemblances were much noticed in this case, as the above narrative is all the authentic information that I have been able to obtain concerning it. In the following instances, however, there appears to have been considerable discussion on these points.

A child, called *Francis Noiseu*, born at Paris on the 22d of December, 1762, was put to nurse in Normandy. When about sixteen months old, it was taken ill, and in consequence was bled in the right arm. It had also a cicatrix on the inner side of the left knee, from a gathering which had been cured by caustics.

On the 13th of August, 1766, this child, aged three years and eight months, was lost, and could not be found; but on the 16th of June,

1768, its godmother, seeing two boys pass, was struck with the voice of one of them. She called him to her, and became convinced that it was her godson. The knee and arm were examined, and the cicatrices found.

In the meanwhile, another person, the widow *Labrie*, claimed this as her son. It had marks of the smallpox on its body; and this was, on investigation, deemed a strong argument in her favour, since it was not pretended that Noiseu had laboured under this disease previous to his being lost. Many witnesses also attested to its being her child. After several examinations before various courts, it was decided that the boy was the son of the widow Labrie.

Foderé impugns this adjudication, and with great appearance of justice. He observes that there were evidently physical marks sufficient to guide to a proper decision, and that these were disregarded. The cicatrix at the knee, according to one party, was caused by an affection to which *caustics* had been applied; while, according to the other, it had originated from a slight tumour, or *abrasion*, during the period of nursing. Certainly, surgeons could decide from the appearance, which of these causes produced it. Again, the boy had a cicatrix on the right arm. The widow Labrie said her child had never been bled, while it was stated that Noiseu's had. Three surgeons, on examining this cicatrix, declared that it was made with a sharp instrument; but others pronounced that it was the consequence of an abscess, and that no mark of venesection was present. Lastly, it was certainly no argument against the maternity of Noiseu, that the boy bore marks of smallpox: he was missing nearly two years, and might have suffered under it during his absence. It appears, also, that the subject of the dispute had some peculiarities in shape, which were not properly investigated.

The Sieur *De Caille*, being a Protestant, fled to Savoy at the period of the revocation of the edict of Nantes. His son died before his eyes at Vevay. Some years after, an impostor pretended that he was the son of this person, and claimed the succession to his property. He was imprisoned, and his cause remained before the parliament of Aix for seven years. Hundreds of witnesses (among which were the nurses and domestics of the family) swore that he was the son of De Caille; and the public sentiment was strongly in his favour, as he was a Catholic. Testimonials, sent from Switzerland, that the real son was dead, were of no avail; and the parliament declared, in 1706, that he was what he claimed to be. The wife of this impostor shortly after discovered, that although she had been silent, yet his elevation would not profit her. She, therefore, began to mention who he actually was; and on appeal, the cause was transferred to the parliament of Paris. The evidence adduced, shewed that the late son of De Caille had some distinguishing peculiarities in shape and make. He was of small height, and his knees approached each other very closely in walking. A long head, light chestnut hair, blue eyes, aquiline nose, fair complexion, and a high colour, were his other characteristics. The stature of the impostor (Pierre Megé, a soldier) was, on the contrary, five feet six inches; and his black hair, brown and thin complexion,

flat nose and round head, sufficiently distinguished him from the former individual. Other physical conformations were observed, which it is not necessary to mention, but which strengthened the testimony against Megé. The parliament accordingly decided that he was an impostor.

The last French case I shall mention, is that of *Baronet*. He was born in 1717, in the diocess of Rheims, and left his native place, at the age of twenty-five, in search of a livelihood. Having served as a domestic for a length of time, he returned, after an absence of twenty-two years, to claim the little property left him by his parents. His sister, however, had used it, and she prevailed on a neighbour, named Babillot, whose son had departed about the same time that Baronet went away, to claim her brother. Although the attempt failed, and the individual could not be prevailed on to continue in the opinion that Baronet was his son, yet the sister had sufficient influence to cause her brother to be condemned as an impostor, and to be sentenced to the galleys for life.

A few years produced a revolution in the minds of those who had witnessed this cause, and an appeal was made to the parliament of Paris. The celebrated surgeon, Louis, was consulted, and his opinion inclined in favour of Baronet, who was discharged and put in possession of all his rights.

The physical facts in this case are so striking, that evidently prejudice, and indeed bribery, must have influenced the first decision. Baronet was sixty years old, Babillot was only forty-six. The father of Babillot swore that his son had a mark (a *nævus maternus*) on his thigh, but this could not be found on Baronet. Other peculiarities were also mentioned, which identified the individual.*

An examination of the cases just related, will lead to the conclusion, that considerable importance should be attached to physical signs.

* The above cases are all taken from Foderé, vol. i. chap. 2, who quotes the *Causes Célèbres*. The following is interesting from its connexion with physical facts. It is extracted from the Causes Célèbres, par Mejan, vol. iv. p. 329.

On the 14th of May, 1808, at 10 P. M. the Sieur Labbe, Mayor of the Commune of Foulanges, in the Department of the Calvados, in passing on horseback along the highway with the widow Beaujeau, his servant on foot, was fired at with a gun from behind a ditch and through a hedge. He was wounded in the hand. It was an hour and forty-three minutes before the rising of the moon and the night was dark, yet both Labbe and his servant swore, that they recognised the assassins by the light of the discharge. One of the persons accused was arrested, tried, and condemned to death, but an appeal was taken to the court of Cassation. The advocate consulted M. Lefevre Gineau, member of the Institute and professor of Experimental Physics in the Imperial College of France, *whether it was possible that the priming* (amorce) *in being inflamed could produce light sufficient to discover the face of the person firing?* Gineau with his son, and Dupuis and Caussin, also professors, with several others, retired on the 8th of December at 8 P. M. into a dark room, and there Prof. Ginéau fired several primings, the spectators being stationed at different distances in order to witness the effect. The light produced was strong, but fuliginous, and so rapidly extinguished, that it was impossible to distinguish the individual firing. "A peine était il possible d'entrevoir la forme distincte d'une tête. On ne reconnaisait pas celle du visage." They then descended into the court-yard of the College, loaded the gun with powder, but the results on discharging were the same. The condemned was acquitted.

Dr. Montgomery in the art. *Identity*, Cyclopædia of Practical Medicine, mentions several analogous cases.

The recollection of individuals may be weakened, and even the physiognomy of the persons in question may be altered, while marks will remain which are not to be effaced. It is on such that reliance should principally be placed; although I am far from denying, that instances may occur where, even in these, a most striking conformity will be observed.

In England several cases of interest have occurred. Dr. Paris notices, amongst others, that of Frank Douglas, a well-known man of fashion, who was committed for highway robbery on the positive oath of one of the parties plundered, and very narrowly escaped conviction. On the apprehension of the notorious highwayman, Page, the mystery was explained; the personal resemblance being so great, as to deceive all ordinary observation.*

"In cases (says Blackstone) where the prisoner, after conviction, escapes and is retaken, the jury shall be empanelled to try the collateral issue, viz. the identity of his person, and not whether he is guilty or innocent, for that has been tried before. And in these collateral instances, the trial shall be instanter, and no time allowed the prisoner to make his defence or produce his witnesses, unless he will make oath that he is not the person attainted."†

But there is another subject of consideration suggested by the present inquiry, which we must not omit; and that is, the change which a number of years produces, as also the hazard that this alteration may be productive of injury to an individual, in causing doubts of his identity.

A noble Bolognese, named Casali, left his country at an early age and engaged in military pursuits. He was supposed to have lost his life in battle, but after an absence of thirty years, returned and claimed his property, which his heirs had already appropriated to themselves. Although there were some marks which appeared to identify him, yet the change in appearance was so great, that none who remembered the youth were willing to allow that this was the individual. He was arrested and imprisoned. The judges were in great doubt, and consulted Zacchias, whether the human countenance could be so changed as to render it impossible to recognise the person. This distinguished physician, in his consultation, assigns several causes which might produce such an alteration; as age, change of air, aliments, the manner of life, and the diseases to which we are liable. Casali had departed in the bloom of youth; he then entered on the hardships of a military life, and if the narrative of the individual in question was to be credited, he had languished for years in prison. All these causes, he conceived, might produce a great change in the countenance, and render it difficult to recognise him.

* Medical Jurisprudence, vol. i. p. 222, and vol. iii. p. 143.

† Commentaries, vol. iv. p. 396. In the Attorney-General *v.* Fadden (Price's Exchequer Reports, vol. i. p. 403), the defendant represented that the person who had actually committed the offence had assumed his name, and that the question would be one of mere identity. He therefore prayed to be brought into court by habeas corpus (he was now in gaol), in order to be present at the trial. It was granted.

The judges, on receiving this opinion, examined into the physical marks, and as the heirs could not prove the death of Casali, his name and estate were decreed to him.*

It is not, however, in foreign countries only that these difficult cases have happened. An individual was indicted and tried before Judge Livingston, at New York, in 1804, on a charge of bigamy, and the whole evidence turned on the question of his identity. He was called Thomas Hoag by the public prosecutor, but stated himself to be Joseph Parker. Several witnesses swore that they had known him under the name of Thomas Hoag, among whom was a female whom he had married, and afterwards deserted. It was stated that Hoag had a scar on his forehead, a small mark on his neck, and that his speech was quick and lisping. All these peculiarities were found on the prisoner. Two witnesses deposed that Hoag had a scar under his foot, occasioned by treading upon a drawing-knife, and that this scar was easy to be seen, and had been seen by them. On examining his feet in open court, *no scar was to be found on either of them;* and it was further proved, that at the period of his alleged courtship of the second wife in Westchester county, he was doing duty as a watchman in the city of New York. The jury acquitted him.†

* Zacchias, Consilium, No. 61. It is to such cases, that the beautiful quotation from Marmion, by Dr. Paris, is applicable.

"Danger, long travel, want and wo,
Soon change the form that best we know;
For deadly fear can time outgo,
And blanch at once the hair:
Hard toil can roughen form and face,
And want can quench the eye's bright grace,
Nor does old age a wrinkle trace
More deeply than despair."

The following singular case is mentioned by Dr. A. T. Thomson: "I recollect a captain of an Indiaman, who was a man of low stature when he left England, but had acquired upwards of an inch in height on his return—a circumstance which the surgeon ascribes to his having been salivated twice in the course of the voyage."—London Medical and Surgical Journal, vol. vi. p. 519. Such cases, in persons beyond the usual period of growth, must, however, be very rare.

† Hall's American Law Journal, vol. i. p. 70. Dr. Smith also mentions a case that occurred in England in 1817, where, on an inquest, an old man declared a dead female to be his daughter. On investigation, however, the daughter was found alive and hearty, and was produced before the coroner. The resemblance here was very great between the living and the dead woman.

"When witnesses swear to the identity of a dead person, unless their *causa scientiæ* consist in scars, tattooing, or other indelible marks, their evidence should be taken with the greatest possible caution by the jury, for very soon after death such a total change of the features takes place, that it is impossible for the nearest relations to recognise them. This is finely illustrated in a case tried before the high-court of justiciary in Edinburgh, last winter (I quote from memory, having no documents.) A resurrection-man was tried for raising the body of a young woman from the church-yard of Stirling—nine weeks after death, the body was discovered and identified by all the relations, not only by the features, but by a mark which they believed could not be mistaken, she being lame of the left leg, which was shorter than the right. There was a good deal of curious swearing as to the length of time after death, that the body could be recognised, but the jury were convinced that the *libel was proven*, and gave a verdict accordingly. Now I am certain that this was not the body of the woman who was taken from the church-yard of Stirling, but one that, at least six weeks after the time libelled, was buried in the church-yard of Falkirk, from

In all disputed cases, says Foderé, we should particularly notice malconformations or congenital marks. These cannot be removed. All wounds, also, of the soft parts leave marks of their existence. Scrofulous ulcers have their cicatrices—smallpox and burns leave their marks. The marks of the executioner, he adds, cannot be effaced. By means of a plate of pewter, he saw the letters come out on the back, although the criminal, who had escaped from prison, had caused an eruption over its whole surface. The cold body made the other parts pale, while the fatal letter V. appeared in full relief.

Finally, we should notice all peculiarities of physiognomy, and of professions and trades. These last, as is well known, develope some members more than others.*

which she was taken by this man, who also took the other, for which he was tried—she also was lame of the left leg; thus, though guilty of the offence laid to his charge, he was found guilty by a mistake of the *corpus delicti*.

"Considerable interest is at this moment excited in the public mind, by the case of a young gentleman of the name of Robinson, who was tried lately (July, 1824), for divers acts of theft. Many people swore positively to his identity, and the jury found him guilty of several of the acts charged. Yet, on a second trial, when he was sworn to as positively, most satisfactorily alibis were proved. The case at present is involved in mystery, but it is generally believed that the King will pardon him, as the second trial has thrown doubt on the first.

"Since writing the above, the Royal mercy has been extended to him."–Dunlop.

* Dictionnaire des Sciences Médicales, vol. xxiv. art. *Impressions*.

Orfila, in a memoir on the inferences to be drawn from the colour of the hair in cases of disputed identity, states, as the result of numerous experiments made by him, that the colour of black hair can be altered by various agents,—that light-coloured hair, with sundry exceptions, can be stained of a dark colour; but that red, or blond, or chestnut-coloured hair, is changed with great difficulty; and, indeed, it can hardly be affected. In all instances of this description, he remarks, that the use of these agents may be detected on a close examination, since it is impossible to effect a total change. Some straggling hairs will peep out and testify to their original colour.—Annales d'Hygiène, vol. xiii. p. 466.

CHAPTER XII.

INSURANCE UPON LIVES.*

Definition of an insurance upon life—of an annuity. Objects of inquiry with insurers upon lives—exceptions made by them. What vitiates policies—fraud or falsehood as to the health of the insured—gout—dyspepsia, whether organic or functional—confinement—omission to mention the actual medical attendant—consumption—mental imbecility—disease of the kidneys—habits of intoxication—opium eating. French annuity case.

"An *insurance upon life*, is a contract by which the underwriters, for a certain sum, proportioned to the age, health, profession, and other circumstances of that person whose life is the object of insurance, engage that the person shall not die within the time limited in the policy; or if he do, that he will pay a sum of money to him in whose favour the policy is granted."† The nature of the agreement is such, that in proportion to the probability of the prolongation of the life, will be the smallness of the premium. *Annuities* are regulated on the same principles, and the only difference is, that here the person deposits the required sum at once, and the company agree to pay a certain *annual* sum during his life.

It is the custom with insurance offices to refer the applicant to some professional man well acquainted with his constitution and habits, or, who, in other words, has been his medical adviser; or persons are directly appointed as physician and surgeon to the respective offices, and charged with the duty of examination. In either, or both cases, the result of their inquiries guides them in accepting or refusing an insurance. The leading objects of investigation, of course, are, whether he labours under any disease, and particularly one that tends to shorten life; whether his habits are temperate or not, and his employment unhealthy or dangerous.‡ The following list of questions will give an idea of the required minuteness:

"Before a common insurance company will undertake the risk of

* In the fifth volume of the New York Medical and Physical Journal (1826), will be found an essay on this subject, which forms the basis of the present chapter. Several years after its publication, I met with a work entitled "The Law of Fire and Life Insurance and Annuities, with Practical Observations, by Charles Ellis, Esq. of Lincoln's Inn, Barrister-at-Law." It is reprinted in the Law Library, edited by Messrs. Sergeant and Lowber (June 1834.) Chapter ii. of Part ii. contains a notice of most of the English cases to which I have referred.

† Park on Insurance, vol. ii. p. 571, 6th edit. Paris and Fonblanque, vol. i. p. 381.

‡ Smith's Forensic Medicine, p. 517. (Second edition.)

paying £100 on the death of an individual, they require the following to be answered by credible and intelligent witnesses: How long have you known Mr. A. B.? Has he had the gout? Has he had a spitting of blood, asthma, consumption, or other pulmonary complaint? Do you consider him as at all predisposed to any of these complaints? Has he been afflicted with fits, or mental derangement? Do you think his constitution perfectly good in the common acceptation of the term? Are his habits, in every respect, strictly regular and temperate? Is he, at present, in good health? Is there any thing in his form, habits of living, or business, which you are of opinion may shorten his life? What complaints are his family most subject to? Are you aware of any reason why an insurance might not with safety be effected on his life?* Whether the party has had either the small-pox or cowpox?"

"With respect to the risk which the underwriter is to run, this is usually inserted in the policy; and he undertakes to answer for all those accidents to which the life of man is exposed, unless the *cestuy qui vie* puts himself to death, or he die by the hands of justice." Hence, these are generally excepted in policies,† and, in certain cases, also, the premium is special, and subject to particular arrangement, such as exposure to risk by long voyages, or by military service, and residence in unhealthy climates. I observe, also, that during the late prevalence of cholera in Great Britain, several, and probably all, of the offices, excluded death by that disease (unless an increased rate of premium was paid), during its continuance as an epidemic.

Policies on lives are vitiated by fraud or falsehood as to the health of the insured. This, then, is the point on which the physician's testimony may be, and indeed is, frequently required. I apprehend that the best and most practical elucidation that I can give of this

* Combe on the Constitution of Man, p. 164, 2d American edition. Mr. Lawrence, in his lectures on Surgery, when speaking of the liability of an organ that has once been inflamed, again becoming so, observes, "Persons who conduct the business of *life insurance*, are well aware of this fact. When a person wishes to insure his life, the insurers inquire, not only whether he is healthy at the time, but whether he at any previous time has had serious disease; and if they find that he has had such disease, though he is healthy at the time, they commonly refuse his insurance; they consider him to be an unsound man."—Lancet, N.S. vol. v. p. 266.

† In a case where the noted Fauntleroy effected an insurance on his life, it appeared that there was no exception, as to death by the hands of justice, in the policies of this company (the Amicable). It was urged, however, that the insured had perpetrated a crime which the laws of his country punish capitally, and that, therefore, his death was as much his own act as if he had committed suicide. But the court (Master of the Rolls) decided that "the obligation to pay did not determine, merely because the conduct of the party insured produced the event, even though such conduct was against the criminal law of the country. To avoid the obligation, the act must be done fraudulently, for the very purpose of producing the event."—Bolland *v.* Disney, 3 Russel's Chancery Reports, p. 351. The House of Lords, however, on appeal, reversed this decision, "on the ground that, as a condition in a policy, saving the insurance in the event of the party effecting the insurance committing felony, would clearly be void, as affording encouragement to crime, and being contrary to public policy, so no effect could be given to a policy which in reality involved that condition."—2 Dow and Clarke's Parliamentary Reports, p. 1.

subject, is to notice cases that have occurred, and I shall do this somewhat in chronological order.

The two following are mentioned by Mr. Park in his *Treatise on Insurance.* It will be noticed, however, that they occurred previous to the establishment of the preliminary inquiries already quoted. Indeed, it is probable, that the case of Sir Simeon Stuart led the offices to name, specifically, gout and other constitutional disorders.*

In an action on a policy made on the life of Sir James Ross for one year, from October 1759, to October 1760, *warranted in good health at the time of making the policy;* the fact was, Sir James had received a wound at the battle of La Feldt, in the year 1747, in his loins, which had occasioned a partial relaxation or palsy, so that he could not retain his urine or fæces, and which was not mentioned to the insurer. Sir James died of a malignant fever within the time of the insurance. All the physicians and surgeons, who were examined for the plaintiff, swore, that the wound had no sort of connexion with the fever; and that the want of retention was not a disorder which shortened life, but he might, notwithstanding that, have lived to the common age of man; and the surgeons who opened him said, that his intestines were all sound. There was one physician examined for the defendant, who said the want of retention was paralytic; but being asked to explain, he said it was only a local palsy, arising from the wound, but did not affect life; but on the whole, he did not look upon him as a good life.

Lord Mansfield, before whom the case was tried, observed, "The question of fraud cannot exist in this case. When a man makes insurance upon a life generally, without any representation of the state of the life insured, the insurer takes all the risk, unless there was some fraud in the person insuring, either by his suppressing some circumstance which he knew, or by alleging what was false. But if the person insuring knew no more than the insurer, the latter takes the risk. When an insurance is upon a representation, every material circumstance should be mentioned, such as age, way of life, &c. But where there is a warranty, then nothing need be told, but it must, in general, be proved, if litigated, that *the life was in fact a good one, and so it may be, though he have a particular infirmity.* The only question is, *whether he was in a reasonable good state of health, and such a life as ought to be insured on common terms?*" The jury, upon this direction, without going out of court, found a verdict for the plaintiff.†

Gout. Again, an insurance had been effected on the life of Sir Simeon Stuart, from April 1, 1779, for one year. The policy contained a warranty that he was about fifty-seven years of age, and in good health on the 11th of May, 1779. He died within the year. The warranty of health was contested, but it appeared in evidence, that, although Sir Simeon was troubled with spasms and cramps from

* Paris and Fonblanque, vol. i. p. 384.

† Park on Insurance, vol. ii. p. 583. Ross *v.* Bradshaw, and 1 Blackstone's Reports, p. 312.

violent fits of the gout, he was in good health when the policy was underwritten, as he had been for a long time before. Lord Mansfield, in commenting on the testimony, observed "*Such a warranty can never mean that a man has not the seeds of a disorder.* We are all born with seeds of mortality in us. A man subject to the gout, is a life capable of being insured, if he has no sickness at the time to make it an unequal contract." The plaintiff obtained a verdict.*

Dyspepsia. In an action brought by the executors of Dr. Watson against the Equitable Insurance Company, to recover a sum insured on his life, the defence was that the deceased had in breach of his declaration to the contrary, a disorder tending to shorten life, and that therefore the policy was void. For the plaintiff, it was proved that Dr. Watson had applied to a physician in Bath for advice, concerning dyspeptic symptoms, and that these, though uncomfortable, do not generally, unless increased to an excessive degree, tend to shorten life, and, further, that his complaint was not *organic dyspepsia*. Several medical men stated that they had attended him since the policy had been effected, and that he was then quite free of the disorder. On the other side, several medical men stated, that they had seen him at the time of his visiting Bath, previously to effecting the insurance, and that they considered him as a failing man. It was left to the jury to decide whether the patient's complaint was organic dyspepsia, and, if it was not, whether the dyspepsia under which he laboured was, at the time of effecting the policy, of such a degree, that by its excess it tended to shorten life. The jury found that it was neither organic nor excessive, and gave a verdict for the plaintiff.

An application was afterwards made to the Court of Common Pleas to set aside the verdict and have a new trial, on the ground, that since the insured afterwards died of the same disorder which he had before effecting the policy, that circumstance was conclusive proof that he was then afflicted with a disorder tending to shorten life.

Mr. Justice Chambre remarked: All disorders have more or less tendency to shorten life, even the most trifling; as for instance, corns may end in a mortification: that is not the meaning of the clause. If *dyspepsia* were a disorder that tended to shorten life, within this exception, the lives of half the members of the profession of the law would be uninsurable. The application was refused.†

* Park, vol. ii. p. 583, Willis *v.* Poole. In a recent case (Swete *v.* Fairlie, 6 Carrington and Payne's Reports, p. 1), the insurer, Mr. Abraham, stated in reply to the usual question concerning diseases, that he was troubled with "occasional indigestion only." This was in 1827. It appeared on the trial, that in 1823, he was seized with depression of spirits, nearly, if not quite, approaching to insanity. He was not, however, secluded, but took lodgings in the country and came to town every day and attended to business. This, after some time, restored him to health His complexion was florid, and there was the general appearance of a tendency to a determination to the head. He died of apoplexy in 1830. It was decided that "a policy of insurance on the life of another person who, at the time of the insurance, is in a good state of health, is not vitiated by the non-communication by such person of the fact of his having, a few years before, been afflicted with a disorder tending to shorten life, if it appears that the disorder was of such a character as to prevent the party from being conscious of what had happened to him while suffering under it."

† 4 Taunton's Reports, p. 763, Watson *v.* Mainwaring.

Confinement. In 1815, a case was tried at the Sarum Spring Assizes, where the defence set up was, that a material fact had been suppressed. The person insured was, at the time, upwards of sixty years of age, but healthy for that period of life. It was not, however, mentioned in the certificate that at this very time she was a prisoner for debt in the county gaol. The judge supposed from the evidence, that by contrivance, the physician had been prevented from stating this fact to the defendants, and, therefore, directed a nonsuit. But on an application to the Court of Common Pleas, a new trial was directed, on the ground, that although there was nothing express in the terms of the policy which required the imprisonment to be stated, and although every thing called for by the office was answered, yet if the imprisonment were a material fact, the keeping it back would be fatal. It ought, however, to have been submitted to the jury, whether this was, or was not, a material omission.*

The omission to mention the actual medical attendant proved fatal in the case of Colonel Lyon. Previous to the execution of the policy, the office sent a number of printed questions to him, among which were the following: "Who is your medical attendant?" He answered, "I have none, except Mr. Guy of Chichester." And "Have you ever had a serious illness?" He answered "Never." Mr. Guy was referred to, and gave it as his opinion, that Colonel Lyon was an insurable life. He died in October, 1823, of a bilious remittent fever, and an annuity creditor prosecuted the present suit.

It was proved on the part of the Insurance Company, that Mr. Guy had not been called to attend him for three years previous to giving his certificate; but that in 1823, Dr. Veitch, a physician, and Mr. Jordan, a surgeon, attended Colonel Lyon, from the month of February to that of April, for an inflammation of the liver and fever, and a determination of blood to the head. The former proved that he considered him in a dangerous way, and had prescribed active medicine, and that he would not have certified him to be in health until the end of May. It was, however, agreed on all hands, that the disease of which he died, had no relation to any of the complaints for which these gentlemen attended him. The verdict was for the defendant.†

Consumption. A female with a disposition to this disease, such as cough and emaciation, had been attended by a medical practitioner for some time immediately previous to effecting an insurance. He, however, did not suppose that structural disease was present, and she was then convalescent. The knowledge of this illness was not communicated to the insurers, and another practitioner, not then in attendance, but who had known her for several years, was sent to examine her, and he stated that she was in ordinary good health. She died, a year after effecting the insurance, of consumption.

Although a verdict had been found for the plaintiff, yet the court ordered a new trial, on the ground that neither the medical attendance,

* 6 Taunton's Reports, p. 186, Huguenin *v.* Rayley.

† Carrington and Payne's Nisi Prius Reports, vol. i. p. 360. Maynard *v.* Rhode, Secretary Pelican Insurance Company.

nor the illness had been communicated to the insurers, and that the jury must decide whether this concealment was material.*

Mental Imbecility. The case that I am now to state, excited considerable attention in England, both from the rank of the individual in question, and the medical testimony that was adduced.

In 1824, a policy was effected by the Baron Van Lindenau on the life of Frederick IV., Duke of Saxe-Gotha and Altenburg, in the Atlas Insurance Company. The duke died on the 11th of February, 1825, and the insurers refused to pay the sum insured for.

On the trial, it appeared that Lindenau had stated in his application that the duke was not gouty, asthmatic, or consumptive, or subject to fits; that he had never had apoplexy; and that he had no disease tending to shorten life. Two physicians of the duke certified that, since the year 1809, he had had a dimness of sight from amaurosis in the left eye; and, since 1819, had been "*hindered*" in his speech from having had an inflammation of the chest, of which he had been perfectly cured: and they further stated that he was perfectly free from disease, and symptoms of disease. In a communication from an agent in Germany, it was mentioned that the duke had formerly led a dissolute life, "by which he had lost the use of his speech; and, according to some, that also of his mental faculties; which, however, is contradicted by the medical men."

On this the company, instead of asking an ordinary premium of 2*l.* 17*s.* per cent per annum, required 5*l.* per cent.

It now, however, appeared that the duke had been afflicted with almost a total loss of speech from 1822 to the time of his death, which one of the physicians attributed to local paralysis, and that he had periodical catarrhal affections, accompanied with fever. The chamberlain of the duke, in his examination, mentioned that he never complained of pain in his head. He ate, drank, and slept well, but could not speak. Dr. Dorl, physician to the duke, agreed that his intellectual faculties were impaired, although his bodily health was good.

On examination after death, no chronic disease was discovered in the viscera, or any part of the trunk, but in the head was found a large tumour six inches in length, two in breadth, and one in depth, which not only pressed on the brain, but had depressed the skull at its base. It was inferred that this tumour had commenced in early life.

The defence was, that there had been a suppression of material facts.

Mr. Green, an eminent English surgeon, gave it as his opinion that, from the history of the case merely, there were no symptoms of organic disease. He further thought that the tumour in the skull must, during life, have been in a passive state; and, from the appearance on dissection, that it must have been formed in early life. He was only willing to allow that the symptoms mentioned above would lead to a *suspicion* of disease in the head; and he was disposed to ascribe the difficulty of speech to want of volition, and not to the tumour in the brain. In

* 4 Bingham's Reports, p. 60. Morrison *v.* Muspratt.

reply, however, to a question of Lord Tenterden, he answered, "If I, as a medical man, was asked by an insurance company concerning the state of a man's health, who was unwilling to move, who was subject to control upon his intellect, and who had lost his speech, I should not consider myself at liberty to forbear mentioning these circumstances."

Lord Tenterden, who tried the cause, said this was sufficient; and that he should charge the jury, that, if any material facts relative to the Duke's health were concealed, then the policy was void.

The plaintiff elected to be nonsuited, and subsequently made an effort to obtain a new trial, but it was refused.*

Diseased kidney. Mr. Chitty mentions the case of Simcor *v.* Bignold, tried in 1832, for a life policy effected in 1827, with the usual declaration that Bird was not affected with any *disease tending to shorten life.* Bird died in January, 1831; and, on dissection, it was found that a large fungous tumour, weighing two pounds four ounces, occupied the place of the left kidney. Some of the witnesses were of opinion that it must have been of five or six years' growth, and that it was an *incurable organic disease.* The bladder was also diseased, but otherwise the rest of the body was in a healthy state. Mr. Bird had been medically treated for symptoms of his disease as far back as 1825 or 1826. The cause ended in a compromise, by the defendant's refunding the premium received.†

Habits of intoxication. Two cases in which it was proved that the knowledge of these was concealed from the insurers, although the individuals in question were at the time apparently hale and healthy, have been decided against the plaintiffs.‡ It was urged, in one instance, that the warranty was only against any *disorder* tending to shorten life, and not against pernicious *habits.* Here, however, the reference to the regular medical attendant had also been omitted.

Opium eating. Professor Christison has directed the attention of the profession to the effects of this on health and longevity. His was particularly called to it by the following case:—

In 1826, the late Earl of Marr effected several insurances on his life in various offices, and, among these, one in the Edinburgh Life Insurance Company for the sum of 3000*l.* This was held by a banking-house in Edinburgh, as a security for debt. He died in September 1828, of jaundice and dropsy; and the company then learned that he had been for years in the habit of taking laudanum to excess; and, instead of being, as was represented, temperate and active, that he had drank to excess, and led a very sedentary life. They refused to pay, and a suit was instituted.

It is not necessary to go into a detail of the evidence, further than to state, that, on the one side, the manifest change in his health and

* 3 Carrington and Payne's Reports, 353. 8 Barnewall and Creswell, 586; 3 Manning and Ryland, 45 (Lindenau *v.* Desborough). On the medical testimony, and particularly Mr. Green's, which is severely criticised, see Medico-Chirurgical Review, vol. xiv. p. 213; and London Medical Gazette, vol. ii. p. 669.

† Chitty's Medical Jurisprudence, part i. p. 235.

‡ 6 East's Reports, 188. Aveson *v.* Lord Kinnaird and others. 5 Bingham's Reports, 503. Everett *v.* Desborough.

spirits in 1827 was ascribed mainly to his depressed pecuniary situation, which he then discovered to be very low.

On the part of the company, it was proved that he had been in the practice of taking laudanum for thirty years, and in large quantities. He used to take a table-spoonful at a time on going to bed, and often, also, when going out to walk, &c. They contended that this was a "habit tending to shorten life." He appears, also, to have been subject to rheumatism and stomach complaints, previous to effecting the insurance.

The charge of the chief commissioner was in favour of the plaintiffs, principally, as it would seem, on a technical ground, implying that the insurance company did not make the inquiries relative to his health with the care usually observed, and, therefore, were to be understood as accepting the life at a venture. He also appears to have entertained doubts whether the habit was carried to such an extent, or, at all events, that it was so important a circumstance as to render it necessary for Lord Marr to reveal it. The jury agreed with him in their verdict, although its justice may well be doubted.*

Having collected, I believe, most of the English cases on this subject, I will conclude with the narrative of one that occurred in France.† It relates to *Annuities,* modified by the peculiar provisions of the French code.

Article 1974 of the *Civil Code* enacts, that "a contract for an annuity on the life of a person dead the same day on which the contract is signed, is void."

Article 1975 extends the same provision to the case of a person *affected with a disease of which he dies within twenty days after the passing of the contract.* It is to this last that the case is particularly referable.

The Sieur Fried, residing at Strasburg, and aged upwards of sixty, sold on the 11th of March, 1809, a large sum in the funds, for the purchase of an annuity on his own life. He was, at the time of the bargain, and had been for ten years, afflicted with hemiplegia, in consequence of an apoplectic seizure, and he died, on the second day after signing the contract, of an attack of apoplexy, excited by an altercation. The question was, whether M. Fried, on the day when he signed the papers, was or was not already under the influence of the disease to which he fell a victim thirty hours afterwards? or, in other words, whether the ten years' hemiplegia and the apoplexy did not constitute one and the same disease?

The following is an abstract of the testimony presented. A hairdresser deposed that he had dressed M. Fried for upwards of two years; who, during that time, had been repeatedly seized with apo-

* Edinburgh Medical and Surgical Journal, vol. xxxvii. p. 123. Christison on Poisons, p. 626. (Second edition.) I shall notice this subject more in detail when speaking of opium as a poison.

† Two other cases of some interest connected with this subject will be more appropriately noticed in subsequent chapters,—one relating to the point whether a drowning was accidental or suicidal; and the other, whether apoplexy or taking opium had been the cause of death.

plectic attacks: that Fried had, for a long time, been paralytic of the right side, and was obliged to write with his left hand. The day after the new year the deceased suffered a severe attack of apoplexy, and this recurred several times till his death. His strength gradually failed, so that he was unable to go out and pay his usual visits.

Dr. Schweighauser stated that he had long known Fried, and that the paralysis arose from an attack of apoplexy. He did not, however, attend him professionally until March 1808, when he was called in consequence of an apoplectic stroke. He treated him during ten or fifteen days, and left him as well as he was before his illness. In January 1809 he was again called on the same account. This yielded readily, and he attributed both to slight indigestion. In March, however, he found, on being summoned, that the attack was more serious; stertorous breathing was present, and death soon followed. On inquiry, he ascertained the immediate cause of this last seizure to have been a violent fit of passion.

Some of M. Fried's servants deposed that his mind was impaired, particularly since January; that he walked and spoke with difficulty; that his hearing was affected; and that the attacks of apoplexy were very frequent,—sometimes one every two days. On the other hand, Lacombe, a notary, stated that early in March he had a conversation with Fried relative to the contract which he was about making, and received his directions thereon; that his mind appeared sound, nor did he seem ill, but walked about and sat down apparently with ease. Other witnesses agreed that his intellect was unimpaired.

The case was, by order of the court, submitted to the examination of the Professors of the Faculty of Medicine at Strasburg and Montpelier, and also to sundry professors and physicians at Paris. As is usual, they differed.

The Strasburg physicians were of opinion that Fried was affected with the disease of which he died on the day of signature. Their arguments may be stated as follows:—

Apoplexy, independent of the symptoms which constitute the attack, has certain precursory symptoms, as well as concomitant and subsequent ones. To the last belong hemiplegia, affected senses, weakness of mind, &c. All, however, are referable to the same cause. Apoplexy may be styled the acute form of the disease, and palsy the chronic; and from the slightest excitement, as passion, for example, the chronic will suddenly become acute. They, in fact, only differ as to the degree of intensity; and hemiplegia always terminates in a fit of apoplexy. It is also asserted as a sound maxim, that a disease is not removed until the symptoms characterising it have disappeared; and the professors apply it to the present case, by observing that hemiplegia is one of the principal elements of apoplexy.

The professors at Montpelier, in their consultation, totally reject the idea of apoplexy and palsy being the acute and chronic forms of the same disease. Paralysis is a consecutive and permanent state,—apoplexy a primitive and temporary one. As to paralysis being an element of apoplexy, this would be to suppose that there could be no apoplexy without paralysis, when the contrary is undoubtedly true.

And again, paralysis arises from many other causes besides apoplexy. In this case, it is granted that there was a predisposition to apoplexy, induced by the paralysis; but predisposition to a disease does not carry with it the idea of its actual presence; many causes may annihilate the predisposition,—and even, if present, a foreign cause, as in this instance, may be necessary to excite the complaint.

Marc, Chaussier, Desgenettes, and Renaulden, constituted the Parisian board of reference. They agree in opinion with those of Montpelier.

They observe that palsy consists in a lesion of the nerves of motion and sensation,—apoplexy in a suspension or abolition of sense. Hence different organs are necessarily affected in each. There is no such disease as chronic apoplexy, since death must follow a prolonged attack; but paralysis may occur in three ways, independent of apoplexy, as from compression, section of nerves, &c.,—as an *avant-courier* of apoplexy,—and lastly, and most commonly, as a consequence of it.

Was it the latter in this case, and, if so, is the consequence of a disease the disease itself? The remark, that the symptoms must be removed before the complaint can be considered as cured, does not apply here. He had no symptoms of apoplexy; and the different attacks of it, so far from proving a continuity of the same disease, directly indicate the contrary. Every seizure is an independent affection, arising from a particular organic derangement; and this derangement must occur, in order to produce a second. How then can paralysis be called chronic apoplexy?

The mind of the deceased, from the most intelligent testimony, appears to have been sound. Even those who question it, rather speak of loss of memory, than of the more essential functions being impaired.

The professors conclude by giving their opinion—1. that Fried was of sound mind when he made the contract; 2. that he was *predisposed to apoplexy* at the above period; and, 3. that the fatal disease did not exist at the indicated time, but was excited by an occasional cause, operating on the predisposition.

From grave consultations prepared in the closet, and submitted to the legal tribunals of the country, the controversy was transferred to the Medical Journals of Paris. Sedillot and Marc were the principal combatants. The most striking remark of the former is—that the effects of a disease require curative treatment, while the predisposition only calls for preventive. Hence, in applying this to the present subject, he considers paralysis as an *epiphænomenon* (a superadded symptom) of apoplexy. The latter is barely cured, and its effects remain.*

In an examination made some years since of this case, I felt strongly inclined in favour of the opinion of the Strasburg physicians.† The subsequent publication of Marc suggests, however, some

* All the papers, opinions, and discussions, relative to this case, were collected and published by Dr. Ristelhueber, in an octavo volume, in 1821, entitled "Rapports et Consultations de Médecine Légale."

† New York Medical and Physical Journal, vol. v. p. 40.

additional points which have considerable weight.* One of the strongest arguments adduced by him is, that the opposite construction would render an individual like Fried totally incapable of making a contract during the last ten years of his life. The article (says he) was framed to prevent an advantage being taken of a person labouring under what are by common consent called acute diseases, or else it would not have been restricted to twenty days. The disease should be continuous, and it is not correct to apply this enactment to a case where this is an intermission of disease, with supervening attacks.

It had been endeavoured, in the course of the controversy, to assimilate this case to one of hemoptisis, the first attack occurring, for example, on the day of signing. This is removed, and the patient has no return of it, but apparently is well. On the nineteenth day, however, he has another, and dies. Does this invalidate the contract? Orfila said not.† Marc, however, is willing to qualify this. If the hæmorrhage arises from an *occasional* cause, and a full and perfect intermission has occurred, he will agree to the above opinion; but if it be shewn to originate in a tuberculous state of the lungs, and thus prove to be the symptoms of an *essential affection*, the contract is void. If it be replied, that the analogy is close between this and Fried's case, since both paralysis and apoplexy arise from lesions of the brain, the objection is met by denying that the same pathological state occurs in each, and also by the fact, that the attacks of apoplexy all had preceded the time of signing of contract. The article in question requires that the individual should labour under the particular disease at this very period.

It is evident, however, that Professor Marc has some scruples. He suggests the necessity of dissection in these instances, and intimates that an alteration of the article might perhaps be proper, so as to enact that a contract shall be void, if signed by a person labouring under a disease actually the same (*qui a été individuellement la même*) as that of which he dies within twenty days.

In concluding the notice of this subject, the importance of which must be my apology for prolixity, I cannot avoid expressing a wish that the custom of obtaining life insurances and annuities may become more prevalent with us. This is not the place to insist on their importance to the happiness of individuals; I will only say, that experience has fully demonstrated their value in other countries. When offices of this nature shall be generally established, physicians and surgeons will be called upon to act in their appropriate stations. Let them recollect that their opinions are in all cases reviewed by intelligent and acute bodies of men, and that their medical reputation may be exalted or diminished, according as they perform their duty. Above all, their acts may, as in several of the above cases, be submitted to a jury of their country. The concealment of material facts, or ignorance of them, may prove a source of unceasing regret.‡

* Commentaire Medico-Légal sur l'Article 1975 du Code Civil, par M. Marc, in Annales d'Hygiène (1830), vol. iii. p. 161.

† Leçons, vol. i. p. 457. ‡ Medico-Chirurgical Review, vol. xiv. p. 213.

CHAPTER XIII.

MENTAL ALIENATION.

1. Of the symptoms that constitute a state of insanity. Division of insanity into mania—monomania—dementia—idiotism—moral insanity. *Mania.* Precursory symptoms. Symptoms—state of the countenance—language and actions—disordered appetite—state of the stomach and bowels—condition of the tongue and pulse—insensibility to cold and heat; how far this is correct—perversion of the senses, or *illusions:* the ear, the eye, the smell, taste and touch—wakefulness—loss of memory—pusillanimity—aversion to friends. Duration of a paroxysm. *Monomania.* Its nature. Gaiety of some, melancholy in others. Danger of suicide or violence from the insane of this class. The age most liable to melancholy monomania. Its symptoms—peculiar cast of countenance—state of the eye. Bodily symptoms. Concentration of thoughts on one idea. General sanity on subjects not connected with the morbid impression. Unwillingness to admit any evidence unfavourable to the delusion. The length of time that it may remain. Age most liable. Incoherent madness of Dr. Prichard. Its characters. *Dementia.* Generally a consequence of mania and monomania. Its characters. May be idiopathic. Hoffbauer's modifications of it into imbecility and stupidity. *Idiotism.* Its frequency in some countries. Cretins. Characteristics of idiotism—form of the head and face—affection of various senses. Complication with other diseases. *Moral insanity.* Nature of this—its subjects very liable to commit acts of violence. Enumeration of the most common causes of mental alienation. 2. Of feigned and concealed insanity. Rules for their detection. Instances of both. Cunning of the insane in eluding detection. 3. Legal definition of a state of mental alienation, and the adjudications under it. Common law of England as to idiots and lunatics in civil cases. Introduction of the term *unsoundness of mind*—the meaning of it according to Lord Eldon and others—used in our own statutes—attempt to give a strict definition to it. Cases—Mr. Davies—Miss Bagster. English law as to criminal cases. French law. Law of the State of New York. Method of proving a person a lunatic—method of proving his recovery. Distinctions made in the law between civil and criminal cases. Lucid interval—ancient meaning of this term—present definition of it by lawyers and physicians—restriction of its meaning in criminal cases. Responsibility of the insane in criminal cases—ability to judge between right and wrong—what this means, and how it should be considered. Cases shewing the construction put on it. Scotch law on this. Great difficulty in discriminating between crime and partial insanity—whether those who are proved to have been previously insane, should be exempted from responsibility—arguments in favour of this. Cases—Dean—Howison—Papavoine. Moral insanity. Cases illustrating its nature—Henriette Cornier. Characters distinguishing it from crime. Cases referable to it in the

United States. 4. Inferior degrees of diseased mind. Delirium of fever. Hypochondriasis. Hallucination. Epilepsy. Nostalgia. Intoxication — its presence does not excuse from the guilt of crimes — a frequent cause of insanity. Delirium tremens, an insane state of mind — its presence should relieve from responsibility — characters of this disease — its temporary nature. Cases. Old Age. 5. Of the state of mind necessary to constitute a valid will — legal requisites — nuncupative wills — wills disposing of personal property — testaments. Persons who cannot make valid wills. Diseases which incapacitate. Law cases in which various states of mind have been urged against the validity of wills. 6. Of the deaf and dumb — their capacity, and the morality of their actions — are to be judged of according to their understanding. A person born deaf, dumb, and blind, is deemed an idiot; if he become so, a *non compos*. A deaf and dumb person may be a witness — may obtain possession of real estate — may be tried for crimes. Cases of each.

I have chosen the term mental alienation, at this time, simply because it is more comprehensive than others in common use. Were not the words *unsoundness of mind* employed at the present day in a technical sense, they would probably be preferable for the object in view. And this is to consider under one title all those diseased states of mind, which occasionally require the investigation of the medical jurist.

In examining the subject of insanity, I propose to confine myself to those points which are particularly noticed in civil and criminal cases, as it would neither comport with the limits of the work, nor the objects for which it is prepared, to extend the research over that broad field which is usually occupied by the medical pathologist. And we shall find that the symptoms are the important subject of inquiry, since a decision is usually founded on the estimate formed of them.

I shall accordingly arrange my remarks in the following order:

1. The symptoms that constitute a state of insanity.
2. Of feigned and concealed insanity.
3. Of the legal definition of a state of mental alienation, and the adjudications under it.
4. Of inferior degrees of diseased mind.
5. Of the state of mind necessary to constitute a valid will.
6. Of the deaf and dumb — their capacity, and the morality of their actions.

1. *The symptoms that constitute a state of insanity.*

Insanity, in its ordinary acceptation, is usually divided into mania, melancholia, and idiocy; but I prefer the classification proposed by M. Esquirol, as better calculated to illustrate the varied appearances of the disease. The following is the order pursued by him. 1. Mania, in which the hallucination extends to all kinds of objects, and is accompanied with some excitement. 2. Monomania, in which the hallucination is confined to a single object, or to a small number of objects. 3. Dementia, wherein the person is rendered incapable of

reasoning, in consequence of functional disorder of the brain, not congenital. 4. Idiotism, congenital, from original malconformation in the organ of thought.*

After describing these in as succinct a manner as possible, I shall lastly notice a form of disease, which is now frequently characterised by the name of *moral insanity*.

Mania. In many instances, though it is far from being general, pain in the head and throbbing of its arteries precede an attack of insanity; and sometimes giddiness is complained of, as a precursory symptom.† The appearance of the eye is, however, the circumstance most readily to be noticed, and the change in it from a state of health even precedes incoherence of language. Recovered patients have described a peculiar sensation connected with this appearance, as though the eye flashed fire from being stricken smartly with an open hand, and this increased in proportion as the ideas became more and more confused. There is a peculiar muscular action of these organs, a protrusion of the eyes, a wandering motion, in every possible direction, and in a manner peculiarly tiresome to the beholder. During a paroxysm they appear as if stiffly and firmly pushed forward, and the pupils are contracted.‡ And yet with all these appearances of excitement, it has rather a dull than a fierce character.§

The muscles of the face, also, partake in the change; and the rapidity of the alterations they undergo, depends on the succession of ideas which pass with such velocity through the mind of the sufferer.

As the attack advances, the individual becomes uneasy, is unable to confine his attention, walks with a quick and hurried step, and while doing so, suddenly stops. Men of the most regular and established habits, will suddenly become active, jealous, and restless: they abandon their business, and enter into the most extravagant undertakings; while, on the other hand, some who naturally are of a lively disposition, become indolent and indifferent, fancy themselves sick, or have a presentiment of severe disease. Persons subject to habitual indisposition, which has disappeared suddenly, fancy themselves in high health, and are greatly elated.‖ A very vigorous action of body

* Medico-Chirurgical Review, vol. i. p. 249. (American edition.) This is an analysis of the masterly article of Esquirol on insanity, in the *Dictionnaire des Sciences Médicales*.

The above division, although modified and improved by Esquirol, was originally presented by Pinel. The term *monomania* was, however, introduced by the former.

† Haslam on Madness, p. 41.

‡ Hill, p. 68. "It is curious (says Dr. Burrows,) that in many persons predisposed to insanity, the iris is so black that it can scarcely be distinguished from the pupil. The melancholic have generally blue or gray eyes."—Commentaries, p. 283.

§ "I have observed (contrary to my expectations) that there was not that energy, that knitting of the brows, that indignant brooding and thoughtfulness in the face of madmen, which is generally imagined to characterise their expressions, and which we almost uniformly find given to them in painting. There is a vacancy in their laugh, a want of meaning in their ferociousness."—Charles Bell on the Anatomy of Painting, Edinburgh Review, vol. viii. p. 376.

‖ Parkman. I am greatly indebted, in this chapter, to the publications and MS. communications of this learned and diligent examiner of the subject of insanity.

and mind soon takes place, and particularly the exertion of great muscular strength. And here, it is impossible to present any thing like a description that shall be generally applicable. The language is totally different, both in tone and manner, from the usual habits of the maniac. He becomes angry without any assignable cause—attempts to perform feats of strength, or efforts of agility, which shall strike the beholder with astonishment at his great powers. Many talk incessantly, sometimes in the most boisterous manner, then suddenly lowering their tone, speak softly and whisper. The subjects vary equally. They are never confined long to one point, but voluble and incoherent, run rapidly from one thing to another totally disconnected with it. The same phrase is sometimes repeated for a length of time, or conversation is maintained with themselves, as with a third person, with all the variations of violent and ridiculous gestures. In females, there is frequently a complication, as it were, of hysteria, with general madness, and laughing or weeping is a common attendant.*

The food necessary for the sustenance of life is often neglected, and fasting is endured for a length of time without any apparent inconvenience; yet with some, there is an unusual and indiscriminate voraciousness, and they swallow every thing that may come in their way.

The stomach and bowels are unusually torpid—costiveness prevails, and the stools are white, small, and hard. Diarrhœa rarely occurs, except towards the termination of the disease. The urine is scanty in quantity, and, for the most part, of a high colour.

The pulse is very various, sometimes full and laboured, and sometimes natural; but little dependence can be placed on it as an indication.† The tongue is usually moist, and sometimes has a whitish appearance, and there is often a preternatural secretion of saliva and mucus in the mouth and throat, which is of a viscid nature, and discharged with difficulty by spitting. According to Esquirol, maniacs are frequently tormented with great thirst. There is also generally a stoppage of the secretion of mucus in the nose. Dr. Rush mentions, that Dr. Moore, at his request, examined the maniacs in the Pennsylvania Hospital, with reference to this symptom, and found it present in two-thirds of them. Where this secretion was not suspended, he found the mucus of the nose dry and hard.‡

Maniacs are generally deemed capable of enduring high degrees of heat or cold without suffering. This, however, is incorrect, if we are to credit the united testimony of Haslam and Esquirol. During a paroxysm, indeed, they are insensible to either, and particularly to cold, but they suffer like the sane. Mortification of the feet is a com-

* Rush, p. 145. It is a remark of Esquirol, that in female maniacs the sense of delicacy is obliterated. Dr. Knight (p. 123), however, states that he has rarely observed this.

† In 85 females examined by Lauret at La Salpétrière, the pulse was above 100 in 7 only; in 10, it ranged from 90 to 95; in 38, from 80 to 90; in 25, from 65 to 75; in 4, only from 60 to 65; and in 1, it was under 60. According to this observer, the frequency of pulse decreases gradually in mania, monomania, and dementia, the mean pulsation in the latter being 77.—Andral, in Lancet, N.S. vol. ii. p. 617.

‡ Rush, p. 146.

mon occurrence, and some indeed die from the effects of a low temperature, during the winter, if not properly secured. It is suggested by Esquirol, that the great internal heat which some experience, may explain their voluntary exposure.*

The senses are often perverted, constituting what we commonly call ILLUSIONS.† The *ear* more particularly suffers. Haslam observes, that he scarcely recollects of a lunatic becoming blind, but numbers deaf; and those who are not deaf, are troubled with difficulty of hearing and ringing in the ears. It is from the disorder of this organ, and which is referable to the original diseased action of the functions of the brain, that many maniacs derive the delusion under which they labour. The commission which they suppose themselves to receive from some superior being, is given by the ear; they imagine it constantly repeated. They are thus, they imagine, urged to its performance, and in too many cases, murder or self-destruction is the unhappy result. "In consequence of some affection of the ear, the insane sometimes insist that malicious agents contrive to blow streams of infected air into this organ. Others have conceived, by means of what they term hearkening wires and whiz-pipes, that various obscenities and blasphemies are forced into their minds; and it is not unusual for those who are in a desponding condition, to assert that they distinctly hear the devil tempting them to self-destruction."‡

The *eye* is also diseased. Indeed, as Esquirol remarks, it is as much so as any other sense, since it is the principal organ of communication with external objects. It is a common circumstance to mistake various substances or persons. Their appearance to the maniac is various—sometimes fiery and bright; and in these instances,

* Haslam on Madness, p. 84. Dictionnaire des Sciences Médicales, vol. xxx. art. *Mania*. The temperature of maniacs, according to Dr. Knight (p. 123), is always below the natural standard; yet, during a paroxysm, he agrees that they are insensible to the effects of cold.

† An attempt has of late been made to distinguish this term from that of *hallucination*. Dr. Morrison defines them as follows: "Illusions are dependent on the state of the organs of sense; hallucinations on that of the intellectual organs." (p. 35.) Esquirol, who has written on both, makes a somewhat similar distinction, illustrating the latter, (in which the brain only is excited), when it relates simply to the remembrance of the sensations of sight, by what is commonly called a *vision*, or the appearance of apparitions, while the former originates from the senses. When, however, he proceeds to characterise illusions particularly, he refers them to two causes, and one a disordered state of the brain; and acknowledges, that the understanding and the passions concur in producing them. See his Essay translated by Liddel.

‡ Haslam on Madness, p. 69. A curious case is mentioned by our author, (p. 71,) of a patient, who was a well-educated man of middle age. He always stopped his ears closely with wool, and in addition to a flannel night-cap, usually slept with his head in a tin sauce-pan. Being asked the reason why he so fortified his head, he replied, "to prevent the intrusion of the sprites." He was apprehensive that his head would become the receptacle of these imaginary formations; that they would penetrate into the interior of his brain, become acquainted with his hidden thoughts and intellectual observations, and then depart and communicate to others the ideas they had thus derived. "In this manner," said he, "I have been defrauded of discoveries that would have entitled me to opulence and distinction, and have lived to see others reap honours and emoluments for speculations which were the offspring of my own brain."

the eye itself is sparkling and protruded. To the changes thus produced in this organ may be ascribed the passion that some have for collecting sparkling objects, as pebbles, glass, &c.

Relief has sometimes been experienced by the temporary use of a bandage over the eyes. The unnatural excitement is thus mitigated.*

On the other hand, there are many cases in which the eye is sunken and dull, and external objects produce but little impression.

The *smell* does not escape perversion, though this is by no means so common as with the other senses. A lady twenty-seven years of age, in the last stage of consumption, perceived in her room the odour of charcoal. She immediately conceived that there was a design against her life. She left her lodgings, but the fumes of charcoal incessantly pursued her till her death. This depraved state often leads to an abhorrence of food, and a danger of starvation.

The derangement of the *taste*, however, is the principal agent in this, originating most commonly in an unsettled state of the stomach, and accompanied with a furred tongue and a parched mouth.†

The *touch*, in many instances, loses its peculiar power of correcting the other senses. The skin is occasionally hot and dry, or extremely sensitive; and even if these conditions be wanting, the sense is so far perverted, that the insane frequently deceive themselves in respect to the size, form, and weight of things around them, and the greater number become unhandy in all mechanical occupations, music, writing, &c.‡ This, however, is far from being universal, as some speak and write with ease, and are remarkable for striking expressions, deep thoughts, and ingenious associations.

Wakefulness is another symptom, which sometimes precedes all others, and is coeval with pain or uneasiness of the head, or of some other diseased organ; and its degree is determined by the age, habits, situation, and original vigorous or feeble constitution of the patient. From its being always followed in the morning by the peculiar appearance of the eye already described, it may sometimes lead to proper suspicion, as well as attention to the diseased person. This watchfulness is attended with an irresistible impulse to rise early, go abroad,

* Esquirol, p. 22.

† Sometimes the *taste* preserves its power, as in the following case, related by Sir Walter Scott, who, with Shakespeare, may be considered as the two master spirits in describing the various phases of insanity. I will only refer to Hamlet and Lear, to Madge Wildfire and Clara Mowbray. "A late medical gentleman, my particular friend, told me the following case of a lunatic patient confined in the Edinburgh Infirmary. He was so far happy, that his mental alienation was of a gay and pleasant character, giving a kind of joyous explanation to all who came in contact with him. He considered the large house, numerous servants, &c. of the hospital, as all matters of state and consequence belonging to his own personal establishment, and had no doubt of his own wealth and grandeur. One thing alone puzzled this man of wealth. Although he was provided with a first-rate cook and proper assistants, although his table was regularly supplied with every delicacy of the season, yet he confessed to my friend that by some uncommon depravity of the palate, every thing which he ate *tasted of porridge*. This peculiarity, of course, arose from the poor man being fed upon nothing else, and because his stomach was not so easily deceived as his other senses."—Note to the Pirate. Dr. Young relates the same story in an early volume of the Quarterly Review, vol. ii. p. 152.

‡ Medico-Chirurgical Review, vol. i. p. 246.

and ramble about; or, if remaining in the house, to be incessantly employed in arranging, and rearranging articles of furniture, dress, books, or papers; and by thus placing, displacing, and confounding every thing, their ideas become more confused, and they soon give rise to actions of the wild and outrageous nature which we have already described.

The memory is early affected in maniacs. After a time, it seems to be almost destroyed. Some, according to Haslam, lose, in a wonderful degree, their former correctness of orthography.

Pusillanimity is also a remarkable trait in the character of the insane. Though occasionally boisterous and fierce, yet they are readily overcome by a person of decision. Their leading characteristics are timidity, distrustfulness, suspicion, never contented with their present condition, but always desirous of some change. It is this discontent of mind that detaches them from their parents and friends, and causes them to hate most, those whom they previously cherished with the fondest affection. The exceptions to this are few, and even if they retain the semblance of affection, still they will bestow no confidence on the objects of it, nor pay any respect to their solicitations or advice. This alienation from friends is, therefore, one of the most constant and pathognomonic traits of the malady. And frequently the first favorable symptom is a diminution of the constant discontent.*

The duration of a paroxysm is very various. It continues for days, weeks, months, and even years, and ends in death—a state of fatuity—a remission—or a perfect and durable recovery. Dr. Rush states, that in one case which came under his notice, the disease continued from June, 1810, until April, 1811, with scarcely any abatement in the excitement of the body and mind, notwithstanding the patient was constantly under the operation of depleting remedies. He also witnessed another instance, in which the same remedies were insufficient to produce an interruption for five minutes, of speech or vociferations, except during a few short intervals of sleep, for five months.† Others again have paroxysms with chronic but moderate derangement in their intervals; and in these intervals, the recovery is sometimes so great as to indicate insanity on a particular subject only. But a reference to this will readily excite a return of general madness.

If the paroxysm ceases suddenly, we have reason to dread the return of another. On its cessation, the patient seems waked from a dream; he is exhausted, speaks or moves but little, and seeks solitude; and if there is an approach to reason, he states what he has seen, heard, or felt, his motives and his determinations.‡

Monomania. Here the permanent delirium is confined to one object, or to a small number of them. The sufferers are pursued day and night by the same ideas and affections, and they give themselves

* Medico-Chirurgical Review, vol. i. p. 247. Knight, p. 14.

† Rush, p. 162.

‡ Parkman. "The convalescence from insanity differs from convalescence from common disorders, in being sometimes suddenly and unexpectedly commenced; but it is often very feebly and imperfectly declared. Intermissions of sanity and insanity may be observed for weeks, or for months."—Conolly on Insanity, p. 26.

up to these with profound ardour and devotion. They often appear reasonable, when conversing on subjects beyond the sphere of their delirium, until some external impression suddenly rouses the diseased train.

The character of this form of insanity is very various, and depends on the predominant species of delusion that is present. It is hence divided into several varieties. Some are gay and highly excited—laugh, talk, and sing—fancy themselves deities, kings, learned and noble. Cases of this nature must be familiar to every reader. Foderé mentions one which is strikingly illustrative. A merchant at Marseilles, aged seventy, and always a decided royalist, had devoted himself to heraldic researches. He was so overjoyed at the return of the Bourbons to France, that he became insane. His predominant mania was to recite with a loud voice the history of the kings of France, and to fatigue his auditors with a tedious catalogue of chronological facts. If they listened with patience, he was contented and calm, but if any impatience was manifested, his fury became ungovernable.*

Some patients, when suffering under this form, are excessively irascible, and even without any apparant cause, are suddenly hurried into a violent passion or fury. It is while labouring under this, that they become dangerous to themselves or to those around them. They will seize any weapon, and strike and injure others or themselves. Sometimes consciousness of their situation is so far present, as to allow them to warn individuals of their danger, or to entreat them to prevent their doing injury. An internal sensation is perceived—as a burning heat with pulsation within the skull, previous to this excitement.† This description of lunatics "eat much, but sometimes they endure hunger with great obstinacy; they have frequent pains in the bowels, and costiveness is common. The pulse is full, hard, and strong, and the skin warm."‡

Probably this is a form of insanity as common as any other. It is also said to be less durable, and to end more favourably.

Melancholy, which is another form of monomania, is a disease of mature age, and rarely affects young and athletic persons. It is also generally characterised by a peculiar appearance, and particularly by black hair and eyes—by a striking cast of countenance, as the complexion is either yellow, brown, or blackish. This is to be ascribed to a sluggishness and torpor of the cutaneous system, and in consequence, the impressions of cold and heat are slightly noticed, and sometimes not heeded. The physiognomy is wrinkled and languid, yet sometimes the muscles of the face become convulsively tense, and the countenance is full of fire.

The pupils of the eye are dilated, and that organ has a peculiarly dull muddy look, rolling heavily on surrounding objects, if it can be

* Foderé. Traité du Délire, vol. i. p. 385.

† Others again refer the pain to the presence of some animal in the brain, the stomach, or some other organ, and not unfrequently it has its origin in real disease. An insane woman, who said she had an animal in her stomach, died at Salpêtrière. Esquirol opened her, and found a cancer of that viscus.— Page 10.

‡ Parkman.

roused to move at all. But ordinarily it is fixed with an unmeaning stare on vacancy. The adnata is commonly painted with a dull purplish red, sometimes on a deep orange coloured ground, and this especially when advancing age and hepatic affections exist, or intemperance has long preceded the attack. Holding a strong light near the eyes, produces a very transient effect.*

Pain is said by some recovered patients to have preceded the attack —sometimes fixed, but more commonly wandering; and the suffering by this is extreme. Great apprehension, which, indeed, is a characteristic of this form, ensues, and plunges the sufferer into the most gloomy state of mind, accompanied by indifference as to his personal comfort, or urging him forcibly to self-destruction, or to the murder of others. The state of reverie and delusive ideas gradually becomes more fixed, and the thoughts are concentrated on one mournful topic, until finally he is, as it were, inanimate, motionless, and speechless. A fixed position of the body is a very common attendant. In one instance that occurred to Dr. Rush, the patient sat with his body bent forward for three years without moving, except when compelled by force, or the calls of nature. In another, the sufferer occupied a spot in a ward, an entry, or in the hospital yard, where he appeared more like a statue than a man. Such was the torpor of his nervous system, that a degree of cold so intense as to produce inflammation and gangrene upon his face and limbs, did not move him from the stand he had taken in the open air.†

The pulse is extremely vacillating, and generally is slow and feeble; yet with all this, has a labouring feel, not accompanied with a bold throb, but as though difficulty attended every exertion. A sort of ticking movement is sometimes observed, which is often intermitting, giving from one hundred to one hundred and thirty strokes in a minute.‡

The skin is dry, and burning, while the extremities are cold, and bathed in a clammy sweat.§ With these, transient purple-coloured flushings of the face are sometimes an attendant. The tongue is usually of a brownish yellow colour, furred, and has intensely purple red edges. Constipation is a very common symptom, accompanied with flatus and eructation; and diarrhœa is uncommon, excepting the disease is about to undergo a salutary change. The urine is pale, thin, and cloudless, unless it be morbidly retained, which some do for several days. The thirst is usually great, and a peculiar odour is perceptible from their bodies.

Watchfulness is also common in this form of disease; and sleep, when it is present, is often broken by nocturnal visions or frightful dreams.

On objects not relating to the subject or passion which charac-

* Hill, p. 98.

† Rush, p. 216. Dr. Reid (Essays on Nervous Affections), in his usual figurative language, says, "Paroxysms of mania are convulsions of the mind; those of melancholia its paralysis."

‡ Hill, p. 101.

§ Some lunatics complain of a burning or stinging in the skin, when on examination it appears healthy.—Knight, p. 116.

terises the delusion, they sometimes reason and act rightly, and often with great force and subtilty. But this is far from being invariable. The mind cannot be deemed sound, even when exercised on points disconnected from the particular hallucination, and it is very common that this absorbs the whole attention.

In these instances, even when apparently sane, if the morbid impression be once referred to or excited, all is merged in it. And it is equally astonishing and melancholy, how vivid this remains, through the long lapse of years. A young clergyman, two days previous to the appointed period of his marriage, was employed in snipe-shooting with a friend. Accidentally, he received part of the charge of a gun in his forehead. He instantly fell, and did not recover for some days, so as to be deemed out of danger; but at the end of this period it was perceived that he was deranged. The interesting event that was to have taken place, became the leading object of thought, and all his ideas seemed to stop at this. "All his conversation was literally confined to the business of the wedding; out of this circle he never deviated, but dwelt upon every thing relating to it with minuteness; never retreating or advancing one step farther for half a century, being ideally still a young, active, expecting, and happy bridegroom, chiding the tardiness of time, although it brought him at the age of eighty gently to the grave."*

There are very few melancholics whose delirium is not exasperated every two days; many have a strongly marked remission in the evening and after meals; others are exasperated at the beginning of the day or at evening.† Haslam also observes, that the symptoms are aggravated by being placed in a recumbent posture. And patients, when in the raving state, seem, of themselves, to avoid the horizontal position as much as possible; and when so confined that they cannot be erect, will keep themselves seated upon the breech. This remark applies equally to mania and monomania.

I may also, in this place, add a general remark with respect to the age most liable to insanity. This is often useful in the formation of an opinion. Infancy seems to be nearly exempted from its attacks, unless there be some congenital malconformation, or unless idiotism be induced by convulsions, epilepsy, or some other previous and severe disease. The disease, however, often occurs in very young persons, and it is about the age of puberty that its causes begin to operate most powerfully on youth. It is at this period characterised by its rapid progress and height of excitement; in adult age it is more chronic.‡

The state of mind in this and the previous form of insanity is strikingly peculiar. I have met somewhere, but am not able to refer to the author, with a proposed division of the disease into abstraction and vivid imagination, and they would certainly seem to embrace the most striking mental features. The last creates new ideas, and mistakes recollections for real existences. "The power of reasoning or judgment" (says Dr. Prichard) "does not appear to be so much impaired

* Hill, p. 421. † Parkman, Haslam on Madness, p. 80.
‡ Medico-Chirurgical Review, vol. i. p. 251.

in madness, as the disposition to exercise it on certain subjects. Often there is a manifest unwillingness to admit any evidence unfavourable to the false notions impressed upon the mind. In many instances, it would appear that the characteristic feature of the disease is a morbid inclination to indulge in reverie, and to yield the judgment and all the faculties to its control. The impressions of reverie are so modified by disease as no longer to be distinguishable from those of memory or active reflection."*

Dementia. This is often the consequence of mania or melancholy, and is somewhat allied to that decrepitude of mind which frequently appears in old age. It may also originate from external injury or internal disease.

The understanding and memory are either totally, or to a very great extent, impaired in this form of disease; yet on a few points the latter seems sometimes to be in a perfect state. "Habit, however, has a great influence on their conduct, and gives it an appearance of regularity, which should not be mistaken for reasoning."† They hate, love, or fear, particular individuals uniformly, and kindness or attention will seldom, if ever, give them confidence in those they dislike.

Patients of this description are usually calm and quiet, though occasionally short periods of fury supervene. They sleep much, enjoy a good appetite, and are apt, if neglected, to become slovenly and dirty in their appearance. Esquirol mentions a case, which will give a general idea of this class in its usual form. The patient was a female, aged seventy, who, after having passed several years in a state of furious mania, at last fell into dementia. "The hallucination of this individual corresponds with her advanced age, and the long duration of the complaint. She preserves a few ideas, which still savour of pride. She believes herself the daughter of Louis XVI., but otherwise there is no coherence; no memory of recent transactions; no hopes or fears, desires or aversions. She is calm, peaceable, sleeps well, eats with voracity, and appears perfectly happy."‡

The ideas, although few and isolated, sometimes pass in rapid or alternate succession: and this gives rise to incessant babbling, unwearied

* I am unwilling to multiply the divisions of insanity, but there is one variety, particularly noticed by Dr. Prichard, which may be deemed the intermediate one between mania and dementia, as described in the text, and, therefore, deserves a brief notice. He styles it *incoherent madness;* and its most striking characteristic, according to our author, is the rapidity and disorder with which the ideas follow each other, almost without any discoverable connexion or association, in a state of complete incoherence and confusion. The understanding of the patient is wholly lost in the constant hurry of ideas that crowd upon him, while his habits shew equally restless activity and extravagance.

In many cases no hallucination or erroneous impression on the mind can be traced. The thoughts seem to be single and insulated, and words and sentences are half pronounced. It is impossible to fix the attention of the patient, and he is almost insensible to external objects. In favourable cases this incoherency gradually subsides, and the patient is in a promising state for recovery, if he become capable of sleeping. The resemblance of this to some of the symptoms of mania, will occur to the reader, but it is evident that it occasionally constitutes an idiopathic species of insanity. It may end, like mania or monomania, in dementia.

† Parkman. ‡ Medico-Chirurgical Review, vol. i. p. 270.

declamation, and continual activity, without object or design. Occasionally they assume a menacing air, without any real anger, and this is soon succeeded by immoderate laughter.*

The appearance is generally peculiar; the countenance is pale, the eyes are dull and moist, the pupils dilated, and the look is motionless and without expression. There is a variety as to emaciation or fatness; some are extremely thin, while others are corpulent.†

Idiotism. Individuals labouring under congenital idiotism, are marked by some striking characters. At its commencement, it is indicated both by feebleness of body and feebleness of mind. In some countries this melancholy disease is not uncommon, and it has been particularly remarked in the Valais in Switzerland, and in Carinthia. In the former countries, the subjects of it are styled *Cretins.* But wherever found, whether in individual instances, or originating in some national cause, the appearance may generally be described as follows:

The skull is usually smaller and inferior in height to the skull of maniacs, and there is a great disproportion between the face and head, the former being much larger than the latter. The countenance is vacant and destitute of meaning, the complexion sickly, the stature usually diminutive, the lips and eyelids coarse and prominent, the skin wrinkled and pendulous, and the muscles loose and flabby. To these, are usually added a complication of other diseases. The subjects are ricketty, scrofulous, or epileptic; the eyes are squinting or convulsive, and the hearing is imperfect or totally destroyed. Dr. Reeve visited the Valais, and saw several of these unhappy beings. One lad, twelve years old, could speak a few words, but was silly, and of a weak and feeble habit. Another boy, nine years old, was deaf, dumb, and idiotic. Neither of these, however, had goitres. A third, a girl, twelve years old, was deaf, dumb, and cross-eyed, and had a monstrous goitre; while a fourth had an enlarged abdomen, and some feeble traces of understanding.‡

While some are dumb, others express themselves in inarticulate sounds, cries, or a prolonged roar. A few are able to utter a word or two distinctly, as with the idiot mentioned by Esquirol. This was a female, aged twenty-one years, who had been in the Salpêtrière three years without any change. Her head was large and irregularly shaped, and the forehead high and prominent, so that the facial angle was more

* Foderé, Traité du Délire, vol. i. p. 413.

† It is proper to state that many other subdivisions have been made of that condition of mind which is characterised by weakness, and of which idiopathic dementia and idiotism are the most striking examples. Thus, Hoffbauer, a legal writer of celebrity in his own country (Germany), makes two modifications of this state, *imbecility* and *stupidity;* the one defective in the powers of reason and discrimination, the other obtuse in perception and apprehension. He again subdivides imbecility into five degrees, the last being identical, as far as I can judge, with idiocy; and stupidity into three degrees. It is doubtful whether the practical benefit to be derived from this minuteness, will ever compensate for the endless discussions that might arise on its introduction into our laws, and this is the object of Hoffbauer. I refer to his work, and to Dr. Prichard, art. *Soundness and Unsoundness of Mind,* in the Cyclopædia of Practical Medicine, vol. iv. p. 39.

‡ Edinburgh Medical and Surgical Journal, vol. v. p. 32. See also Edinburgh Review, vol. ii. p. 170. (American edition.)

than ninety degrees. She ate voraciously, and without discrimination; passed all evacuations involuntary, but the menses were regular and abundant. She walked little, and all her movements were convulsive. She was a perfectly helpless infant—insensible to heat, cold, rain, or even her own internal feelings. She could only utter the words "*papa*" and "*mama*," which she frequently repeated.*

Dr. Rush relates the case of a boy born near Philadelphia, which is no less striking. He was twenty years old when that distinguished physician published his work, and was then unable to walk or speak. He had the head of a man, but all the parts below it resembled those of a child two or three years old. His pulse was from ninety to one hundred and twenty in a minute. He had shed his teeth, and now exhibited a third set, in three distinct rows in his upper jaw; and yet with all this, he was unable to chew his food, and all that he took of a solid nature was first chewed for him by his sister. His ears were very large. When hungry or in pain, he cried, but more commonly laughed for hours, and even for whole nights together, and so loud as to disturb the sleep of his family. He discovers mind, says Dr. Rush, in but three things, viz. in an affection for his mother and sister, and in love for a dog, and for money. Distress is manifest when the dog is out of his place; and the pleasure which money gives him, is owing to the association he has been enabled to form between it and the means of procuring gingerbread, of which he is fond.†

I must not, however, be understood as stating that all who belong to the class of idiots are distinguished by equally striking marks. There is a variety in this, as in other diseases. Some approach to the description of dementia, or what is commonly called *imbecility;* others appear capable of cultivating the memory and attention. Though in general harmless and timid, yet there are occasionally exceptions.‡

There remains to be considered another and disputed form of mental disease, which, in conformity to the nomenclature of many experienced observers, I have denominated MORAL INSANITY.

It has professedly been adopted, because physicians have not been able to detect any delusion or hallucination in the persons affected. The intellectual faculties appear to have sustained but little injury, but the feelings and affections are perverted and depraved, and the power of self-government is lost or greatly impaired.§ Thus, Spurzheim defines insanity to be either a morbid condition of any intellectual faculty, without the person being aware of this; or *the existence of*

* Medico-Chirurgical Review, vol. i. p. 250.

† Rush, p. 292. I will only refer to another case, and it is that mentioned by Mr. Hobhouse, which was seen by him at the hospital in Smyrna, in 1810. The individual was a female, about three feet and a half in height. She constantly sat, rolled up, as it were, upon a truss of straw; was quite dumb, nearly deaf, and possessed of no one consciousness of humanity. She would hop towards her keeper, on being loudly called by a name with which she was familiar. Her profile is given by Mr. Hobhouse, and it is strikingly characteristic of idiotism.—Travels in Albania, vol. ii. p. 626. (London edition.)

‡ As in the instance of the idiot in Cornwall, who strangled and afterwards burnt the body of an old woman who had for some years superintended his person.—Paris and Fonblanque, vol. i. p. 311.

§ Prichard, art. *Insanity*, in Cyclopædia of Practical Medicine.

some of the natural propensities in such violence, that it is impossible not to yield to them. Dr. Elliotson, while approving of this, suggests that there should be included in the definition, the idea of such irresistible violence as *leads to criminal acts.** Pinel was so struck with the peculiarity of this form, that he introduced it as a distinct species in his work, under the title of "*madness without delirium or hallucination.*"

Esquirol, indeed, goes so far as to assert, that this is the proper characteristic of mental derangement. "There are madmen (he observes) in whom it is difficult to discover any trace of hallucination; but there are none in whom the passions and moral affections are not disorded, perverted, or destroyed. I have, in this particular, met with no exception."

Concurring in these opinions from actual observations, Dr. Prichard, in a late essay on this subject, has proposed the following definition.

"*Moral insanity or madness* consists in a morbid perversion of the natural feelings, affections, inclinations, temper, habits, and moral dispositions, without any notable lesion of the intellect, or knowing and reasoning faculties, and particularly without any maniacal hallucination."†

According to our author, individuals of this description are often, before the idea of their insanity occurs, reputed to be of singular, wayward, and eccentric character.‡ They commit many equivocal actions,—their temper aud disposition are found to have undergone a change—probably, in consequence of some misfortune or loss—or from some shock to the constitution. The alteration is gradual, but sufficient to excite the apprehension and solicitude of friends; and though these may be unwilling to recognise the actual disease, yet they must notice caprice and fickleness in pursuits, united with a total perversion of affections. Enmity against their dearest friends, is a frequent trait in such individuals.

"Persons labouring under this disorder, are capable of reasoning or supporting an argument on any subject within their sphere of knowledge, that may be presented to them; and they often display great ingenuity in giving reasons for their eccentric conduct, and in accounting for and justifying the state of moral feeling under which they appear to exist." They think and act, however, under the influence of strongly excited feelings.

It is under this division of insanity, that the commission of acts of violence very frequently occurs. The French writers insist much on a faulty education as a principal cause, and there is no doubt that they have given in this the key to most of the histories with which legal and medical works are lately filled. The temper is scarcely attempted to be restrained, nay, its very transports are encouraged and justified;

* London Medical Gazette, vol. viii. p. 168.

† Prichard *ut antea.*

‡ "The errors of the eccentric (says Dr Gooch) are the results of long habits continued for a great part of their lives, and fabricated by slow, and almost insensible degrees; while the errors of the insane spring up suddenly within a few months, or even weeks."—Quarterly Review, vol. xli. p. 173.

and it is hence not surprising, that as age advances, liberty of action should be converted into licentiousness. France has tried the experiment. Other countries are rapidly feeling its early results.

Pinel relates the case of a self-willed, violent boy, encouraged by his mother in every caprice and passion. The slightest opposition produced actual violence. Any animal that offended him, was put to death. As he grew up he was constantly engaged in broils, and ended his career by murdering a person, who used offensive language to him. On his trial, this course of conduct was adduced as proof of his insanity, and he was condemned to perpetual confinement in the Bicêtre.

The results of this species are various. In many, it displays itself in an irresistible propensity to commit murder (homocidal mania); in others, to commit theft; while some are impelled to set fire to buildings, often of the most venerable description. We are told, that when this state is connected with the false belief of some personal injury actually sustained, "it does not come under the head of moral insanity." Here is an hallucination. "But if the morbid phenomena include merely the expressions of intense malevolence, excited without ground and provocation, actual or supposed, the case is strictly one of moral insanity."

Though there are many, as above described, who have this propensity to commit each and every kind of mischief, yet there are some where the disease commences and ends in intense irascibility.* A large proportion are subject to melancholy and dejection of mind, unaccompanied, however, by any illusion. It would appear to be confined to no age—and, indeed, is said occasionally to make its appearance in those advanced in years. Their whole moral character is changed—"the pious" says Dr. Burrows, "become impious; the liberal, penurious; the sober, drunken."

In this description, which, as already stated, is taken from the writings of the most esteemed modern authors on insanity, I need hardly suggest to the reader the striking resemblance that it bears to crime. Owing to this, our legal tribunals can hardly be considered as giving an assent to its actual existence. The difference of opinion which exists, with examples of cases that have been discussed, will, however, be more properly considered in the section on the *legal definition* of a state of mental alienation.†

Besides the forms of insanity now described, there are others mentioned by systematic writers; as *demonomania*, which is a variety of melancholy, originating from mistaken ideas on religious subjects; and *nymphomania*, or *furor uterinus*, a raving mania of females, connected with a disorder of the generative organs. Other mitigated affections will be noticed hereafter.

* "Some complain—lie—quarrel. You cannot find a single idea truly foolish; the delirium is in their actions and moral sentiments. The judgment only becomes perverted when the disease is at its height."—Leuret, Annales d'Hygiène, vol. i. p. 284.

† It is proper to add, that all the medical observers above quoted, concede that the other forms may be, and often are, superadded after a time, to the state of moral insanity.

A short enumeration of the causes of insanity may be introduced in this place. They are usually divided into physical and moral, or bodily and mental; but a separation of this nature is not conducive to just views of the disease. Insanity is essentially a bodily disease, and the moral causes operate in producing it, as they do in producing other complaints.

We may enumerate the following as remote causes: repeated intoxication, abstinence, injuries to the head, fever, suppressed discharges and secretions, excessive evacuations, mercury largely and injudiciously administered, paralytic affections, influence of particular seasons, hereditary predisposition, sedentary habits, excess in pleasure, factitious passions, mistaken views of religion, parturition, errors in education, intense application to a particular study or object of investigation, misfortunes, the excitement of political changes, and particularly a state of war.

On age, a remark has already been made; and it may be added, as to sex, that upon a comprehensive comparison, there is found to be no other disproportion among the insane, than among the sane population in general.*

It should be remembered, that the insanity of females is always aggravated at the period of menstruation, particularly when it is in a morbid state.†

II. *Of feigned and concealed insanity.*

The medical witness is often required to decide on the actual existence of insanity, and it, therefore, behoves him to be well acquainted with its actual symptoms. It is in this point of view, that the enumeration given in the previous section becomes valuable. It will also materially aid in detecting feigned or concealed insanity.

There is no disease, says Zacchias, more easily feigned, or more difficult of detection, than the one under consideration. And hence, he remarks, many great men of ancient times, in order to elude the danger that impended over them, have pretended it; as Ulysses, Solon, and Brutus, the expeller of the Tarquins.

In our day, however, madness is most commonly feigned for the purpose of escaping the punishment due to crime, and the responsibility of the medical examiner is consequently great. It is his duty, and should be his privilege, to spend several days in the examination of a lunatic, before he pronounces a decided opinion. If this be allowed to him, and also if he be enabled to obtain a complete history of the antecedent circumstances, much may be effected towards forming a correct opinion. The following remarks may serve as points on which the inquiry is to be grounded, and the comparison instituted.

1. Insanity is seldom sudden in its attacks. The aberrations from reason are at first slight and almost imperceptible, but gradually acquire more marked characteristics. With the feigned, on the other hand, they are sudden, abrupt, and violent.

* Haslam on Madness, pp. 208, 210. Medico-Chirurgical Review, vol. i. p. 251.
† Marc, in Godman's Western Reporter, vol. ii. p. 68. Esquirol.

2. It requires powers beyond the scope of ordinary exertion to counterfeit the character of an active paroxysm to its full extent. The deception is not maintained when the pretenders are alone and unwatched—the assumed malady then dissappears, and the imposture is recommenced when they are in the society of others.*

3. A certain cast of countenance, and gestures accompanying it, are so peculiar in the insane, that a medical examiner familiarised to them, will generally be able to designate the state that is present. Pretenders often outstrip madness itself, and seem desirous to exhibit themselves in its most violent and disgusting forms. They overdo their part. "They seek to exhibit the total abolition of the rational faculty, instead of its partial perversion."

4. Real lunatics, at the period of remission, are desirous of being deemed free from the malady, and often assiduously endeavour to conceal from observation those lapses of thought, memory, and expression, which are tending to betray them. Alexander Cruden, when suffering under his last attack of mental aberration, upon being asked whether he ever was mad, replied, "I am as mad now as I was formerly, and as mad then as I am now, that is to say, *not mad at any time.*"† The feigned never desire to conceal their condition.

5. Pretenders are unable to prevent sleep. That watchfulness which is so constant an attendant on the insane, is scarcely to be preserved for any length of time by those who are in actual health. "In the case of a seaman, who enacted under our own eye the part of a furious maniac, in hopes of escaping punishment, sound sleep overpowered him on the second night of the attempt."‡

6. The physician should endeavour to obtain from the individual, a history of himself. This requires attention and time, but the prosecution of the inquiry may lead to the developement of some probable motives for his present conduct.§ Unless highly irritated, or suspicious of his medical attendant, some opportunity will occur in which the real state of mind will be shewn. If there be delusive ideas prevailing, a glimpse of them may be caught, and by prudent management, the lunatic thus often makes him a confidant. Not only should the physician frequently converse with the patient, but also endeavour to have him write. In many instances the style, or the manner of penmanship will detect.‖

7. Mr. Hill also recommends attention to the presence or absence of the peculiar animal odour that is observed in maniacs. And "the best mode of making the discovery of it, is to enter the bedroom of the subject on his first awaking after having slept in a small, ill-ventilated

* Haslam's Medical Jurisprudence of Insanity, p. 322.

† Hill, p. 392. It may be new to some of my readers that this was the author of the "Concordance of the Bible," and that he became insane in consequence of the death of Queen Charlotte, to whom he had dedicated it, and on which he had founded high hopes. See an account of him in the Library of Entertaining Knowledge, vol. iii. p. 186.

‡ Cyclopædia of Practical Medicine, *art.* Feigned Diseases, vol. ii. p. 146. When soldiers or sailors are suspected of feigning, they should be confined alone, and so that they can be overlooked when not suspecting it.—Marshall, p. 144.

§ Hill, p. 396. ‖ Conolly, p. 467.

room, in sheets and body linen occupied by him for some time, the curtains now to be opened by the inspector. On inhaling the effluvia under these circumstances, it is scarcely possible to be mistaken."*

8. Dr. Rush proposes a rule, grounded on the following circumstance: the pulse, according to his observation, is more frequent in all the grades of madness than in health. I have already intimated doubts on this point, and, therefore, can only recommend it as a test worthy of notice, but not of great value. He mentions the following case in which it was applied, and which deserves quotation. Two men were condemned to die in 1794, for treason, committed against the general government in the western counties of Pennsylvania. One of these was said to have become insane after sentence of death was pronounced on him. A physician was consulted upon his case, who declared the madness to be feigned. General Washington, the president of the United States, directed a consultation of physicians, and Drs. Shippen, Rush, and Samuel P. Griffits, were appointed for that purpose. The man spoke coherently upon several subjects, and, for a while, the state of his mind appeared doubtful. Dr. Rush suggested the propriety of examining his pulse. It was more frequent by twenty strokes in a minute, than in the healthy state of the body and mind. Dr. Shippen ascribed this to fear, but when the pulse of his companion was examined, although equally exposed to capital punishment, it was found perfectly natural, both in frequency and in force. This discovery induced the physicians to unite in a certificate, that the individual was really mad. He was respited, and subsequently pardoned.†

9. The administration of a strong solution of tartar emetic, unknown to the suspected person, has been advised. Where a common dose takes a full and powerful effect, deception may be suspected, as it is stated that this never follows its administration in any stage of approaching or actual insanity, and more especially in the maniacal form, which is commonly attempted to be personated.‡

10. It is very difficult uniformly to assume that extreme and sudden irritation, which, in real maniacs, instantly arises from any contradiction of their opinions or wishes.§

11. Dr. Willis has suggested the following as proofs of recovery: "If a patient, after being perpetually restless, can sit quiet in his chair for half an hour, we may judge favourably of him, though his delusions be as strong as before. When he remains composed for whole days together, we may look for a return of reason."

He further adds, that, in his opinion, no one can be considered cured, or in other words, of sane mind, "*until he freely and voluntarily confesses his delusions.*" I confess that I doubt this, and at all

* Dr. Knight recognises the correctness of this, and says Boerhaave and Van Swieten have each noticed it. P. 121. Esquirol also mentions it. Burrows says (p. 297), "If I detected it in any person, I should not hesitate to pronounce him insane, even though I had no other proof of it."

† Rush's Introductory Lectures. Lecture xvi. p. 369.

‡ Hill, p. 306. "Some melancholics, as well as maniacs, are very insensible to the action of drastic purgatives."—Marc, Godman's Western Reporter, vol. ii. p. 67. See also Male, p. 257.

§ Foderé, Traité du Délire, vol. ii. p. 500.

events agree with the critic, who observes that it can only apply to monomania, as in the other species the insane may be perfectly ignorant of what he has been doing.* "I do not think it quite fair to expect this (says Sir Henry Halford). Something must be conceded to the pride of human nature."†

But it must also be remembered that the insane may conceal their delusions, and they frequently do this with great cunning. Hence it requires particular attention on this point, and it should also be ascertained whether they sleep habitually well.

12. The attempt to feign melancholy is much more difficult, according to Dr. Haslam, than to pretend mania. "They are deficient in the presiding principle, the ruling delusion, the unfounded aversions, and causeless attachments which characterise insanity; they are unable to mimic the solemn dignity of characteristic madness, nor recur to those associations which mark this disorder; and they will want the peculiarity of look which so strongly impresses an experienced observer."‡

13. In cases of doubtful idiocy, the fact should be noticed whether they are pusillanimous and submissive. This is a precept of Zacchias; but it must also be remembered, that impetuous excesses sometimes occur in individuals of this description. Their memory and conception should also be put to the test.§

14. However skilful may be the attempt to counterfeit dementia, and it is the most easily assumed of all the forms, yet there is always in the pretender a kind of hesitation and reflection to be observed in his discourse. His wild ideas do not succeed each other with the same rapidity as those of a person whose understanding has been really destroyed. Marc proposes, as another test, to repeat to the insane person a series of ideas recently uttered. The pretended madman, instead of wandering incoherently, would judge it most expedient to repeat the same words for the purpose of proving his madness.‖

15. There are many instances, where, without any precise intention of concealment, the existence or non-existence of insanity requires to be ascertained. This is particularly the case as to the disposition of property; and hence the sanity of a testator is so often the subject of dispute in our courts of justice. If the physician has free access to the patient, all the directions already given should be followed, so far as they are applicable.

Sir Henry Halford, in a recent case, made a practical application of the test of Shakespeare, as given in the following speech of Hamlet:

> "Ecstasy!
> My pulse as yours doth temperately keep time,
> And makes as healthful music. It is not madness
> That I have uttered; bring me to the test,
> And *I the matter will reword, which madness would gambol from.*"

A gentleman sent for a solicitor, and gave him instructions for his will; and, among other things, told the solicitor that he would make

* Medico-Chirurgical Review, vol. vi. p. 371.
† Sir Henry Halford's Essays, p. 141.
‡ Haslam's Medical Jurisprudence of Insanity, p. 323.
§ Marc, Godman's Western Reporter, vol. ii. p. 66. ‖ Marc, *ut antea*, p. 68.

him his heir. He soon after became deranged, and was attended by Sir Henry Halford and Sir George Tuthill. After a month's violence, he was composed and comfortable, but extremely weak, and manifested great anxiety to make his will. This request was evaded as long as possible, but at last consented to. The solicitor received the same instructions, drew it, and it was signed by the physicians as witnesses. They inquired, at the time of executing it, whether such were his intentions; and to each and every question, he answered affirmatively. On going down stairs, and conversing on the delicacy of their situation, it occurred to Sir Henry Halford to apply the above test. They returned to his room, and asked him as to the disposition of his property. With respect to the legacies, he answered correctly; but when inquired of, to whom his real estate was to go, he answered, "to the heir-at-law to be sure."*

16. It may sometimes be proper, if suspicion exist, to speak of some severe remedy, or to threaten some punishment. The really insane do not heed these, being occupied with the phantasms of the imagination, and they are hence insensible to the operation of hope or fear; the feigned, on the other hand, will often discover, by words or actions, the emotion which the threat produces. Zacchias relates, that in his day, an able physician ordered, in the hearing of a suspected person, that he should be severely whipped. This was directed on the following grounds: If the patient be really insane, the whipping will produce an irritation on the external parts, and may tend to alleviate or remove the disease; if not, he cannot stand so severe a test. The event proved the success of this mode of reasoning, as the threat alone sufficed to cure the pretended malady.†

On the same principle, the following case was detected by Foderé. A female, named Susannah Cloitre, was, in 1789, imprisoned on the charge of having, in company with others, committed several highway robberies. Before this time, she had repeatedly, through her ingenuity in feigning insanity, escaped punishment from several tribunals in Savoy and Geneva. Foderé was ordered to examine her; and on his first visit, she counterfeited the maniacal fit in so able a manner, as almost to lead him to certify that she was insane. Recollecting, however, at the moment of departure, the case related by Zacchias, he returned to the door of the prison, and said in a firm tone of voice, the following words: "To morrow I shall again visit her, and if she continue to howl, if she be not dressed, and her chamber not put in order, you must apply a red hot iron between her shoulders." The next day the chamber was found washed, the prisoners had slept quietly during the night, and the patient was dressed. Foderé continued his visits for some days, when he certified that she was not affected in her mind.‡

* Halford's Essays, p. 47.

† *Threaten*, but do not apply any *extra-professional* infliction. Speak of sending to an insane hospital—of confining them to a diet of bread and water, &c. and let them be secluded from their companions. These directions are particularly applicable to feigned insanity among soldiers and sailors. Occasionally the physician, in spite of every precaution, proves to have been mistaken, and he *may* cause the innocent much suffering.—Cyclopædia of Practical Medicine, vol. ii. p. 147.

‡ Foderé, Médecine Légale, vol. ii. p. 461.

17. Marc advises us to notice whether the returns of the disease are regular or irregular. Dementia is rarely periodical in its excitements; melancholy is more commonly so; mania with delirium, almost constantly; and mania without delirium, always. The approach of storms always excites maniacs, and females are most violent as menstruation is approaching.*

In elucidation of the subject of doubtful insanity, Marc relates three cases, which I shall briefly analyse.

A man named Doux, was committed to prison for attempting the murder of his wife. Drs. Marc and Rostan were desired to visit him. His companions in confinement stated that they had not witnessed any thing inconsistent with sanity, and that he testified regret for his conduct. Doux's own account was, that his wife had proved faithless, and that he was constantly witnessing her attachment to her paramour; a violent quarrel finally ensued, when he beat her, and left her apparently dead.

These facts appearing probable, and presenting nothing like insanity, they repeated their examination three days after. He made a similar statement, and on being asked as to his health, said he was well. On examining witnesses, however, the wife and neighbours knew nothing of the paramour, nor of other circumstances of which he had spoken. In this state of facts, Marc put the following questions: *Are the statements false?* Then his memory must be extraordinary, to repeat these circumstances so frequently, without any alteration. *Has he lied to feign insanity?* Why then does he say that he is well? *Are these stories the effect of an illusion?* Yes. He was melancholic; had violent quarrels with his wife; became very intemperate during the last year; fell at one time from his horse on his head, and has had constant pain there since. The physicians hence gave it as their opinion that this was a case of monomania, in which the predominant idea was jealousy.

Two months after, he was again visited, and found much altered. The conjunctiva was injected, the tongue red, the pulse slow, and his answers to questions slow and incoherent. He knew nothing of the paramour, on whose conduct he had previously dilated so much; and on being desired to shake hands firmly, he was unable to exercise the least constriction. It was also ascertained that he frequently had involuntary discharges of urine. The case was thus evidently verging to dementia, combined with palsy.

* Dictionnaire des Sciences Médicales, art. *Aliené*.

" The best mode that has yet been discovered, for forcing a man who feigns madness, to confess and desist, is by the use of the whirling chair; that is, a chair placed upon a spindle, which revolves upon its own axis, and is turned by a wheel and crank, with the rapidity of the fly of a jack. It produces nausea, even to syncope; and after two minutes of such discipline, few men can command spirits sufficient to act any part. It was by this means that M'Dougal of Glasgow was rendered sane, when he feigned madness to avoid being tried for sinking ships to defraud the underwriters; but he betrayed himself to the medical men by the common fault of impostor, not having " a method in his madness," but mixing up the two irreconcilable characters of,

" ' The moping idiot and the madman gay.' "

—DUNLOP.

Another instance is derived from the narrative of Professor Monteggia.

In 1792, a criminal confined in the prison of Saint Ange, no sooner heard that his accomplices had denounced him, than he appeared to be in a state of dementia. The physicians who examined him, were inclined to doubt its reality, from the suddenness of the attack—from its sometimes seeming to be melancholy, then exhilarated insanity, and then complete dementia. He made no answer to questions, except by single words, as *book*, *priest*, *crown*, *crucifix*, and if he made an attempt, as it would sometimes appear, it ended in the repetition of some of these words.

In his presence, the physicians stated, that there were several peculiarities in the case, and among these, that he made noise during the night, and was quiet in the day time—that he never sighed, and that he never fixed his eyes on any object. The drift of their conversation was, that the opposite of all these would induce them to suppose him insane. Shortly after, in fact, he ceased making noise at night, and did every thing that they had indicated. A blister applied to his neck had no effect, except to change a state of complete muteness which had been present for some time, to the former babbling of disconnected words.

All these things strengthened the idea of feigning. In July 1793 he was transferred to the prison at Milan, and Monteggia was ordered to visit him. He still appeared demented. He could not look at a person steadily,—never spoke, but made a hissing noise at the sight of any thing that pleased or displeased him. He was fond of shining bodies, and made a collection of them. He was constantly in motion; and it was the opinion of his attendants that he scarcely ever slept. His appetite was good, though sometimes irregular.

The impression hence became strong with Monteggia that he was insane; but recollecting his conduct at Saint Ange, the idea suggested itself of giving him a strong dose of opium, in order to ascertain its effects. Six grains were mixed in his soup, but without any effect. Some days after this dose was repeated; but seeing, in the course of six hours, no proofs of its operation, it was again repeated. Notwithstanding this, he passed the night and the next day awake. The next night he seemed disturbed, and about one in the morning he raised himself in bed, sighed profoundly, and exclaimed, "*My God, I am dying!*" His attendant, who had never heard his voice before, was extremely frightened, and sent immediately for Monteggia. The patient was tranquil, and speaking sensibly, without any appearance of insanity. He said that he had no recollection of the past; but that he had heard persons say that poisoned soup had been given to him. He complained, also, of the state of his stomach. An emetic was given, which acted freely. From this time he appeared cured. He remained a month, and then was conducted to his criminal associates in prison.

Monteggia asks whether this man was insane? If so, was he cured by the opium; or did its effects produce such a state that he imagined he was going to die? Why, then, did not the first dose produce some effect? Is it not probable (he adds) that from long feigning, a state of actual dementia may have at last been present at the first exhibition?

A female of the name of Buy was assassinated by Jean Gerard, a bold villain, at Lyons, in 1829. He was arrested, but immediately afterwards seemed to be struck with dementia, accompanied with inability to speak. Drs. Biessy, Favre, and Brachet, were directed to visit him. They understood that he ate well, but never spoke, and remained on his bed constantly, without scarcely ever moving. When food was administered to him he was placed in a proper position, and he remained in that without appearing to hear or attempting to speak.

Reflecting on this, it was agreed that they would not shew themselves to him, lest his suspicions might be excited; but as this was a case nearly approaching to idiotism, with apparent paralysis of the nerves of the ear and tongue, the actual cautery to the soles of the feet would be a proper application. It was accordingly applied for several days, with active purgatives, without any effect. It was next agreed that the cautery should be used on the neck, as nearer to the seat of disease. Two days passed without any result. On the third, however, while making the necessary preparations for another trial of the remedy, Gerard signified by signs his objections to it. When urged to explain, he spake—"They accuse me of a crime of which I am innocent. They call me a fool," &c.

The disease was thus removed, and the physicians reported that it had been feigned.*

Whether the investigation should be confided to medical men, or whether individuals generally are competent to it, is a question raised by some writers which I shall not discuss. In disputed cases, both of feigned and concealed insanity, it is very common for persons in every class of society to come forward with their testimony, stating that the individual is or is not insane, while their depositions are often founded on transient conversations, on short and inattentive examinations, or on a slight notice of counterfeited or ordinary actions. That these are not calculated to determine the true state of mind has, I hope, been already shewn. That they may lead to serious errors will particularly appear, when we hereafter notice that form of insanity in which the boundaries between it and sanity approach so near that judges and juries often doubt whether the act is the result of madness or of wickedness.†

This disease is observed to be *concealed*, in the hope of escaping the restraints of confinement. And the difficulty of detection is increased by the remarkable cunning and dissimulation of which some maniacs are capable. A few examples will illustrate this in a satisfactory manner.

"An Essex farmer, about the middle age," says Haslam, "had on

* Annales d'Hygiène, vol. ii. pp. 353—392. Additional reports of cases of doubtful insanity, examined by Marc and others, are given in vol. iv. pp. 383—404.

† In Hathorn *v.* King (Massachusetts Reports, vol. viii. p. 371), the question of the sanity of a testator was agitated; and the counsel for the appellants moved to inquire of the attending physicians, whether, *in their opinion*, at the time of executing the will, the deceased was of sound, disposing memory. It was objected that the sanity of the party must be determined by his conversation and actions. These were the only standard; and the examination proposed would put the physicians in the place of the jury. But the court decided that the opinion of the physicians should be asked, and that they should state their reasons for the same.

one occasion so completely masked his disorder that I was induced to suppose him well when he was quite otherwise. He had not been at home many hours before his derangement was discernible by all those who came to congratulate him on the recovery of his reason. His impetuosity and mischievous disposition daily increasing, he was sent to a private madhouse, there being at that time no vacancy in the hospital. Almost from the moment of his confinement he became tranquil and orderly, but remonstrated on the injustice of his seclusion.

"Having once deceived me, he wished much that my opinion should be taken respecting the state of his intellects, and assured his friends that he would submit to my determination. I had taken care to be well prepared for this interview, by obtaining an accurate account of the manner in which he had conducted himself. At this examination he managed himself with admirable address. He spoke of the treatment he had received from the persons under whose care he was then placed as most kind and fatherly: he also expressed himself as particularly fortunate in being under my care; and bestowed many handsome compliments on my skill in treating this disorder, and expatiated on my sagacity in perceiving the slightest tinges of insanity. When I wished him to explain certain parts of his conduct, and particularly some extravagant opinions respecting certain persons and circumstances, he disclaimed all knowledge of such circumstances, and felt himself hurt that my mind should have been poisoned so much to his prejudice. He displayed equal subtlety on three other occasions when I visited him; although, by protracting the conversation, he let fall sufficient to satisfy my mind that he was a madman. In a short time he was removed to the hospital, where he expressed great satisfaction in being under my inspection. The private madhouse which he had formerly so much commended now became the subject of severe animadversion: he said that he had there been treated with extreme cruelty; that he had been nearly starved, and eaten up by vermin of various descriptions. On inquiring of some convalescent patients, I found (as I had suspected) that I was as much the subject of abuse, when absent, as any of his supposed enemies,—although to my face his conduct was courteous and respectful. More than a month had elapsed since his admission into the hospital before he pressed me for my opinion,—probably confiding in his address, and hoping to deceive me. At length he appealed to my decision, and urged the correctness of his conduct during confinement as an argument for his liberation. But when I informed him of circumstances he supposed me unacquainted with, and assured him that he was a proper subject for the asylum which he then inhabited, he suddenly poured forth a torrent of abuse,—talked in the most incoherent manner,—insisted on the truth of what he had formerly denied,—breathed vengeance against his family and friends, and became so outrageous that it was necessary to order him to be strictly confined. He continued in a state of unceasing fury for more than fifteen months." *

* Haslam on Madness, p. 53.

Lord Erskine, in his celebrated speech for James Hadfield, mentions two cases which are striking and instructive. "I examined," says he, "for the greater part of a day, in this very place (the Court of King's Bench), an unfortunate gentleman who had indicted a most affectionate brother, together with the keeper of a madhouse at Hoxton, for having imprisoned him as a lunatic, whilst, according to his own evidence, he was in his perfect senses. I was, unfortunately, not instructed in what his lunacy consisted, although my instructions left me no doubt of the fact; but not having the clue, he completely foiled me in every attempt to expose his infirmity. You may believe that I left no means unemployed which long experience dictated, but without the smallest effect. The day was wasted; and the prosecutor, by the most affecting history of unmerited suffering, appeared to the judge and jury, and to a humane English audience, as the victim of the most wanton oppression: at last Dr. Sims came into court, who had been prevented by business from an earlier attendance. From him I soon learned that the very man whom I had been above an hour examining, and with every possible effort which counsel are so much in the habit of exerting, believed himself to be the *Lord and Saviour of mankind*, not merely *at the time of his confinement*, which was alone necessary for my defence, but *during the whole time, he had been triumphing over every attempt to surprise him, in the concealment of his disease.* I then affected to lament the indecency of my ignorant examination,—when he expressed his forgiveness, and said, with the utmost gravity and emphasis, in the face of the whole court, 'I AM THE CHRIST!' and so the cause ended."

The other statement he derived from Lord Mansfield himself, who had tried the cause. "A man of the name of Wood had indicted Dr. Munro for keeping him as a prisoner, when he was sane. He underwent the most severe examination by the defendant's counsel, without exposing his complaint; but Dr. Battie having come upon the bench by me, and having desired me to ask him what was become of the PRINCESS with whom he had corresponded in cherry-juice, he shewed in a moment what he was. He answered that there was nothing at all in that,—because, having been (as every body knew) imprisoned in a high tower, and being debarred the use of ink, he had no other means of correspondence but by writing his letters in cherry-juice, and throwing them into the river which surrounded the tower, where the Princess received them in a boat. There existed, of course, no tower, no imprisonment, no writing in cherry-juice, no river, no boat; but the whole was the inveterate phantom of a morbid imagination. I immediately," continued Lord Mansfield, "directed Dr. Munro to be acquitted. But this man Wood, being a merchant in Philpot Lane, and having been carried through the city on his way to the madhouse, indicted Dr. Munro over again, for the trespass and imprisonment in London, knowing that he had lost his cause by speaking of the Princess at Westminster; and such," said Lord Mansfield, "is the extraordinary subtlety and cunning of madmen that, when he was cross-examined on the trial in London, as he had successfully been before, in order to expose his madness, all the ingenuity of

the bar, and all the authority of the court, could not make him say a single syllable upon that topic, which had put an end to the indictment before, although he had still the same indelible impression upon his mind, as he had signified to those who were near him; but, conscious that the delusion had occasioned his defeat at Westminster, he obstinately persisted in holding it back."*

Some directions as to the best method of detecting concealed insanity may readily be drawn from the above narratives; but the subject is in itself a very difficult one.† The medical witness in these cases has to decide, not whether a person is actually or feignedly insane for the first time in his life, but whether there is such a recovery from madness as to entitle him to the appellation of a sane man.

The nurses, attendants, and physicians, who have had the care of him, are the proper persons to testify concerning his state. Notwithstanding all the efforts, all the cunning and dissimulation which may be exercised, there are moments when the ruling malady breaks forth, and it will most readily be noticed by those who have previously watched him. And if his eye at these moments "meets that which has so often checked his vacillatory emotions, the instant of such a meeting is the instant of self correction, of silence, or of sudden order and surprising self possession." ‡

* This evidence at Westminster was then proved against him by the short-hand writer. Lord Eldon, since he has been lord chancellor, has mentioned from the bench a case which occurred to him while at the bar, also illustrative of the difficulty that occurs in such cases. After repeated conferences, and much conversation with a lunatic, he was persuaded of the soundness of his understanding, and prevailed on Lord Thurlow to supersede the commission. The lunatic, however, immediately afterwards, calling on his counsel to thank him for his exertions, convinced him in five minutes that the worst thing that he could have done for his client was to get rid of the commission.—Vesey junior's Reports, vol. ii. p. 11. *Ex parte* Holyland.

† Hoffbauer lays down the following short directions for discovering the particular hallucinations of insane persons:—

"A general rule to be observed in these cases is not to contradict the patient, nor to appear to consider his assertions as absurd or ridiculous. An air of interest acquires his confidence, and induces him to conceal nothing. Sometimes, however, we may exhibit some astonishment, and even contradict him upon some unimportant points, so as to excite him to a more full explanation; but always in such a maner as indicates attention, and never incredulity."

Connected with the subject of mental alienation in a medico-legal point of view is the uncontrollable inclination which some individuals have to drink vinous liquors, which always produce in them the most violent and dangerous excitement. The following cases, related by Esquirol, illustrate this observation, and prove the necessity of subjecting such individuals to seclusion.

"A girl who has been maniacal, and on this account was taken to Salpêtrière, is generally in such possession of her reason that she acts as servant to the other insane. On the slightest contradiction, however, she takes to drinking, and, unless prevented by seclusion, drinks till she is intoxicated, becomes furious, and attempts suicide."

"A lady has been several times taken to Charenton on account of her frequent intoxication, from the abuse of wine and spirituous liquors. When the paroxysm is over she becomes ashamed, conceals herself, and loudly demands that she may return to her family. With the hope of giving her powerful motives for overcoming the inclination, the douche has been administered, her dismission has been refused, and she has been threatened with seclusion for life. When she has again been brought back, she makes the fairest promises and the strongest resolutions; but nothing can prevent the return of the paroxysm."—Darwall.

‡ Hill, p. 397. This circumstance may also be applied to the detection of

It must also be remembered, that those who are insane on particular subjects, will reason correctly on ordinary and trivial points, *provided they do not become associated with the prevailing notions which constitute their insanity.** And this circumstance is very apt to become a source of error, since unobservant persons will be readily deceived by this temporary display of rational discourse, and form a hasty conclusion. Hence the importance of continued examination. At the commencement of an interview, it may be all calmness and apparent rationality—yet when least expected, the disorder breaks forth, and in many instances, there seems to be no cause for this conversion from apparent sanity to evident derangement. Even when placed in the society of other madmen, he is capable of detecting their folly and aberration from reason, and will endeavour to convince them of the absurdity of their prevailing opinions, "yet in a moment his mind launches into the regions of fiction, its admired clearness becomes obscured, and its seeming regularity exhibits a confused assemblage, or violent distortion. There is no intermediate condition which separates these states, and the transition very much resembles the last connected glimpses of our waking thoughts, followed by the abrupt creation of a dream."†

To conclude, then, on this point, the examiner must have sufficient time allowed him, and he should not be interrupted during it. The subtlety of the patient should be recollected, and his artful concealment of his real opinions. And these should not be directly commenced with, as subjects of discussion, since he would soon perceive the drift of the inquiries, and endeavour to evade, or pretend to disown them. "The purpose is more effectually answered by leading him to the origin of his distemper, and tracing down the consecutive series of his actions and association of ideas. In going over the road where he has once stumbled, he will infallibly trip again."‡

III. *Of the legal definition of a state of mental alienation, and the adjudications under it.*

In this section, I propose to confine myself to such parts as it is important for a physician to be acquainted with, in his capacity as a witness. To go beyond, and to endeavour to give the whole law on this subject, would be like a lawyer instructing in anatomy.

The common law of England on the subject before us, is thus expounded by Blackstone. "An idiot or natural fool," says he, "is one that hath no understanding from his nativity, and therefore is by law presumed as never likely to obtain any." But a man is not an idiot if he hath any glimmering of reason,—so that he can tell his parents, his

feigned lunatics. "All such, upon seeing the person whom they know has been long accustomed to the management or cure of lunatics, become ten-fold more foolish, boisterous, or unmanageable than before, in order to impress the minds of the beholders with awful ideas of their very alarming or pitiable state, but their detection and exposure are the sure result of diligent inquiry."

* Haslam's Medical Jurisprudence of Insanity, p. 295.

† Ib. p. 296. ‡ Ib. p. 331.

age, or the like common matters.* Over individuals of this description the king is appointed guardian, and the lord chancellor acts under his authority, as the conservator of their property. He also is to provide for them, and at their death renders their estates to their heirs.

"A *lunatic*, or *nor compos mentis*, is one who hath had understanding, but, by disease, grief, or other accident, hath lost the use of his reason. A lunatic is, indeed, properly one that hath *lucid intervals;* sometimes enjoying his senses and sometimes not, and *that frequently depending upon the change of the moon.* But under the general name of *non compos mentis* (which, Sir Edward Coke says, is the most legal name), are comprised not only lunatics, but persons under frenzies, or who lose their intellects by disease; those that *grow* deaf, dumb, and blind, not being *born* so; or such, in short, as are judged by the court of chancery incapable of conducting their own affairs."† Over such, the crown is also guardian, but in a different manner, as the law supposes that these accidental misfortunes may be removed, and therefore he or his special delegate, the lord chancellor, acts only as a trustee, and preserves the property for the use of the insane person until he be restored to reason.

Of late years, however, a new term has been introduced in legal adjudications, and it is important to trace its origin, and, if possible, to fix its meaning. I refer to the phrase, *unsoundness of mind.*

Lord Chancellor Eldon was, I believe, the individual who first gave it a distinct place among the legal varieties of mental alienation, and the question of its existence has been a fruitful source of litigation. To appreciate the changes occasioned by its introduction, it will be sufficient to refer to the opinions of various chancellors of England. Lord Hardwicke held that unsoundness of mind imported, not weakness of understanding, but a total deprivation of sense. It was thus equivalent with the term insanity.‡ Lord Eldon, however, says, "Of late, the question has not been whether the party is insane, but the court has thought itself authorised to issue the commission *de lunatico inquirendo*, provided it is made out that the party is unable to act with any proper and provident management, liable to be robbed by any one, under *imbecility of mind*, not strictly insanity, but, as to the mischief, calling for as much protection as actual insanity."§ And this opinion, according to the commentary of Mr. Shelford, imports that the party is in *some such state of mind as is contradistinguished from idiocy and from lunacy*, and yet such as makes him a proper subject of a commission. All the cases decide that mere imbecility will not do, and that incapacity to manage affairs will not do, unless such imbecility and such incapacity amount to evidence that the *party is of unsound mind, and the jury find him to be so.*‖

In a subsequent case, the attempt of a jury to specify the conditions that in their opinion constituted the unsoundness of mind, was defeated.

* Blackstone's Commentaries, vol. i. pp. 302, 304. † Ib. p. 304.

‡ He deemed it equivalent with the term *non compos mentis*, and said that by unsound mind must be understood a depravity of reason, or want of it, and not mere weakness of mind.

§ 8 Vesey junior's Reports, p. 67. Ridgway *v.* Darwin. ‖ Shelford, p. 87.

Their verdict was, "that the party was not a lunatic; but, partly from paralysis and partly from old age, his memory was so much impaired as to render him incompetent to the management of his affairs, and consequently that he was of unsound mind, and had been so for two years."* Lord Lyndhurst quashed this inquisition, and ordered a second commission, which found the person to be of unsound mind.†

As to what is the legal acceptation of this term, I will quote the sentiments of an eminent barrister, Mr. Amos, late professor of medical jurisprudence in the University of London. "This state of unsoundness of mind, in the legal sense of the present day, is perhaps not very easy to define, for it is neither lunacy, idiocy, imbecility, or incompetency to manage a person's own affairs. And yet we have seen that an inquisition finding a person unfit to manage his own affairs, and, therefore, not of sound mind, has been found bad. The term unsoundness of mind, therefore, in the legal sense, seems to involve the idea of a morbid condition of intellect, or loss of reason, coupled with an incompetency of the person to manage his own affairs." And again, "*Soundness of mind* is a legal term, the definition of which has varied, and cannot, even in the present day, be stated with any thing like scientific precision."‡

Mr. Shelford, the author of a recent very elaborate Treatise on the Law of Lunatics, makes the following observations: "It is to be lamented that the original meaning of the term 'unsound mind' should have been departed from, and that so much uncertainty and latitude should have been given to it as are implied by the words of Lord Eldon. For if unsound mind does not mean a deprivation of reason, but a degree of weakness, and the crown can issue commissions to try whether a party be of sufficient understanding to manage himself and his affairs, that is such a vague and uncertain ground for inquiry, as will open a door to invade the liberty of the subject and the rights of property."§

Notwithstanding these objections by gentlemen of the bar, the term remains a part of the English law, and is already naturalised into our own jurisprudence. In the Revised Statutes of the state of New York, it is enacted, that the chancellor shall have the care and custody of all idiots, lunatics, *persons of unsound mind*, and habitual drunkards.‖ Again, it is ordained, that every person capable of holding

* 4 Russel's Chancery Reports, p. 182. *In Re* Holmes.

The Rev. Mr. Holmes was seventy-seven years old. Two medical men (Drs. Pennington and Arnold) who had examined and conversed with him, considered him in a state of dementia, denoted by decay of the thinking faculty—mental imbecility and great want of memory; and they deemed him unfit for the management of his pecuniary affairs. It was on this testimony that the first verdict was rendered.—Medico-Chirurgical Review, vol. xii. p. 244.

† A legal friend has suggested to me that probably Lord Lyndhurst's objection was to the argumentative nature of the verdict.

‡ London Medical Gazette, vol. viii. pp. 419, 421. § Shelford, p. 5.

‖ Revised Statutes, vol. i. p. 52. It is also in use in Pennsylvania.—Ashmead's Reports, p. 82. In the matter of O'Brien, a lunatic. In Illinois and New Hampshire, the term "*distracted person*," is used in their statutes to express the state of insanity. —Revised Laws of Illinois, 1833, p. 332. Digested Laws of New Hampshire, 1830, p. 339.

land, except idiots, *persons of unsound mind*, and infants, may alienate it.* It is, therefore, of great importance that medical men and lawyers should agree on some definite meaning to be applied to it, and I know none better than that suggested in the following extract. It is deduced from the current of decisions.

After remarking that the terms insanity, lunacy, unsoundness of mind, and imbecility, are employed under very different acceptations by lawyers, physicians, and medical writers, the critic continues, "and in consequence, witnesses have often seemed to differ widely from each other in their evidence, when in fact the chief difference between them consisted in the meaning that each attached to the vague and unscientific terms sanctioned by the practice of the courts. The inconveniences have been abundantly felt on many recent occasions, and appear, in particular, to have been the origin of the chief difficulties experienced in the late Portsmouth cause. In defence of our medical brethren, and in justification of the awkward appearances they have made, we may safely maintain that the source of confusion does not lie with them. This has been clearly shewn, we think, in a letter addressed, a few months ago, by Dr. Haslam to the lord chancellor, on account of certain opinions lately expressed by his lordship, with regard to the different states of mind which may justify the issuing of a commission of lunacy. His lordship seems to hold that there are three such states,—idiocy, lunacy, and unsoundness of mind. The meaning of the term *Idiocy* can never be mistaken. The word *Lunacy* has also a definite meaning, different from that in which it was originally used, and now comprehending all those who have once been sound in mind, and who still possess the power of reasoning though on imaginary or false principles. But as to the term *Unsoundness of mind*, as contradistinguished from lunacy on the one hand, and from idiocy on the other, we confess that, like Dr. Haslam, we are unable to form a clear conception of it. 'Whatever,' says the chancellor, 'may be the degree of weakness or imbecility of the party to manage his own affairs, if the finding of the jury is only that he was of an extreme imbecility of mind, that he has an imbecility to manage his own affairs, if they will not proceed to infer from *that*, in their finding upon oath, that he is of unsound mind, they have not established, by the result of their inquiry, a case in which the chancellor can make a grant constituting a committee, either of the person or of the estate. All the cases decide that mere imbecility will not do, unless that imbecility and that incapacity to manage his affairs amount to evidence that he is of unsound mind, and he must be found to be so.' On carefully considering these expressions, we imagine this *unsoundness of*

* Revised Statutes, vol. i. p. 719. Before these distinct enactments, it would not appear to have been entertained by our courts. In Jackson ex dem. Cadwell *v.* King, the Supreme Court said, that idiots, lunatics, or persons *non compos*, are alone persons incapable of contracting, and of such alone, till since the revolution, did even the Court of Chancery entertain jurisdiction. "It does not follow that because, according to the modern doctrine of the Court of Chancery, one would be the proper subject of a commission in nature of a writ *de lunatico inquirendo*, that his acts are void or voidable in a court of law."—Cowen's Reports, vol. iv. p. 207.

mind to he nothing else, in strict language, than *imbecility, amounting to an inability to manage one's affairs*, a state which is precisely a minor degree of idiocy, and need not be distinguished from it, except as a mere variety."*

The methods of proving a person an idiot or *non compos*, or of unsound mind, are, in every important particular, alike. But in the first, a writ is issued to inquire into the state of the person's mind, and the question of idiocy is tried before the escheator or sheriff, by a jury of twelve men; while the two last have, of late years, been examined by a commission, in the nature of the writ *de idiotâ inquirendo*, and a jury is summoned by the persons appointed commissioners.† If the result of the commission be a return that the individual is a lunatic, he is then committed to the care of tutors or guardians, who are styled his *committee*.

Should the individual recover his state of sound mind, the chancellor must be petitioned to supersede the commission; and, on the hearing of this, the individual should attend, that he may be inspected in person; and it is also usual for the physician to attend, or to make an affidavit *that he is perfectly recovered*.‡

In cases of this description (civil as contradistinguished from criminal ones), the important question, as has been well stated by Dr. Conolly, for the physician to decide, is, *whether or not the departure from sound mind be of a nature to justify the confinement of the individual, or the imposition of restraint upon him as regards the use or disposal of his property?*§ This is the point on which the reputation of many physicians has, of late years, been nearly wrecked. I will mention one or two cases that have excited great attention in England, and which are well worthy of consideration.

Mr. Edward Davies was born in low circumstances, and obtained an extremely imperfect education. He was noticed at school as being very shy of his companions, but was not considered stupid. He commenced business as a tea-dealer, and by indefatigable industry and attention to his business, acquired property; but his early habits continued, and he was so habitually anxious and nervous, that the night before the great tea-sales at the India House, he could not sleep. He was subject to dyspepsia, and even inclined to hypochondriasis. Finding himself also deficient in education, he endeavoured to acquire

* Edinburgh Medical and Surgical Journal, vol. xix. p. 612. Dr. Morrison, (2d edition, p. 28) presents the following definitions. "*Unsound mind* sufficient to excuse the commission of crime, is marked by delusion, confounds ideas of imagination with those of reality, those of reflection with those of sensation, and mistakes the one for the other. *A weak mind* differs from a strong one in the extent and power of its faculties; but unless there be delusion, it is not considered unsound." These, however, it must be recollected, are *medical* definitions, and differ widely from the meaning of the terms in legal parlance.

† Highmore on the Law of Idiocy and Lunacy, pp. 20, 21. ‡ Ibid. p. 73.

§ Or, to put it in another point of view, the physician and the jury are "to determine, *not the mere existence of a mental affection, but the limit at which that affection begins to deprive the individual of the power of proper self-direction; and at which, therefore, it becomes the duty of the law, and of the friends, to step in for his protection.*"—Medico-Chirurgical Review, vol. xvi. p. 512.

information by reading what he took to be the best authors, and, as is natural with such persons, was very vain of shewing off his late acquisitions, particularly in the way of spouting.

It appears that his mother, even at his advanced period of life (twenty-seven years), exercised a complete sway over him. She would not allow him to carry any money in his pocket, nor to spend the most trifling sum without her advice and permission. He dared not go to the play, nor leave the house for a few hours, without asking her consent; and, indeed, she turned him out of his shop, if he displeased her. Foreseeing that if he married, she would be displaced from the management of his house and concerns, she prevented him from seeing young females.

He made many attempts to emancipate himself from this control, by offering large sums of money if she would leave him; but they were all rejected. His health became more and more affected; and Mr. Lawrence, to whom he applied for advice, found his look wild, and manner hurried. He used much gesticulation, and expressed a strong antipathy to his mother and several relations, whom he supposed were combining against him. Mr. Lawrence considered him of unsound mind, but that the antipathy to his mother was the chief delusion. The disease would be removed, if he could be reconciled to her.

About this time, his mother placed him under the care of Dr. Burrows, against whom it appears he entertained a strong aversion. He now consulted Dr. Latham on the subject of his supposed insanity. In the conversation with that physician, he used much gesticulation and theatrical gestures; was apprehensive that any one should hear his narrative; spoke of his wealth, and occasionally quoted Byron and Shakespeare. He repeatedly insisted on Dr. Latham's opinion whether he was insane, and threatened vengeance if he did so think. Dr. Latham was inclined, from this interview, to doubt his sanity,

Mr. Davies shortly after left his house, and lodged at an inn, where his appearance was wild, and he awoke the servant in the night, with an idea that there were thieves in the house. He was, however, soon reassured, and went to sleep.

He was soon after confined in a private mad-house, and this confinement led to an application for his release. Several physicians examined him (Sir George Tuthill, Dr. Munro, Dr. Macmichael, and Dr. Sutherland), and the majority being of opinion that he was of unsound mind, the chancellor granted a commission.

The testimony adduced was principally what has been already stated. The state of his affections was much dwelt on as a proof; so also his having purchased some property at an extravagant rate. He expressed much indignation at his confinement, but was calm and correct in his conversation. It turned out on the trial before the commission, that at the very time when he was about being confined, he gave directions as to his business, and was indeed consulted by the very persons engaged in the application relative to the conduct of that business. The result of the commission was, that Mr. Davies was restored to his liberty and property.

This narrative is gathered from an abstract of the case by one who

evidently entertained strong feelings against the correctness of the opinions of the principal medical witnesses, and there possibly may be some colouring given more favourable to the individual implicated, than the testimony warrants. But it is evident, so far as I can judge, that a sufficient inquiry was not made into the state of his domestic relations—of his capacity for business, and above all, of his actual state of mind, previous to the charge of insanity. It is well remarked by the author from whom I am quoting (and who, I believe, was Dr. Gooch), that Davies was always, and probably would continue to be, what we usually call a man of weak mind; but he had capacity sufficient for making money—was inoffensive in his habits, although eccentric, and absolutely indulged in no delusion, unless antipathy to his mother's government was so considered. This, if his history had been properly inquired into, would never have been so denominated. The important rule evidently deducible from the whole, is to ascertain the person's natural character, and to reason from that as to deviations.*

Another case that equally interested the intelligent portion of the community in England for a time, was that of Miss Bagster. This was in 1832.

Miss Bagster was a young lady of fortune, who perpetrated a runaway match with Mr. Newton. An application was made by her family to dissolve the marriage, on the ground that she was of unsound mind. The facts urged against her before the commissioners, were, that she had been a violent, self-willed, and passionate child; that this continued as she grew up; that she was totally ignorant of arithmetic, and, therefore, incapable of taking care of her property; that she had evinced a great fondness for matrimony, having engaged herself to several persons, and that, in many respects, she evinced little of the delicacy becoming her sex. Dr. Sutherland had visited her four times, and came to the conclusion that she was incapable of taking care of herself or of her property. She had memory, but neither judgment nor reasoning power. Dr. Gordon did not consider her capacity to exceed that of a child of seven years of age. Several non-medical witnesses, who had known her from infancy, spoke of her extremely passionate, and occasionally indelicate conduct. On her examination, however, before the commissioners, her answers were pertinent and in a proper manner. No indelicate remark escaped from her. Drs. Morrison and Haslam had both visited her, and were not disposed to consider her imbecile or idiotic. She confessed and lamented her ignorance of arithmetic, but said that her grandfather sent excuses when she was at

* I have taken the narrative of this case from the Quarterly Review, vol. xlii. p. 354. I will remark, that the observations of Dr. Gooch on the testimony of some of the medical witnesses, are frequently too severe. They could only judge from what they witnessed; and though we may recognise the correctness of the abstract principle, that they should have thoroughly informed themselves, yet this is more easily recommended than accomplished. Dr. Duncan, junior, of Edinburgh, seems to have publicly noticed some of the offensive parts of the review.—Lancet, N. S. vol. vi. p. 214. To avoid the charge of plagiarism, I will state, that the concluding idea in the text, is derived from Dr. A. Combe. "*The true standard*," says he, "*is the patient's own natural character*, and not that of the physician or the philosopher."

school, and begged that she might not be pressed. Her conversation generally impressed these gentlemen in a favourable manner as to her sanity.

The jury brought in a verdict that Miss Bagster had been of unsound mind since November 1, 1830, and the marriage was consequently dissolved.

However little we may be disposed to sympathise with Mr. Newton, this certainly would seem to be a hard decision against the female. With a neglected education—indulged in every wish, and growing up under the combined effects of these, she is persuaded to elope with a person highly offensive to her mother; and in order to dissolve the connexion, the whole history of her life is ransacked for inconsistencies and improprieties. Dr. Morrison said, under oath, that he would undertake, in six months, to teach her arithmetic and the use of money. "A deficiency of education," he said, "would account for all the appearances observed in Miss Bagster."*

From the above statement, an idea may be formed of the principles and practice of the English law relative to the insane in *Civil cases:* I come now to notice such as are in force in *Criminal ones.*

Insanity or idiotism excuses an individual from the guilt of crimes, and he is not chargeable for his own acts, if committed when under these incapacities. "And if a man in his sound memory commits a capital offence, and, before arraignment for it, he becomes mad, he shall not be tried; if after he be tried and found guilty, he loses his senses before judgment, judgment shall not be pronounced; and if after judgment, he becomes of non-sane memory, execution shall be stayed. If there be any doubt whether the person be *compos* or not, this shall be tried by a jury. And if he be so found, a total idiocy, or absolute insanity, excuses from the guilt, and of course from the punishment, of any criminal action committed under such deprivation of the senses: *but if a lunatic hath lucid intervals of understanding, he shall answer for what he does in those intervals, as if he had no deficiency.*†

The French law makes similar provisions. "It is neither a crime nor an offence, if the accused was in a state of insanity (*demence*) at the time of committing the action."‡ And even in the remaining particulars it is practically the same. In the case of a person who had committed murder and afterwards became insane, the judgment was suspended indefinitely. The Procureur-General stated, that although this principle was not expressly adopted in the French code, yet it was

* London Medical Gazette, vol. x. pp. 519, 553. London Atlas, newspaper, July 8 and 15, 1832.

In the suit for the dissolution of the marriage of the Earl of Portsmouth, on the ground that he was of *weak*, and afterwards of *unsound* mind, it was proved that his servants were his play-fellows—that he was fond of driving carts, loaded with dung or hay—that he was occasionally extremely cruel to his horses and his domestics—breaking the leg of his coachman, who was lying with it already broken. He had a great desire to bleed persons, carrying lancets with him—would follow funerals, &c.

The commission found him of unsound mind, and the marriage was subsequently dissolved.—Haggard's Ecclesiastical Reports, vol. i. p. 355.

† Blackstone, vol. iv. p. 24. ‡ Code Penal, art. 64.

contained in the 70th article of a *projet* of a criminal code, submitted for discussion in 1804, and that this justified the course adopted.*

The law at present in force in the state of New York is similar in most particulars to the English. The chancellor has the care, and provides for the safe keeping, of all idiots and lunatics, and of their real and personal estates, so that they and their families may be properly maintained. He is also empowered to dispose of and regulate their property under certain restrictions, and should the lunatic recover, his property is to be restored, but should the idiot or lunatic die, it goes to his heirs or next of kin.†

Two or more justices are also allowed to cause to be apprehended and kept safely in custody, any persons who, by lunacy or otherwise, are furiously mad, or are so far disordered in their senses that they may be dangerous to be permitted to go abroad. This provision does not, however, restrain or abridge the powers of the chancellor, or prevent any friend or relative of the lunatics from taking them under their own care and protection.‡

The mode pursued of proving a person a lunatic or idiot is to make an application to the chancellor, who appoints commissioners to inquire into the fact, and they summon a jury to try it, and by their verdict he is guided. He may, however, and has directed an issue to try the allegation of lunacy in the circuit court.§

On the petition of a lunatic to supersede the commission, it may either be referred to a master, to take proof thereon, and examine the lunatic, and to report the proofs and his opinion, or the lunatic is directed to attend in court, to be examined by the chancellor.‖

As to criminal cases the broad principle of want of responsibility is laid down. "No act done by a person in a state of insanity can be punished, as an offence, and no insane person can be tried, sentenced to any punishment, or punished for any crime or offence which he commits in that state."¶ Some special provisions have also been recently enacted. If any convict, after he is sentenced to the punishment of death, shall become insane, the sheriff, with the concurrence of the circuit judge, shall summon a jury of twelve electors, to inquire into the same; and he must give notice of this inquisition to the district attorney, who can subpœna witnesses. If found insane, the sheriff shall transmit the inquisition to the governor, who can order the execution, in case the convict recovers.**

If a convict in a county prison becomes insane, he is to be transferred to the superintendents of the poor, and if one in a state prison, he may be removed to the New York Lunatic Asylum, at the expense of the state.††

In other states, where no separate equity jurisdiction exists, the

* Causes Célèbres. Par Mejan. Vol. vi. p. 310.

† Revised Laws, vol. i. p. 147. Revised Statutes, vol. ii. p. 52.

‡ Revised Laws, vol. i. p. 116. Revised Statutes, vol. i. p. 635.

§ In the matter of Wendell, a lunatic. Johnson's Chancery Reports, vol. i. p. 600.

‖ In the matter of Hanks, a lunatic. Johnson's Chancery Reports, vol. iii. p. 567.

¶ Revised Statutes, vol. ii. p. 697. ** Ibid. p. 658.

†† Ibid. pp. 756, 771. We provide for all except the *insane poor.*

examination and guardianship of these individuals are usually confided to high judicial tribunals, or to officers specially appointed for that purpose.*

The common law of England is, however, generally the guide by which civil and criminal cases are decided in this country. It is the basis on which our statute laws are founded, and it is hence important that its peculiarities be distinctly understood.

The most striking are the distinctions that are made between civil and criminal cases. The reader has doubtless already observed, that in the latter, the testimony of others is sufficient to establish the insanity of the prisoner. But under a writ *de lunatico inquirendo*, as happens in civil cases, the supposed insane is usually brought before the commission and jury to be examined by them, and to satisfy them as to his state.

There is a still more striking distinction. If a lunatic be *perfectly recovered*, and not otherwise, his property is to be restored to him.† But in criminal cases, if he exhibit a *lucid interval* of understanding, he may be punished for acts committed during its presence, in the same manner as a sane person is punished. It will hence be proper to offer a few remarks on what is understood by a lucid interval.

The term itself is, with great appearance of probability, supposed by Dr. Haslam to be connected with, and originate from, the ancient theory on the subject of *lunacy*. The patient became insane, as was supposed, at particular changes of the moon, and the inference was natural, that in the intervening spaces of time, he would be rational.‡ This, however, is an opinion long since abandoned. Observers have repeatedly noticed, that the access of the paroxysms has no connexion with the phenomenon in question; and our author expressly states, that he kept an exact register for more than two years, but without finding in any instance that the aberrations of the human intellect correspond with, or were influenced by, the vicissitudes of the moon. Esquirol observes, that in respect to lunar influence he cannot confirm the long prevalent opinion. The insane, he adds, are certainly more agitated about the full moon, but so they are about daybreak every morning. Hence he conceives the *light* to be the cause of the increased excitement at both these periods. Light, he asserts, frightens some lunatics, pleases others, but agitates all.§

If, then, the theory on which the term is founded, and the practical deduction from it, are both incorrect, what are we to understand by the term itself at the present day, in legal proceedings? I answer this by

* The following is made a crime in Ohio: "Having carnal intercourse with an insane woman, not the offender's wife, he being over 18 years of age. The punishment is confinement in the penitentiary from 3 to 10 years."—American Quarterly Review, vol. x. p. 41.

† In *ex parte* Atkinson, in the matter of Parkinson, the jury, under a commission of lunacy against Parkinson, returned "that the said T. Parkinson at the time of taking this inquisition is a lunatic, enjoying lucid intervals, and during such lucid intervals he is competent to the government of himself and the administration of his own affairs." The lord chancellor (Eldon) refused on this to grant a committee, and issued a new commission.—Jacob's Chancery Reports, vol. i. p. 333.

‡ Haslam on Madness, p. 214.

§ Medico-Chirurgical Review, vol. i. p. 251.

some quotations from the writings of distinguished advocates and enlightened physicians.

Daguesseau, one of the greatest names in French jurisprudence, thus defines it: "It must not be a superficial tranquillity, a shadow of repose; but, on the contrary, a profound traquillity, a real repose: it must be, not a mere ray of reason, which only makes its absence more apparent when it is gone—not a flash of lightning, which pierces through the darkness only to render it more gloomy and dismal—not a glimmering which unites the night to the day; but a perfect light, a lively and continued lustre, a full and entire day, interposed between the two separate nights of the fury which precedes and follows it: and to use another image, it is not a deceitful and faithless stillness which follows or forbodes a storm, but a sure and steadfast tranquillity for a time—a real calm, a perfect serenity; in fine, without looking for so many metaphors to represent our idea, it must be not a mere diminution, a remission of the complaint, but a kind of temporary cure, an intermission so clearly marked as in every respect to resemble the restoration of health: so much for its *nature*.

"And as it is impossible to judge in a moment of the quality of an interval, it is requisite that there should be a sufficient length of time for giving a perfect assurance of the temporary re-establishment of reason, which it is not possible to define in general, and which depends upon the different kinds of fury; but it is certain there must be a time, and a considerable time: so much for its *duration*."*

"To determine the existence of a lucid interval in insanity," says Percival, "the testimony of a physician is sometimes required in courts of law. The complete remission of madness is only to be decided by reiterated and attentive observation. Every action, and even gesture, of the patient, should be sedulously watched; and he should be drawn into conversations at different times, that may insensibly lead him to develope the false impressions under which he labours. He should also be employed occasionally in business or offices connected with, or likely to renew, his wrong associations. If these trials produce no recurrence of insanity, he may, with full assurance, be regarded as legally *compos mentis* during such period, even though he should relapse a short time afterwards into his former malady."†

* Highmore on the Law of Idiocy and Lunacy, p. 6.

In further noticing this subject, he remarks, that "much of the difficulty of discriminating arises from confounding a *sensible action* with a *lucid interval*. An action may be sensible in appearance, without the author of it being sensible in fact; but an interval cannot be perfect unless you can conclude from it that the person in whom it appears is in a state of sanity. The action is only a rapid and momentary effect; the interval continues and supports itself: the action only marks a single fact; the interval is a state composed of a succession of actions." And again: "If it was true that a proof of some sensible action was sufficient to induce a presumption of lucid intervals, it must be concluded that those who allege insanity could never gain their cause, and that those who maintain the contrary could never lose it; for a cause must be very badly off, in which they could not get some witnesses to speak of sensible actions. A reasonable action is an act—an interval is a state—the act of reason may subsist with the habit of madness; and if it were not so, a state of folly could never be proved."—Pothier's Treatise on the Law of Obligations, vol. ii. appendix 19, p. 670. London, 1806.

† Percival's Medical Ethics, p. 214.

"I should define," says Haslam, "a *lucid interval* to be a complete recovery of the patient's intellects, ascertained by repeated examinations of his conversation, and by constant observation of his conduct, for a time sufficient to enable the superintendent to form a correct judgment. If the person who is to examine the state of the patient's mind be unacquainted with his peculiar opinions, he may be easily deceived; because, wanting this information, he will have no clue to direct his inquiries, and madmen do not always nor immediately intrude their incoherent notions. They have sometimes such a high degree of control over their minds, that when they have any particular purpose to carry, they will affect to renounce those opinions which shall have been judged inconsistent; *and it is well known that they have often dissembled their resentment, until a favourable opportunity has occurred of gratifying their revenge.*"*

Lord Thurlow has also, with great clearness, stated *what should be the state present to constitute an actual lucid interval.* "By a perfect interval," says he, "I do not mean a cooler moment, an abatement of pain or violence, or of a higher state of torture—a mind relieved from excessive pressure; but an interval in which the mind, having thrown off the disease, has recovered its general habit."

"The burden of proof," he adds, "attaches on the party alleging such lucid intervals, who must shew sanity and competence at the period when the act was done, and to which the lucid interval refers, and it is certainly of equal importance that the evidence in support of the allegation of a lucid interval, after derangement at any period has been established, should be as strong and demonstrative of such fact, as where the object of the proof is to establish derangement. The evidence in such a case, applying to stated intervals, ought to go to the state and habit of the person, and not to the accidental interview of any individual, or to the degree of self-possession in any particular act.†

* Haslam on Madness, pp. 46, 52. Dr. Burrows, however, remarks on such an opinion, as follows: "Some contend that there is no such thing in insanity as a lucid interval; that is, a person must be sane or insane. This is the *reductio ad absurdum*; for who, accustomed to insane people, will deny that intervals of sanity do occur, and that, during such period, a person is in full possession of his faculties? This interval may be of so short a duration as a few hours, or a day or more; and yet, as the paroxysm uniformly returns, it is obviously the continuation of the same morbid action. Do we not admit that fevers have perfect intermissions? but do we pronounce the patient, therefore, freed from his insanity? Thomas Willis describes a lucid interval as a perfect return of a sound mind during the intermission, or so long as the mania ceases; and this, in my opinion, is an accurate definition."—Burrows's Commentaries on Insanity, p. 280.

† Brown's Chancery Cases, vol. iii. pp. 443, 444. The Attorney-General *v.* Parnther. Lord Eldon has, however, intimated his disagreement with Lord Thurlow's proposition. *Ex parte* Holyland, Vesey's Reports, vol. xi. p. 10. And, in a late trial (July 20, 1822) in Chancery, he has still more openly avowed his opposition to it. The following are stated to have been his words: "With regard to what might be a lucid interval, it was a point of some difficulty. He could never go the length of Lord Thurlow in the case of Barker. (This is the case quoted above, Attorney-General *v.* Parnther.) That noble lord was of opinion, that if the existence of insanity was once established, the evidence of a lucid interval ought to be as clear as the evidence in support of the lunacy. He remembered putting the matter thus to Lord Thurlow: "I have seen you exercising the duties of lord chancellor

On the other hand, somewhat differing from the above opinions, Sir John Nicholl, in a late decision, observes, "nor am I able exactly to understand what is meant by a 'lucid interval,' if it does not take place when no symptom of delusion can be called forth at the time. How but by the manifestation of the delusion is the insanity proved to exist at any one time? The disorder may not be permanently and altogether eradicated—it may only intermit—it may be liable to return; but if the mind is apparently rational upon all subjects, and no symptoms of delusion can be called forth on any subject, the disorder is for that time absent, there is then an interval, if there be any such as a lucid interval. It may often be difficult to prove a lucid interval, because it is difficult to ascertain the total absence of delusion."*

Such, then, is the construction attached to the term *lucid interval* in civil cases; but its signification is narrowed down in criminal ones. Lord Hale, with reference to these, makes a distinction between total and partial insanity; by the first he understands a perfect form of the disease, and by the last, the presence of so much reason and understanding as will make the individual accountable for his actions. It is

with ample sufficiency of mind and understanding, and with the greatest ability. Now, if Providence should afflict you with a fever which should have the effect of taking away that sanity of mind for a considerable time (for it does not signify whether it is the disease insanity, or a fever that makes you insane), would any one say that it required such very strong evidence to shew that your mind was restored to the power of performing such an act as making a will—an act, to the performance of which a person of ordinary intelligence is competent?" His lordship observed upon the case of Mr. Cogland: he was a person who lived in Prince's Street, Oxford Road, and a fire happening in his house, he was taken out of a two-pair-of-stairs window: it had such an effect upon him that he became insane. He afterwards made his will in a house kept by a person who had the care of lunatics. His will was precisely according to what he had previously told Mr. Winter, the bank-solicitor, he had intended to make. He had stated to him what provisions he had made, and what he intended to make, and his will was in conformity with what he had so stated of his ideas of justice. The will was contested, on the ground that it was not made during a lucid interval, but the delegates were of opinion, that, as it was a will effecting the very purposes he had before expressed, it was a good will—for these reasons, he could not agree in the doctrine of Lord Thurlow." *In the matter of Parkinson, a lunatic.*—Albion newspaper of the 7th of Sept. 1822, extracted from an English paper. In the course of the pleadings, it was mentioned that Dr. Powell, an eminent physician in London, and for many years secretary to the commissioners for licensing mad-houses, held *there was no such thing as a lucid interval* (in the ordinary acceptation of the term, I presume). Dr. Powell probably holds the same opinion that Dr. Haslam does.

"Hoffbauer, after stating that during a lucid interval a lunatic ought to be held responsible for his actions, and to be esteemed able to make legal contracts, observes "that we must not act too strictly upon this opinion, although it is *generally* correct, for, however a lunatic may be in possession of his mental powers, there may be still an inaccurate conception of his present state remaining, at least in connexion with former events."

"In the present complicated state of society, when the slightest error may endanger the happiness and welfare of a whole family, it is highly important to keep the above remark in remembrance. An individual may greatly have recovered, and yet not so far as to be safely trusted with the management of his own affairs. Upon the whole, therefore, Lord Thurlow's opinion is safer and more consonant with our present knowledge of the phenomena of insanity, than Lord Eldon's. The editor refers the reader to the work lately published by Dr. Burrows, for some useful observations upon the criterion of recovery from insanity."—Darwall.

* 3 Haggard's Reports, p. 575. Wheeler and Batsford *v.* Alderson.

allowed by all commentators "that the line which divides them is invisible, and cannot be defined; yet one or other of these states must be collected from the circumstances of each particular case, duly to be weighed by the judge and jury."* Sir Vicary Gibbs, when attorney-general of England, and trying Bellingham for the murder of the Hon. Spencer Percival, used the following language: "A man may be deranged in his mind—his intellects may be insufficient for enabling him to conduct the common affairs of life, such as disposing of his property, or judging of the claims which his respective relations have upon him; and if he be so, the administration of the country will take his affairs into their management, and appoint to him trustees; but, at the same time, such a man is not discharged from his responsibility for criminal acts. I say this upon the authority of the first sages in this country, and upon the authority of the established law in all times, which law has never been questioned, that, although a man be incapable of conducting his own affairs, he may still be answerable for his criminal acts, *if he possess a mind capable of distinguishing right from wrong.*"†

Lord Chief Justice Mansfield, in his charge to the jury on the same trial, observed that "there were various species of insanity. Some human beings were void of all power of reasoning from their birth; such could not be guilty of any crime. There was another species of madness, in which persons were subject to temporary paroxysms, in which they were guilty of acts of extravagance: this was called lunacy. If these persons were to commit a crime when they were not affected with the malady, they would be, to all intents and purposes, amenable to justice. So long as they could distinguish good from evil, so long would they be answerable for their conduct. *There was a third species of insanity*, in which the patient fancied the existence of injury, and sought an opportunity of gratifying revenge by some hostile act. If such a person were capable, in other respects, of distinguishing *right from wrong*, there was no excuse for any act of

* Collinson on Lunacy, vol. i. p. 475. In the case of Hadfield, who was tried, in 1800, for shooting at George III. in Drury Lane theatre, it appeared that his insanity had been of some years standing, owing to a wound of the head received in battle—that he had repeatedly, in these paroxysms, attempted murder—that, a day or two before the act, he attempted to kill his own child. Lord Kenyon held that as he was deranged immediately before the offence was committed, it was improbable that he had recovered his senses in the interim; *and although, were they to run into nicety, proof might be demanded of his insanity at the precise moment when the act was committed*, yet there being no reason for believing him to have been at that period a rational and accountable being, he ought to be acquitted; and the jury accordingly acquitted him.—Ibid. vol. i. p. 458.

Hadfield shot at the king on the persuasion of Truelock, a maniac, who prophesied that the Messiah should proceed from his mouth, and told Hadfield that the only obstacle was the king, and who must first be despatched. They both became tenants of Bedlam for life. Hadfield was still alive in 1823, and may be at present. At the time now referred to, he did not evince any symptoms of insanity, but his impatience of confinement had soured his temper, and he was constantly grumbling and discontented. He was cleanly and regular in his habits, and made handsome straw baskets, which he sold.—Sketches in Bedlam, London, 1823, p. 18.

† Collinson on Lunacy, vol. i. p. 657.

atrocity which he might commit under this description of derangement."*

Sir John Nicholl, in the case of Dew *v.* Clark, which I shall hereafter notice, takes the following distinction between the responsibility of lunatics in civil and criminal cases. "The true criterion in these cases is, where there is delusion of mind, there is insanity; that is, when persons believe things to exist which exist only, or at least in that degree exist only, in their own imagination, and of the non-existence of which neither argument nor proof can convince them, they are of unsound mind, or, as one of the counsel has accurately expressed it, "it is only the belief of facts, which no rational person would have believed, that is insane delusion." This delusion may sometimes exist on one or two particular subjects, though generally there are other concomitant circumstances, such as eccentricity, irritability, violence, suspicion, exaggeration, inconsistency, and other marks and symptoms which may tend to confirm the existence of delusion, and to establish its insane character. The law then does recognise partial insanity in the sense already stated, and in civil cases this partial insanity, if existing at the time the act is done—if there be no clear, lucid interval—invalidates the act, though not directly connected with the act itself; but in criminal cases it does not excuse from responsibility, unless the insanity is proved to be the very cause of the act."

These are the principles by which the criminal jurisprudence of England and this country is guided, in cases of insanity. The question to be considered in each case, as will be seen by the above quotations, is whether the criminal is capable of distinguishing between *right and wrong.* Is not this the same as inquiring whether he is a moral agent? And how are we to infer this; and who are to be the judges of this capacity or incapacity? I apprehend it must be the jury, and I recommend, in accordance with the advice of Professor Amos, that the medical witness should decline answering this question, and confine himself to an opinion as to the presence or absence of insanity at the commission of the act. Let the rest be a matter of inference, deduced from the nature of the case.†

There are some English trials, in addition to those already quoted, which will illustrate the practical operation of the English law. One was that of Earl Ferrers, who was tried before the House of Lords, in 1760, for the murder of Mr. Johnson, his steward. It was proved that his lordship was occasionally insane, and incapable from his insanity of

* Collinson on Lunacy, vol i. p. 672. Dr. James Sims states, that he has seen an account of a trial for a capital offence, in which the judge stated that no murderer could be deemed insane, who knew that it was a man and not a dog or a cat, that he killed. Dr. Sims, on the contrary, asserts that no madman ever made this mistake. — Memoirs Medical Society of London, vol. v. p. 372.

† London Medical Gazette, vol. viii. p. 421. Haslam relates some cases of insanity in which acts of violence or suicide had been attempted, and the patients after their recovery, stated that they had not the slightest remembrance of these acts. Certainly, such could not judge of what was right or wrong.

knowing what he did, and of judging of the consequences of his actions. He had harboured enmity against Johnson for some time, but dissembled it, so that it was not suspected, or, at least, was supposed to have been forgotten. Johnson waited upon him by appointment, and when alone in the room with the Earl, the latter, with great deliberation, told him his time was come; and taking a pistol, inflicted a mortal wound. A verdict of guilty was found, and the earl was executed.*

Edward Arnold was indicted for maliciously shooting at Lord Onslow. He had, for years, harboured an idea that Lord Onslow was an enemy to him, and, in consequence, had formed a regular, steady design to murder him, and had prepared the means for carrying this into effect. And yet there was no doubt that, to a certain extent, he was deranged. He, also, was found guilty; but, at Lord Onslow's request, was reprieved and confined in prison until his death.†

Again, in Rex *v.* Offord, who was tried at the Bury Assizes (1831), before Lord Chief Baron Lyndhurst for murder, by shooting with a gun, the defence was insanity. It appeared that the prisoner laboured under a notion that the inhabitants of his town, and particularly the deceased, were continually issuing warrants against him, to deprive him of his liberty and life: that he would frequently, under the same notion, abuse people in the street, and with whom he never had any dealings or acquaintance of any kind. In his waistcoat-pocket a paper was found, headed, "List of Hadleigh conspirators against my life;" and among these were the names of the deceased and his family. Several medical witnesses deposed to their belief, that, from the evidence they had heard, the prisoner laboured under that species of insanity which is called *monomania*, and that he committed the act while under the influence of that disorder, and might not be aware that, in firing the gun, his act involved the crime of murder.

Lord Lyndhurst told the jury that they must be satisfied, before they could acquit the prisoner on the ground of insanity, that he did not know, when he committed the act, what the effect of it, if fatal, would be. With reference to the crime of murder, the question was, did he know that he was committing an offence against the laws of God and nature? His lordship referred to the doctrine laid down in Bellingham's case by Sir James Mansfield, and expressed his complete accordance in the observations of that learned judge. The jury acquitted the prisoner on the ground of insanity.‡

Lord Erskine, in his famous speech on the trial of Hadfield, proposed the following distinction. To absolve from criminal responsibility, there must first be *delusion*, and secondly, the *delusion* and the act must be connected. Valuable as is this suggestion, yet it must be understood, that there are cases in which no connexion of this description can be shewn, and, indeed, from the nature of the disease, it is often impracticable to prove it. We may

* Hargrave's State Trials, vol. x. p. 478. † Collinson on Lunacy, vol. i. p. 476.
‡ Carrington and Payne's Reports, vol. v. p. 168.

be satisfied as to the insanity (partial or total) and yet not be able to trace its union with the act that constitutes the subject of investigation. The difficulty is increased when we take into account the form of insanity which most commonly leads to the perpetration of acts of homicide. It is that of melancholy, where the mind broods often in silence over a single idea, and that idea may be his own destruction, or the destruction of others. Its similitude to the effects of passion, and, indeed, of deliberate crime, is often so near that we can hardly appreciate the difference. "Of methodical madness, of systematic perversion of intellect," says Haslam, "the multitude can form no adequate conception, and cannot be persuaded that insanity exists without turbulent expression, extravagant gesture, or fantastic decoration."

What can be more alike than the anger of the sane and insane? What a similitude between the maniac and the habitually passionate, between the melancholic and him who habitually broods over his malignant and revengeful conceptions!* In fine, if madness were not stamped on its front, would not the following be ranked among the foulest and most deliberate murders? It is taken from the mouth of the maniac himself, as stated to Dr. Haslam. "The man whom I stabbed richly deserved it. He behaved to me with great violence and cruelty; he degraded my nature as a human being; he tied me down, handcuffed me, and confined my hands much higher than my head with a leathern thong; he stretched me on a bed of torture. After some days he released me. I gave him warning, for I told his wife I would have justice of him. On her communicating this to him, he came to me in a furious passion, threw me down, dragged me through the court-yard, thumped me on my breast, and confined me in a dark and damp cell. Not liking this situation, I was induced to play the hypocrite. I pretended extreme sorrow for having threatened him, and, by an affectation of repentance, prevailed on him to release me. For several days I paid him great attention, and lent him every assistance. He seemed much pleased with the flattery, and became very friendly in his behaviour towards me. Going one day into the kitchen, where his wife was busied, I saw a knife (this was too great a temptation to be resisted); I concealed it, and carried it about me. For some time afterwards the same friendly intercourse was maintained between us; but, as he was one day unlocking his garden-door, I seized the opportunity, and plunged the knife up to the hilt in his back."†

It is from long-continued and anxious reflection on the difficulties which thus present themselves to the consideration of the medical witness, that I am led to withdraw much of the objection that I have

* In speaking of Carlos, son of Philip of Spain, Sir James Mackintosh remarks, "The clouds which always darkened his feeble reason might sometimes quench it. The subtle and shifting transformations of wild passion into maniacal disease, the return of the maniac to the scarcely more healthy state of stupid anger, and the character to be given to acts done by him when near the varying frontier which separates lunacy from malignity, are matters which have defied all the experience and sagacity of the world."—History of England, vol. iii. p. 36.

† Haslam on Madness, p. 169.

felt and expressed against the *dictum* of the English law on this subject. There must be some rule to guard the sacred interests of society; something to repress and keep in check that tendency to "shed the blood of his fellow," which unfortunately is too common, and at the same time, humanity forbids that the horrid spectacle should be permitted of taking away the life of the insane by judicial process. Let the question put by Lord Lyndhurst be presented to every jury; *did the prisoner know, that in doing the act, he offended against the laws of God and man?* Let the following remarks of the Scotch Law Commentators on this subject be kept in mind; and with the acknowledged mildness of our laws, and the unwillingness to convict capitally, I feel a strong conviction that no practical injustice will be done. But, to aid in effecting all this, it is very necessary that the medical witness should have every facility allowed him for studying the nature of the case, and that its history should be well ascertained. Need I add, that juries should be carefully instructed as to this particular form of insanity?

"Whether it should be added to the description," says Baron Hume, "that he must have lost all knowledge of good and evil, right and wrong; this is a more delicate question, and fit perhaps to be resolved differently, according to the sense in which it is understood. If it be put in this sense, in a case, for instance, of murder; did the panel (prisoner) know that murder was a crime? Would he have answered on the question that it was wrong to kill a neighbour? This is hardly to be reputed a just criterion of such a state of soundness, as ought to make a man accountable in law for his actions. Because it may happen that a person may answer in this way, who yet is so absolutely mad, as have to lost all true observation of facts, all understanding of the good or evil intentions of those who are about him, or even the knowledge of their persons. But if the question be put in this other and more special sense, as relative to the very act done by the panel, and the particular situation in which he conceived himself at that time to stand, did he, at the moment of doing that thing, understand the evil of it? was he impressed with the consciousness of guilt and fear of punishment? It is then a pertinent and material question, but which cannot to any substantial purpose be answered, without taking into consideration the whole circumstances of the situation. Every judgment in the matter of right and wrong, supposes a case or state of facts to which it applies; and though the panel have that vestige of reason, which may enable him to answer in the general that murder is a crime, yet if he cannot distinguish his friend from his enemy, but conceive every thing about him to be the reverse of what it really is, and mistake the illusions of his fancy for realities, with respect to his own condition and that of others, "*absurda et tristia sibi dicens atque fingens*," these remains of intellect are thus of no use to him towards the government of his actions, nor in any way enable him to form a judgment upon any particular situation or conjuncture, of what is right or wrong with regard to it. Proceeding, as it does, on a false case of conjuration or his own fancy, his judgment of right and wrong as to any responsibility that should attend it, is truly the same as none at all. It is, therefore, only in this complex and appropriated sense, as relative to the thing done and the

situation of the panel's feelings and consciousness on that occasion, that this inquiry concerning his intelligence of moral good and evil is material, and not in any other or larger sense."*

Alison observes, "few men are mad about others, or things in general; many about themselves. Although, therefore, the panel understands perfectly the distinction of right and wrong, yet if he labours, as is generally the case, under an illusion and deception as to his own particular case, and is thereby disabled from applying it correctly to his own conduct, he is in that state of mental alienation which renders him not criminally answerable for his actions."†

I am aware, that in expressing the above opinions on the subject of criminal responsibility, I do not agree with many of the ablest and most experienced of the profession, and the reader should distinctly understand this. He should also be apprised, that with all the cautions I have added, the fearful consequences *may*, in some cases, through mistake as to the absence of insanity, be a *judicial murder*. Considering the difficulties that envelope the subject, and the possibility that I may be wrong in what I have advanced, it is of course my indispensable duty to give a full and fair statement of the opinions of those who object to our law as it stands at present, and who conceive that its result has been in many cases, and will be hereafter if continued to be thus applied, to punish the insane criminals.

The argument urged, as far as I understand it, is briefly this: If insanity is proved to have existed, its presence should absolve from responsibility. The disease is so intricate in its nature, its symptoms are so liable to be mistaken, that the hazard is too great to punish an individual in whom we have once recognised its existence, merely because he seemed at the time to be rational. The act itself is a manifestation of insanity. Why, then, introduce the doctrine of his ability of judging between right and wrong, which, it must be conceded, can only be inferred from conversation and conduct? Such, I believe, is the general train of reasoning adopted. But it will be more satisfactory to quote the exact words of one of the ablest advocates of this opinion.

"If it be true, that there is none of the phenomena of yet imperfectly understood human nature over which hangs a thicker veil to the general eye, than the phenomena of mental aberration, what are we to think of making distinctions, as if all were clear, between *partial*

* Hume's Commentaries, vol. i. pp. 24, 25.

† Alison's Principles of the Criminal Law of Scotland, p. 645.

The legal reader will readily perceive the difference between the English and Scotch opinions on this subject. Sir James Mansfield held that Bellingham was accountable, because *he knew murder was a crime, and could distinguish right from wrong*. "On this case," says Mr. Alison, "it may be observed, that unquestionably the mere fancying of a series of injuries to have been received, will not serve as an excuse for murder, for this plain reason, that supposing it true that such injuries had been received, they would have furnished no excuse for the shedding of blood; but, on the other hand, such an illusion as deprives the panel of the sense of *what he did* was wrong, amounts to legal insanity, although he was perfectly aware that murder in general was a crime, and therefore the law appears to have been more correctly laid down in the case of Hadfield, than in this instance."—Edinburgh Law Journal, vol. i. p. 524. It is the opinion of many physicians in England, that Bellingham was insane when he murdered Mr. Percival.

and total insanity, and drawing the line of responsibility with perfect confidence? We humbly but earnestly suggest, that instead of deciding for responsibility in partial insanity, it is both more just and more merciful to doubt as to that essential, when DISEASE OF MIND, TO A PALPABLE AND CONSIDERABLE AMOUNT, IS PROVED. It is more just and more merciful, in such a case, to take care of the accused and of society by his confinement, than to run the risk of putting to death an irresponsible agent. Insanity, as far as we have the means of perceiving, is a bodily disease; in other words, its visible and invariable condition is a morbid action of the brain, either structural or functional. A definition of the effect, in feeling and manifestation of a diseased brain, which shall be sufficiently comprehensive to include all the varieties of insane affection, is scarcely to be looked for; yet definitions are constantly sought after in courts of law, and the whole value of a witness's evidence is often made to turn on its relation to a standard, which is in itself the merest assumption. It would be a safer rule for courts of law to direct their attention to the proof generally of diseased manifestations of the intellect and feelings; and when these are undoubted, to presume irresponsibility, because the contrary cannot be made sure of, and the balance of probability is greatly on the side of irresponsibility. If mercy is often extended to youth, to seduction, even to great provocation, how much more ought it to shelter disease of the mind when clearly established? If it be true, and no physician denies it, that to diseases of the inflammatory class it is impossible to prescribe limits, or to predict that new and aggravated symptoms shall not suddenly follow in the course of the diseased action, is it not presuming too much, to decide that inflammation of the brain, a usual cause of insanity, has known boundaries, and shall not suddenly extend from partial to produce total insanity? We feel assured that no one conversant with insanity will deny the fact, that the insane, however partially, are not safe from sudden paroxysms and aggravations of symptoms."*

In applying this argument, cases are adduced which it will be useful to review. Out of a great multitude, I will principally select such as have excited peculiar interest of late years in different countries.

Robert Dean was a young man of weak intellect and strong animal passions. He became warmly attached to a female superior in station to himself, and was rejected. This caused ungovernable feelings of revenge, and he determined on her murder. He had, at the same time, some religious ideas; and it occurred to him, that by putting this woman to death, he would send an unprepared sinner into eternity. But the impulse to shed blood had taken irresistible possession of him. There was a child of which he was very fond and had often caressed, who, he concluded, had fewer sins to answer for, and this he determined should be the victim. He murdered it, and then gave himself up to justice. He was tried, condemned, and executed, in the county of Surrey (England), in 1819. "The act, itself a sufficient proof of

* "Observations on the degree of knowledge yet applied to the plea of Insanity, in trials for crimes."—Edinburgh Law Journal, vol. i. p. 542.

insanity, was strengthened by insane notions and actions, and absolute raving even on the scaffold."*

John Howison, aged 45 years, a sturdy beggar, but formerly a hawker of small wares, was tried before the High Court of Justiciary in Scotland, December 31, 1831, for the murder of the widow Geddes, on the 2d of the same month. For a fortnight before the fatal act, he was wandering round the country, and no evidence of the state of his mind during that time was obtained *before* the trial. He entered the village where Mrs. Geddes (and who was an aged woman) resided, with a black handkerchief covering the lower part of his face (which it was his constant practice so to wear), a stick in his hand, and a book hanging from his wrist. He asked alms from several persons without success; was seen to enter the cottage, and in a very brief space to come out again hurriedly, shut the door after him, and run from the village, quickening his pace when he thought himself observed. One witness heard the sound of a blow when Howison was in the cottage. He had murdered her by striking on the head with the sharp edge of a spade, and thus dividing it nearly in two.

He was apprehended the next day, some two or three miles from the place; and, when taken, denied all knowledge of the murder, and said he had come from Glasgow. It did not appear that he had taken a single article from the cottage, although there was some money open in a cup.

Howison was visited by Dr. Spens and Mr. Watson several times before the trial, but they could discover no indications of insanity — no hallucination — no disorder of intellect. He appeared, however, to be of low and weak intellect, and to be possessed of a great deal of cunning.

On the trial, it was proved by a woman with whom he had lodged six years previously, that when she first knew him he was a hawker of

* The melancholy results of fanaticism with which the history of almost every age and every nation is so rife, are but other modifications of this homicidal insanity. Weak, ignorant, or ill-balanced minds are overcome by the ravings of impostors or monomaniacs; the feelings and affections are crushed by what they are taught and verily believe to be now their duty, and they pursue this to the wildest verge of acting and suffering. Thus in Denmark, during the middle of the last century, a large number of individuals were found, who imagined that by committing premeditated murder, and being afterwards condemned to die, they would be the better able, by public marks of repentance and conversion as they went to the scaffold, to prepare themselves for death, and work out their salvation. They generally selected children, to avoid sending any one out of the world in an unprepared state. Capital punishment of course could not stop this. It was what they wished for. The king issued an ordinance, directing that those who were guilty should be branded on the forehead with a hot iron and whipped, and then confined for life at hard labour in the House of Correction. Every year, on the day of their crime, they were to be publicly whipped.—Quarterly Review, vol. xii. p. 219. London Magazine, 1768.

I need hardly mention the frequency of suicide resulting directly as a consequence of these wild imaginations; while on the boundary line between crime and insanity, is that indefatigable spirit of slander which pursues every person who "believes a little more or a little less" than the prevailing object of excitement, in his character and his means of subsistence. Such men are only prevented by the fear of consequences, and the freedom of our institutions, from becoming inquisitors. They have all the elements of monomania within them, and I am much mistaken if it be not in many the termination.

small wares, clean in his person, and like other people. He then left her to go to England, where he remained till within the two last months. His appearance now was that of a beggar, filthy in his person, and peculiar in his mind. He said that he had had a fever in England; but no correct account of this could be obtained. She mentioned some of his peculiarities. He was solitary and silent; his only companions in his lodgings being a cat and a child, and he fed both before eating his own meal. He was very superstitious, salting his bed and head, wearing a Bible about his wrist, or round his head. He used to sit brushing away the flies with his hand for hours together, when there were no flies, and his landlady told him so. He had an almost incredible appetite for food, usually devouring half a peck of potatoes at a meal, with one or two pounds of bullock's liver, almost raw, and generally filthy. After this, he would eat two or three pence worth of bread. He habitually wounded his hands, wrists, and arms, with needles and pins; and if he went to bed without his weapons, he rose and procured them. In this state, he would sally forth, brandishing a stick, and playing extravagant tricks, till the neighbours interfered. He would suck the blood from his wrist, after every two or three mouthfuls of his food; and when asked why he ate his meat so raw, said *he liked the blood.*

He had taken a fancy to become a Quaker some weeks before the murder, and attended the meetings, but paid no respect to the worship, muttered to himself, and pricked his body with pins and needles. On one occasion, he violently demanded instant admission into the society.

Dr. Spens and Mr. Watson gave testimony in the manner stated above; but the latter added, that the prisoner had told him that there was occasionally pain and uneasy feeling in his head.

For the defence, Drs. Mackintosh, Scott, and Alison, were witnesses. Some of them do not appear to have examined the prisoner; but from the testimony adduced, they agreed in opinion, that as there was every indication of previous insanity while a lodger with the witness already noticed, there was probably in this case a morbid determination to acts of violence. The insanity consisted in a *sudden morbid impulse to commit murder.* Dr. Mackintosh considered the desire to change his religious belief as a further proof, while the cunning evinced, with the subsequent denial, were asserted to be altogether consistent with insanity. The absence of motive in this instance was also dwelt on.

Howison was convicted; and an application to the home department, for the privilege to adduce additional proofs of his insanity, was denied. These consisted chiefly in unprovoked and boisterous acts of violence, immediately previous to the murder.

The evening before his execution he stated that he had committed eight murders, not one of which had ever been heard of, or could have occurred without being known. His voracious appetite continued until his death.*

* Edinburgh Medical and Surgical Journal, vol. xxxviii. p. 51. Medico-legal cases of Homicide, by Alexander Watson, Esq. Edinburgh Law Journal, vol. i.

I will only add to these a case which has excited great interest in France, the country where it occurred.

Louis Papavoine was born at Mouy, Department of the Euse, in 1784. His father was a woollen manufacturer, and gave his son a liberal education. At an early age, he was destined for the employment of a clerk; and accordingly, in 1804, was received as an extraordinary one in the navy department. He rose gradually, through good conduct and attention to business, to the office of first clerk at the port of Brest. Although very faithful, yet he was observed to be unsociable and melancholic — much addicted to solitary walks in unfrequented places. He had no confidant — but, in ordinary conversation, his ideas were correct and sensible. One of his fellow clerks deposed, that during the last year of his clerkship, Papovoine complained that an individual appeared to pursue him in his sleep, and threatened to kill him, but that when he awoke he saw no one. This condition of mind continued for ten days, after which nothing remarkable was observed.

His father died in 1823, and as his mother did not seem able to superintend the establishment, he determined to undertake it himself. He accordingly obtained his dismission. Difficulties, however, soon occurred. The manufactory had been in the habit of furnishing clothing for the troops, and notice was received that the contract would not be renewed. The pecuniary situation of the family became in consequence very critical.

Papavoine now seemed to repent having quitted his employment, and made some fruitless attempts to recover it. Their failure seemed to aggravate the severity of his temper and the gloominess of his appearance. He one day appeared before his mother and addressed her, saying, "Mother, my father is not dead. I have the proof in this paper. They sometimes bury persons who are alive." Alarmed at this, she appears to have avoided taking her meals with him, although she continued residing under the same roof.

In this state of things, at the end of September 1824, Papavoine complained of illness. A physician who was consulted, found some symptoms of fever. He prescribed an emetic with good success, and further directed exercise, and particularly an excursion. Papavoine complied, and proceeded to Beauvais, where he had relatives and some commercial connexions. His misanthropy did not, however, desert him here; he was habitually taciturn and sad, although his conversation, when he indulged in it, was correct. The only peculiarity noticed was a question to his relative, whether his father and brother were really dead. "I have a paper here (said he) which contradicts it." He also complained of having a mortal enemy at Mouy.

The day after his arrival (October 3), he received an unexpected letter from his mother, stating that the Department of War had agreed to a renewal of part of the contracts, and for which he appears to have

p. 532. Different views of this case are taken in the respective works quoted. Mr. Watson is strongly of opinion, that the insanity of Howison at the time of the act, was not proven. He persisted in denying the murder to his death; and in all the interviews between him and the law agent and clergyman, no indications of insanity were discovered in his conduct.

been constantly applying. As some further negociations were necessary to complete these, he determined to proceed to Paris. He borrowed money to pay his expenses, and took with him the baggage he had brought from Mouy, writing at the same time to his mother for additional articles. Among his baggage brought from home, and taken by him to Paris, were two *common table-knives.*

On the 5th of October, he alighted at a hotel in Paris, visited his mercantile correspondents, and arranged the mode of completing the necessary formalities of his contract. From this day until the 10th, he appears to have kept himself very retired—at least he was not noticed by any one. At the time last mentioned, after taking a slight repast, he directed his steps to the Forest of Vincennes.

In this place a female was walking with her two boys, one aged five, and the other six years of age. A young woman, also walking, noticed the children, and requested permission to caress them. Papavoine at this instant passed by them, took off his hat, bowed, and proceeded on. The young woman also pursued her walk. She was encountered by Papavoine, who addressed her: "Do you know whose children you were caressing?" She replied, "We may caress children, although we do not know whose they are." He abruptly left her, and appears to have gone immediately into an adjacent shop, where he inquired for a case knife. They refused to sell any, except by the dozen; but on his offering an advance in the price, a single one was sold to him.

He returned to the walks, and with a pale countenance and haggard aspect, encountered the mother. "Your walk is soon finished," said he; and bending his body over one of the children, as if to embrace it, plunged his knife into its breast. Alarmed with its shriek, though ignorant of the cause, she struck him with an umbrella which she had in her hand. He did not heed this, but immediately struck the second in an equally fatal manner. Both died almost instantly. Papavoine escaped into the wood; nor was it until some hours had elapsed, that he was arrested by a *gendarme.* He had, a few minutes previous, emerged near where a soldier was walking, of whom, after examining his clothes, he inquired whether they were not soiled. He also asked the way out of the forest. He was identified by the mother, and gave up his name.

On his examination, he denied having committed the crime, and persisted in this for upwards of a month; at the end of which period, he declared that he had some important disclosures to make, but could divulge them only to two royal princesses. His application to see them was refused; and he then declared that he had committed a mistake in murdering these children, having intended to destroy those of the Duke de Berri. (The duke had been assassinated previous to this.)

This audacious statement was considered as an artifice to persuade the public of his insanity. About this period, also, he became very furious in his prison; got out of his bed at night; searched for a knife, and even attempted to set fire to his bed. His keeper having momentarily left a door open to admit the fresh air, he escaped, and rushed into a room containing several prisoners; snatched a knife in the hands of one of them; gave him three wounds, and was only prevented from

murdering him by the interference of those present. The public prosecutor saw in all this, "*a criminal who sought in new crimes a justification of previous guilt.*" He was tried on the 25th of February, 1825, on two indictments—for murder, and for an attempt to kill.

At the bar, he was calm, though his countenance bore the marks of sadness. On being interrogated, he confessed the murder, but said he was not then himself. He repelled the idea of premeditation—said that he did not know the infants at all; and urged, that if he had designed to kill, he would have carried with him the knives brought from Mouy. Labouring under insanity, he committed the act; but its execution being completed, he became conscious of its enormity, and endeavoured to escape.

It also appeared on the trial, that the father of Papavoine had been subject to attacks of mania during his lifetime, and that he was generally a morose, melancholy man.

As to the attack on the young man, the criminal stated that he was then in a state of fury irritated by his confinement and by bad treatment. The keeper of the prison deposed that Papavoine was sometimes in a most fearful fury; his hair literally bristled—he had never seen a prisoner's hair in such a state; his countenance was highly inflamed, and he actually frightened the soldiers who surrounded him. Although believing at first that this was intended as a deception, the witness had been finally constrained to consider it as real disease.

The public prosecutor, in his argument, endeavoured to shew that the present was a case of ferocity—against the human race itself—a thirst for blood, which is sometimes seen, although fortunately the instances are rare. He aptly adduced examples from the history of revolutionary France.

M. Paillet, the advocate of the prisoner, dwelt much on the evidence of his previous illness, as indicative of a disordered state of mind. His misfortunes, his conversation with his mother—with his relatives at Beauvais—his hallucination concerning a person persecuting him and threatening his life, and the apparent want of premeditation in the murder, evidenced by the rapidity of his actions, all were urged in his favour; and the advocate expressed his decided conviction that this was a case of *monomania without delirium*, as described by Pinel, in which the unfortunate subject is often hurried to commit atrocious crimes, from the current of ideas by which he is unwillingly haunted. Such persons often take strong aversion, and even hatred, against individuals in an instant, and without any assignable cause. Thus parents have sometimes murdered their children, and the wife her husband. Might he not then, at the moment of his several crimes, have been labouring under the access of fury incident to this disease? Let him be confined, so as to guard the public from further violence; but do not send him to the scaffold.

The jury, after retiring for half an hour, brought in a verdict of *guilty* on both indictments. He was condemned to death, and executed on the 19th of March.*

* Causes Célèbres du dix-neuvième siècle, vol. i. pp. 203—290.

I might adduce a multitude of similar examples, differing occasionally in some peculiar features, but all turning on the point whether the insanity has been sufficiently proved at the period of the commission of the act, or whether the previous indications were sufficiently strong to afford a decided presumption of its continuance to the time in question. But my limits forbid; and I will hereafter add additional references, for those who may be desirous of pursuing the subject.

As to the cases that have been related, I will observe, that they are just such as intelligent persons (medical as well as non-medical) might differ about, on the simple point of the presence or absence of insanity. Howison's, for example, I may concede, was an extreme one; yet his is not to be a rule for subsequent decisions. In the same volume which contains the narrative of his trial, is another, of an individual guilty of the murder and *robbery* of his aunt; and yet, though condemned, he received the royal mercy, on a representation of his weak state of mind. It is evidently impracticable to lay down a rule of exemption on the ground of insanity, when that insanity passes through so many varying shades, (from the stupidity, for example, of Hoffbauer, to the raging mania of authors,) that before we have completed it, we shall find that we have introduced the *effects of violent passions* as a species of *temporary insanity*. The philosopher may justly deem them so, but the safety of civil society requires that they should be considered as crimes.

These remarks bring me to the last point to be considered under this section. I refer to the subject of *moral insanity* described on a previous page, and to the definition of which I must beg the reader to recur.

As enounced by Dr. Prichard, it consists in a disorder of the moral affections and propensities, without any symptom of illusion or error impressed on the understanding.* He justly observes, that no such disorder has been recognised in the English courts of judicature, or is it even in general admitted by English medical writers. If, however, such a disease does exist, our legislators and judges should be apprised of it.

The idea of such a state, was first advanced by Pinel, who characterised it by the name of *manie sans délire*, and observed, that persons labouring under it appear to be governed by a sort of instinctive madness, as if the affections alone had suffered injury. Esquirol, when he wrote his valuable articles for the Dictionary of Medical Sciences, did not recognise this species; but he has since avowed having met with several cases in lunatic asylums, and is convinced of its distinct character.†

* Dr. Gooch, without reference, however, to the present subject, denies that delusion is always present in insanity, and in illustration mentions the case of one of his patients. She was a wife, and supposed her husband to be unfaithful to her, which was probably the case. She brooded over this, and became insane. When she recovered she was still of the same opinion. These are all the facts furnished to us by Dr. Gooch. Now, she certainly was not insane on the subject of her husband's infidelity. But was she not so on some other points? if not, what constituted her insanity? This case is mentioned in the Quarterly Review, vol. xli. p. 180.

† Note de Monomanie homicide, par M. Le Docteur Esquirol. Paris, 1827.

The dawnings of this melancholy affection, and the struggles of the understanding with it, will best be understood by the following quotations from Marc:

"In a respectable house in Germany, the mother of a family returning home one day, met a servant, against whom she had no cause of complaint, in the greatest agitation; she begged to speak with her mistress alone, threw herself upon her knees, and entreated that she might be sent out of the house. Her mistress, astonished, inquired the reason, and learned, that whenever this unhappy servant undressed the little child which she nursed, she was struck with the whiteness of its skin, and experienced the most irresistible desire to tear it in pieces. She felt afraid that she could not resist the desire, and preferred to leave the house.

This circumstance occurred about twenty years ago in the family of M. Le Baron Humboldt, and this illustrious person permitted me to add his testimony.

A young lady, whom I examined in one of the asylums of the capital, experienced a violent inclination to commit homicide, for which she could not assign any motive. She was rational on every subject, and whenever she felt the approach of this dreadful propensity she entreated to have the strait-waistcoat put on, and to be carefully guarded until the paroxysm, which sometimes lasted several days, had passed.

A distinguished chemist and a poet, of a disposition naturally mild and sociable, committed himself a prisoner in one of the asylums of the Fauxbourg St. Antoine. Tormented by the desire of killing, he often prostrated himself at the foot of the altar, and implored the Divine assistance to deliver him from such an atrocious propensity, and of the origin of which he could never render an account. When the patient felt that his will was likely to yield to the violence of this inclination, he hastened to the head of the establishment, and requested to have his thumbs tied together with a riband. This slight ligature was sufficient to calm the unhappy R., who, however, finished by endeavouring to commit homicide upon one of his friends, and perished in a violent fit of maniacal fury."*

Other cases of a similar description, are related by French and German writers. In some, the impulse to commit murder was only felt; while in others, as in mothers with their young infants, the desire at last became irresistible, and they destroyed them. Nor is this confined to the puerperal period, when we might possibly suspect the presence of its peculiar insanity, but children of every age have been thus destroyed, both by fathers and mothers.

The following is one of the most dreadful on record, for the atrocity of the crime; and, as it is generally recognised as belonging to this division, may be here stated.

Henriette Cornier, aged 27 years, a domestic servant, was of a mild and lively disposition, always full of gaiety and vivacity, and

* Dr. Prichard, art. *Soundness and Unsoundness of Mind*, in Cyclopædia of Practical Medicine.

remarkably fond of children. In the month of June, 1825, a singular change occurred in her character. She became silent, melancholy, absorbed in reverie, and was soon dismissed from her service. She fell gradually into a permanent stupor. Her friends were alarmed, and suspected that she was pregnant, which, however, was not the case, but they could never obtain from her any account of the cause of her dejection, though she was frequently interrogated. In the month of September she made an attempt to drown herself in the Seine, but was prevented.

In the following October, her relatives procured her employment at the house of Dame Fournier; but her conduct appears to have continued as before.

Without any change from this, she, on the 4th of November, committed the following act. She was desired by Dame Fournier, who went from home in the morning, to prepare dinner, and to go to a neighbouring shop kept by Dame Belon, to buy some cheese. Henriette had frequently gone to this shop, and, when there, always caressed a beautiful little girl, nineteen months old, the child of Belon. On this day she went, and displayed the greatest fondness for it, and persuaded the mother, who was at first rather unwilling, to let her take it out for a walk. She immediately took the child to the house of Dame Fournier, then empty, mounted the common staircase with a large knife which she took from the kitchen, and stretching the child across her own bed, with one stroke cut off its head. This she placed by the casement, and then put the body on the floor near to it. All these proceedings occupied about a quarter of an hour; and during this time Henriette remained perfectly calm. Dame Belon presently came to seek for her child, and called her from the bottom of the stairs. "What do you want?" said the latter, advancing on the corridor. "I come to seek my child." "Your child is dead," replied Henriette with perfect coolness. The mother, alarmed, became more earnest, and she again pronounced the words, "Your child is dead." As Belon forced her way into the room, Henriette took the child's head from the casement, and threw it by the open window into the street. The mother rushed out of the house, struck with horror. An alarm was raised; the father of the child and officers of justice with a crowd of persons entered. Henriette was found sitting on a chair near the body of the child, gazing at it, with the bloody knife by her, and her hands and clothes covered with blood. She made no attempt, for a moment, to deny the crime—confessed all the circumstances, even her premeditated design, and the perfidy of her caresses, which had persuaded the unhappy mother to intrust to her the child. It was found impossible to excite in her the slightest emotion of remorse or grief: to all that was said, she replied with indifference, "I intended to kill the child."

Adelon, Esquirol, and Léveillé, were appointed to visit her. After several interviews, these eminent physicians declared that they could discover no proof of insanity; yet they were not decided as to the non-existence of such disease.

Henriette was taken to the Salpétrière. There she was repeatedly

inspected by the physicians, whose last report concludes, that from February 25 to June 3, "they had discovered merely a dejection of mind, slowness in the manifestation of thought, and profound grief: secondly, that the phenomena are explained by circumstances, and, therefore, are no proof of derangement; and, thirdly, that the opinion as to her sanity is materially affected by facts relating to her previous history. If the allegation is proved, that long previous to the committal, her habits, and her whole character, were changed; that she had become, at a particular period, dejected, gloomy, taciturn, restless, prone to reverie, and had occasionally attempted suicide, it would seem that her present state is not the result of existing circumstances, since it has lasted a year before the commission of the act, in which case the opinion as to her sanity would be materially altered."

On the trial, M. Esquirol and several other physicians were examined. Their opinions leaned generally towards the presence of real derangement. The Advocate-General treated the existence of monomania as a mere fancy, invented for the purpose of paralysing the hands of justice. The jury brought in a verdict that Henriette had committed murder voluntarily, but without premeditation, and she was condemned to perpetual imprisonment with hard labour, and to be branded. She heard the sentence without betraying the least emotion.

It is a remark of Esquirol, that occasionally moral and physical causes can be assigned for this disordered state. In two cases, it resulted from the change produced by puberty; but in many others it seems to be founded on imitation. The fatal propensities are excited by the description of criminal actions. In several cases where our author was consulted it was evident, that females of respectable standing, who were strongly impressed by the story of Henriette's murder, and the horror excited, had been seized with a similar propensity.

The following are enumerated by Dr. Prichard, as distinguishing characters of this form of insanity, deduced from his own observations and those of Esquirol.

"1. Acts of homicide perpetrated, or attempted, by insane persons, have generally been preceded by other striking peculiarities of action, noted in the conduct of these individuals, often by a total change of character.

"2. The same individuals have been discovered, in many instances, to have attempted suicide, or to have expressed a wish for death; sometimes they have begged to be executed as criminals.

"3. These acts are without motive; they are in opposition to the known influences of all human motives. A man, known to be tenderly attached to them, murders his wife and children—a mother destroys her infant.

"4. The subsequent conduct of the unfortunate individual is generally characteristic of his state; he seeks no escape or flight; delivers himself up to justice; acknowledges the crime laid to his charge; describes the state of mind which led to its perpetration; or he remains stupefied and overcome by a horrible consciousness of having been the agent in an atrocious deed.

"5. The murderer has generally accomplices in vice and crime;

there are assignable inducements which led to its commission—motives of self-interest, of revenge, displaying wickedness premeditated. Premeditated are, in some instances, the acts of the madman; but his premeditation is peculiar and characteristic."*

Under this head of *moral insanity*, besides the impulse to murder, there is also included a propensity to break and destroy whatever comes within reach of the individual; "in short, an irresistible impulse to commit injury, or do mischief of all kinds." And this is observed in cases in which it is impossible to discover any motive influencing the mind of the person who is the subject of it. "No illusive belief, for example, can be detected, that the lunatic is performing a duty in perpetrating that which manifests his disease."†

Many cases of suicide are also classed under this head. In these instances, "there is generally no particular illusion impressed on the understanding of the self-destroyer, but a perversion of the strongest instinct of nature—self preservation." Again, the propensity of setting fire to houses or public buildings, is ranked by Dr. Prichard under this head.‡ To these Orfila adds *monomaniacal robbery*; although he allows, that in this case it is rather more difficult to shew the want of motive.§

The cases of Papavoine, Cornier, and others, to which I will hereafter refer, have excited great interest on this subject in France, and numerous publications have been the result. In that country, Esquirol, Gall, Broussais, Orfila, Andral, Marc, Georget, Michu, and many others, have avowed their belief in the various forms of homicidal insanity which I have now described: while in England, Prichard and Elliotson, and I doubt not many others, are among the supporters of the doctrine.

On the other hand, Regnault and Collard de Martigny, two advocates, have opposed it strongly in their writings.‖

The main scope of their argument is, that most of these cases are only the evidences of depraved passions; and, while they allow that

* Prichard, *ut antea*. † Ibid.

‡ Jonathan Martin, who set fire to York Minster, and in consequence destroyed that splendid and venerable relict of antiquity, does not belong to this class. He was undoubtedly a *monomaniac*, and stated that he was inspired by a dream to do it, so that people would go to other places to hear the gospel. See Medico-Chirurgical Review, vol. xv. p. 222; and Shelford on the Law of Lunatics, p. 458.

§ Leçons, vol. ii. p. 65, 2d edition. There is a curious case given in the Annales d'Hygiène, vol. iii. p. 198, and styled *Monomanie erotique*. The individual was in the constant habit of writing love-letters, sometimes to the highest females in rank in France; and although repeatedly confined in prisons and in asylums, he as invariably recommenced when released. He was examined by Esquirol and Marc in 1826, and they positively state that they could find no proof of mental alienation in his moral affections—no incoherence in language or reasoning, and nothing in his physical appearance. The only remarkable circumstances were his denial of having written any letters—though he had probably sent hundreds—and his deeming himself the object of persecution. They conclude by considering him subject to intermittent madness.

‖ Regnault, *Du Degré de Compétence de Médecins, &c.* and *Nouvelles Réflexions sur la Monomanie, &c.* See also his reply to a review of his first work, in Annales d'Hygiène, vol. iii. p. 231. Collard De Martigny, *Sur la Monomanie-Homicide et la Liberté Morale*.

some are correctly styled maniacal, and, therefore, do not bring these into controversy, they assert that all countries have, at various periods, presented criminals whose actions in every respect resemble those of the homicidal monomaniacs of the present day. Nero and Tiberius, Robespierre and Collot d'Herbois, (say they), had as much a thirst as Papavoine or Cornier. The malignant passions also concentrate on a single idea; and though the individual is under their influence, yet, on points not connected with the prevailing idea, they will appear calm and intelligent.

To the argument, that the monomaniac has no motive to urge him to crime, it is urged, that even criminal murderers do not all destroy for money. In many of the instances of supposed insanity, early debauchery, with a profound ignorance of the obligations due to God and man, mark the character. Such persons may acquire a passion for blood. The desire to kill exceeds the desire to obey the laws.

The frequency of cruelty in children, the tournaments of ancient time, the gladiators of Rome, the bull-fights of Spain, and the fondness for witnessing executions in all civilised countries, are urged as proofs that this disposition can be extensively and permanently encouraged. Above all, they object to the act itself being deemed the material proof of the presence of insanity. Because one person murders another without any assignable motive, is the criminal by consequence to be considered a maniac?

The authors, whom I have quoted on the other side, adduce a multitude of facts in favour of their position. They present the narratives of the respective cases—the termination of many of them in raging mania or dementia, and the remarkable change of character that so often occurs.

Esquirol asks, if the intellect can be perverted or abolished, why may not the will? Leuret, in his reply to Regnault, observes, that there are instinctive impulses, which deprive a man of liberty, but not of conscience. The criminal has conscience, liberty, will. The monomaniac, conscience without liberty. Thus some will withdraw themselves, when they feel the disposition for committing injury. If this reasoning be correct, can such a person be held responsible for his actions, even if he knows what he is doing?

In a previous edition, I quoted the following remarks of Marc on this subject, and they are too important to be now omitted.

"There is no species of madness, which so much deserves the attention of the physician and the jurist, as *mania without delirium*. It has brought to the scaffold many deplorable victims, who merited compassion rather than punishment. Unfortunately, I perceive no other means of ascertaining this wretched state, in which an instinct, at the same time destructive and irresistible, hurries on its victim to the commission of crimes the most abhorrent to nature, except a confinement indefinitely prolonged, during which he should be observed at those moments when he is excited by his dreadful propensity. Then, if it be real, an extreme agitation will be perceived, with flushings of the face, eyes sparkling, and perhaps, also, as in cases of propensity to suicide, the most highly wrought state of hypochondriac

excitement. Women are, in general, more subject to this species of mania than men, especially at the periods of menstruation (and particularly when in a morbid state), or during gestation. These different situations, then, require great consideration. *Moreover, the moral circumstances which precede or accompany crimes, generally shew whether they are the result of criminal intentions or derangement of intellect; that is to say, that in a real criminal, there is always some motive of personal interest, by which the moral cause of his act may be known.* Thus, a homicide followed by robbery, cannot be attributed to *mania without delirium.*"*

As a conclusion to this subject, I will state two cases that have lately occurred in this country. Their resemblance to several of the narratives that I have already given, will be readily recognised.

Abraham Prescott, of Pembroke, New Hampshire, was recently tried for the murder of Mrs. Sally Cochran. He was eighteen years of age, and had resided for several years in the family of the deceased. On the 6th of January, 1833, he made an attempt on the lives of Cochran and his wife, at midnight, and while they were asleep; but the blows which he gave with an axe were fortunately not fatal. The case was considered one of destructive somnambulism, as there was no previous malice exhibited. On the 23d of June, 1833, he accompanied Mrs. Cochran to a field, for the purpose of gathering strawberries. He came upon her unawares, and murdered her, by beating her head with a stake, after which he dragged the body about two rods from the scene of violence, where it was concealed in brushwood. Very soon afterwards, the husband ascertained from Prescott himself, on asking where his wife was, what he had done. "I ordered him," says Mr. Cochran, "to run and shew me where she was. He was loath to go, but finally started, and on the way stated that he had the toothach, sat down by a stump, fell asleep, and that was the last he knew, until he found that he had killed Sally."

Soon after being arrested, in conversation with the coroner, the prisoner confessed the crime with which he was charged, and that officer further stated the language held by him. "He and the deceased went out into James Cochran's pasture together, from thence down into the brook field; that when about to return home he made her a proposal, which she indignantly repelled — calling him a rascal, &c., and said she would tell her husband, and he would be punished. The prisoner then sat down on a stump — considered his situation — thought he must go to jail for his offence, and had as lief die as go there. Saw a stake near him, caught it up, and killed her."

The prisoner on his indictment pleaded not guilty, and his counsel set up the defence of insanity.

He was described as a moody, odd sort of person. It was also proved that there was a hereditary predisposition to insanity in the family on the paternal side, exhibited in the grandfather and one or two of his brothers, the grand uncles of the prisoner.

His parents testified, that when an infant, six weeks old, his head

* Marc, ut antea, vol. ii. p. 68.

began to enlarge, and at three years was as large as his father's. He suffered with sores in his infancy, and was very much addicted to sleep walking.

Drs. Wyman and Parkman (the perusal of whose testimony I particularly recommend) gave the result of their extensive experience on the subject of hereditary insanity, illustrating its great frequency, and the predisposition to its occurrence that thus existed. Dr. Wyman has been sixteen years physician of the M'Lean Asylum for the insane in Charleston (Massachusetts), and I was hence struck with one of his answers. "Insanity is sometimes manifested by a sudden disposition to violence, and sometimes to great violence; but I do not remember that I have seen any case where the first symptom was a disposition to kill."

Dr. Cutter, who had for a number of years kept a private asylum, corroborated the opinion of the other medical witnesses. Hereditary insanity may manifest itself, he observed, without any known cause. It is often sudden and intermittent, and is sometimes accompanied by an irresistible disposition to commit violence.

The jury found the prisoner guilty.*

The other case was that of Major Mitchill, tried before the supreme judicial court of the state of Maine in November, 1834, for assaulting and maiming a boy aged eight years, and named David F. Crawford.

Mitchill was eleven years of age. It appears that he induced Crawford, by threats, to go with him and gather some flags. In a very short time, he began to whip the boy. A neighbour heard the crying, and took the prisoner off, and sent Crawford home. Mitchill, however, intercepted him, and, after various threats, carried him into the woods, threw him into the bushes, then carried him to a pond and thrust him in, took off his clothes, tied his hands, and then whipped him severely with withes. Finally, he took a piece of sharp tin, and cut out one of his testicles. His cruelty did not cease even with this, as he afterwards continued to beat him.

On the trial, the counsel for the defendant stated that he would prove that the prisoner, in early infancy, had received a dangerous hurt on the top of his head, and that a striking malformation of that part was now present; but owing to the absence of the parents of Mitchill, a part of this was not corroborated. Dr. Mighels of Portland, however, deposed that there was an unusual appearance in the construction of the head—a palpable depression on the cranium, and the right ear was lower than the left.

Mr. Bailey, at whose school Mitchill had attended for about two months, swore that he could read in spelling lessons, but not in reading lessons. He did not learn so fast as others did, but made improvement. "He was more sly than other boys; he would watch me narrowly, and was mischievous if I turned my back. Punishment influenced his conduct. I do not consider him so bright as others, but far from being a fool." He had been punished for quarrelling.

* I am indebted for all the facts in this case, to the Boston Medical and Surgical Journal, vol. xi. p. 361.

The jury found the prisoner guilty, and he was sentenced to nine years' hard labour in the state prison.

The reporter of this case (Mr. Otis) observes, that many are of opinion "that utter fatuity in this convict is inferable, first, from the very circumstances of the case, as made out upon the trial; next, by the manner and terms of the boy's conversation in reference to the revolting subject of his crime; and, lastly, by his present appearance, his past history, and peculiar physical conformation."*

* Report of the Trial of Major Mitchell, &c. by James F. Otis, Attorney-at-Law, Portland, 1834. Also Boston Medical and Surgical Journal, vol. xi. p. 404.

I will in this place add references to additional cases; but I must premise, that, while some are clearly referable to Dr. Prichard's *moral insanity*, others are at least verging to *monomania;* and the reason probably of this is, that on the Continent they have universally received the general appellation of *homicidal monomania, suicidal monomania, infanticidal monomania, &c. &c.;* and this is, probably, in deference to Esquirol, who, in his *Note sur la monomanie-homicide*, p. 4, makes a division of this form of disease. Some of these insane murderers, according to him, are prompted to the act by a delusion — by false reasoning — by a delirium; others again exhibit no appreciable alteration of the intellect or affections; they are impelled by a blind instinct — an idea which forces them to acts of violence. Now the first class is undoubtedly monomania, and should not be connected with the others. Dr. Prichard very justly condemns the union, since the very term monomania implies a *partial illusion*, the absence of which is the essence of his *moral insanity*. When, however, we proceed to analyse the cases, some difficulty will be experienced in classifying them. I content myself with indicating such as are worthy of examination.

Many are contained in the three pamphlets of Georget — *Examen Médico-légale*, *Discussion Médico-légale*, and *Nouvelle Discussion Médico-légale;* Esquirol and Michu on *Monomanie-Homicide*.—See Catalogue of Books consulted.

Orfila's Leçons, vol. ii. pp. 52–66. 2d edition.

Annales d'Hygiène, vol. i. p. 126. Three cases at Charenton, selected by Esquirol.—Vol. ii. p. 392. A murderer of his wife, examined by Esquirol and Ferrus. —Vol. iii. p. 418. Case by Professor Grossi of Munich, of a man seventy years old, who killed his two children and shot his servant. He was confined, and died within the year of dementia.—Vol. vii. p. 173. Criminal propensities of a child aged eight years.—Vol. viii. p. 397. An extraordinary case of child murder, by Dr. Reisseissen, with observations by Marc.—Vol. ix. pp. 431, 438. Homicidal monomania.—Vol. xi. p. 242; vol. xii. p. 127.

Ibid. vol. xii. p. 94. Arson by an uneducated girl, who was passionate, and deemed a fool.—Vol. xiii. p. 220. Case of Nonnet, a raving madman.

Trial of Sir Alexander G. Kinloch, for the murder of his brother, at Edinburgh, in 1795, in State Trials; and Gordon Smith on Medical Evidence, p. 334.

Edinburgh Medical and Surgical Journal, vol. xii. p. 380. A man in perfect health, awoke insane out of sleep, and attempted to kill his wife. He recovered by an emetic in a few hours, and has never been insane since.—Ibid. vol. xxxviii. p. 49. Case of Stirrat, convicted at Glasgow of the *robbery* and murder of his aunt, but reprieved on the ground of weakness of mind.

Medical Chirurgical Review, vol. x. p. 226. Cases of homicidal mania, &c. in Paris, by Barbier, Esquirol, Marc, &c.—Vol. x. p. 482. Ibid. including the cases of Cornier, Schmitt a parricide, Tristel, and several others.—Vol. xiii. p. 244. Homicidal and infanticidal mania; cases by Professor Outrepont of Wurtzburg.—Vol. xiii. p. 441. Cases of infanticidal monomania at Copenhagen, by Dr. Otto.—Vol. xiv. p. 474. Similar case by Dr. Hawkins of London.

New York Medical and Physical Journal, vol. iii. p. 250. Case of Kirby, who drowned two of his children.

London Medical Repository, vol. xxvi. p. 454.

Lancet, N. S. vol. viii. p. 135. Case by Dr. Elliotson.—Vol. xi. p. 577. Andral's Lecture on Murder-madness.

London Medical Gazette, vol. xii. p. 80. A girl, aged sixteen years, set fire to her master's house, without any apparent motive. Her previous character was good,

IV. *Of inferior degrees of diseased mind.*

There are several forms of disease which, either in a partial or temporary manner, bear a strong resemblance to insanity. The diagnostic appearances of such deserve a brief notice, accompanied with a consideration of the question, how far the mental alienation may be presumed to extend in each.

The *delirium* of fever is one of the most striking, and in its general characters usually resembles mania. It is, however, distinguished by its antecedent or accompanying disease—the sensibility of the sight and hearing—turgescence and redness of the eye—tremor of the tongue—gnashing of the teeth, and heat of the skin. These peculiarly characterise the alienation accompanying synocha and its consequences. "In delirium all the powers of the mind are implicated, and, besides, remain unconnected until it ceases."* The mind is literally a chaos, and is occupied in succession by numerous phantasies. There is no one predominant idea.

The shortness of its term, its evident connexion and dependence, as a symptom, on an obvious bodily disease, and the almost total abolition of the mental faculties, are decided diagnostics.†

The unconsciousness that accompanies the low delirium of typhus shews how profound is the disorder that weighs on the mind.

In the former case, suicide and murder are often committed while labouring under it; and in both, the actions must be estimated like those of the maniac. There is, however, another species of delirium, independent of fever, at least of its most striking characters, which deserves notice. It is consistent with a knowledge of surrounding objects; but the mind rapidly returns to its flights of romance or wildness. It has sometimes been termed *light-headedness*, and is admirably pictured in Massinger's play, *A Very Woman*. At intervals there will be a temporary return to sanity. It is evidently connected with, and, unless checked, must end in, disease of the brain or its membranes.

Hypochondriasis, on the other hand, has many points of similitude to melancholy. Those who are affected with it are usually of a lax fibre, and engaged in sedentary occupations. There is a languor and want of resolution that accompanies all their undertakings; and a cast of sadness and timidity generally marks the countenance. As to all future events, says Cullen in his graphic sketch of this disease, there is

but she had always been reserved and taciturn. She had never menstruated. In January 1832, she was in the Chichester Infirmary, labouring under measles and low fever. Her trial came on at the Lewes assizes, in March 1833. Dr. King and other medical gentlemen, though they had not seen her, gave it as their opinion, that severe illness might have caused imbecility of mind.

Probably, I may add to these the case of Gilbert, tried in New York some years since for murdering his wife. He had injured his head at a considerable time previous, and was deemed insane by several of his neighbours. His wife deserted him. He went to New York, and finding her in an equivocal situation in a bawdy house, stabbed her with a knife.

* Halford's Essays, p. 122. The return to a sane mind just before death, which occasionally occurs in brain fever, is admirably described at p. 88.

† Georget de la Folie, p. 237.

a constant apprehension of the worst or most unhappy state of them; and therefore there is often, upon slight grounds, an apprehension of great evil. "*Such persons are particularly attentive to the state of their own health — to every the smallest change of feeling in their bodies.*" He also remarks, that hypochondriasis is always accompanied with dyspeptic symptoms; and, in elucidation of the diagnosis between it and melancholy, presents the following observations: "When an anxious fear and despondency arise from a mistaken judgment with respect to other circumstances than those of health, and more especially when the person is at the same time without any dyspeptic symptoms, every one will readily allow this to be a disease widely different from both dyspepsia and hypochondriasis." "As an exquisitely melancholic temperament may induce a torpor and slowness in the action of the stomach, so it generally produces some dyspeptic symptoms; and from thence there may be some difficulty in distinguishing such a case from hypochondriasis. But I would maintain, however, that when the characters of the temperament are strongly marked, and more particularly when the false imagination turns upon other subjects than that of health, or when, though relative to the person's own body, it is of a groundless and absurd kind; then, notwithstanding the appearance of some dyspeptic symptoms, the case is still to be considered as that of a melancholy rather than a hypochondriasis."*

Foderé mentions the following circumstances as distinctive of these diseases. The habit of body — the illusion, as illustrated in the above quotation from Cullen, one being relative to physical subjects, and the other to moral ones—the species of fear; that of the melancholic being reserved and prudent, and not destructive of his courage — while that of the hypochondriac renders him credulous, variable, and timid. He is in every respect selfish; while the melancholic, although labouring under the pressure of his disease, often retains noble sentiments.†

The hypochondriac, says Andral, becomes *conscious of various acts of his physiological life* of which he is not ordinarily sensible. But these acts are not deranged. It is only the perception of them that is exaggerated.‡

Dr. Burrows takes a capital distinction, which may greatly aid the examiner in discriminating. "The maniac is too furious and irritable to describe any complaint; the melancholic is generally disinclined to do so; but the hypochondriac's chief solace is in a detail of all his feelings and pains, real and imaginary."

It rarely, he adds, does mischief to let the insane know you are fully apprised of the nature of their malady. But beware of giving a hypochondriac reason to think his mind is deranged: it is the surest way to make it so.§

Hypochondriacs often talk of, and sometimes attempt, suicide, but rarely have courage enough to complete it.‖ They are generally aware of the nature of criminal acts, and should be judged accordingly. But it must be remembered that this disease, as well as hysteria, when

* Cullen, quoted by Smith, pp. 423, 424. † Foderé, vol. i. p. 232.
‡ Lancet (N. S.), vol. xi. p. 550. § Burrows' Commentaries, p. 480.
‖ Parkman.

of long standing, or severe, often degenerate into insanity, and, indeed, are sometimes its first degree.*

Hallucination. "An idea reproduced by the memory, associated and embodied by the imagination."† This state of mind is styled *illusion, or waking dreams*, by Dr. Rush; and it is strikingly illustrated in the remarkable story of Nicolai of Berlin, who for a length of time was visited at his bedside by individual forms, that were visible to his sight, and addressed him. During all this period, however, he was conscious that it was a delusion.‡ Had he believed in the existence of these phantoms, says Haslam, and acted from a conviction of their reality, he ought to have been deemed insane. A more familiar illustration is given by Collinson; and I presume there are many of my readers who, at one time or another, have experienced a somewhat similar state of mind. "Ben Jonson, the celebrated dramatist, told a friend of his that he had spent many a night in looking at his great toe, about which he had seen Turks and Tartars, Romans and Carthaginians, fight in his imagination."§ If this had become permanent in his mind, he would have been deemed insane.

I can hardly imagine that this form of diseased mind can ever become a subject of legal investigation; but it may be remarked that many maniacs have hallucinations resembling those we have noticed. They are sometimes transient and confused, and at other times will grow permanent and fixed.‖

Epilepsy. I mention this, because it is a disease that, when long continued or violent, is very apt to end in dementia. It gradually destroys the memory and impairs the intellect. Lord Eldon, indeed, expressly recognises this disease as one of the causes of "*unsound mind.*" "Epileptic fits," says he, "for instance, may produce a mind in the same state at a much earlier period."¶

Epilepsy may, indeed, be attendant on every form of insanity. "Of all the modifications of mental derangement there is none so terrible as that complicated with epilepsy. Maniacal epilepsy is usually characterised by the most ferocious, malign, and murderous paroxysms; and often it is as instantaneous as it is violent. The effects are sometimes directed against themselves, oftener against others, and not unfrequently to the immolating of all whom they most love when sane."**

Thomas Bowler was tried at the Old Bailey, in 1812, for wounding one Burrows with a blunderbuss, under circumstances that indicated

* "When a hypochondriac fancies his legs are made of glass, or his head is larger than his body, or if he labours under any similar erroneous belief, he is insane."—Prichard. Hypochondriasis, says Sir Henry Halford, is not accompanied by delusions, though its nervous fears are sometimes as gratuitous and ill-founded.

† Parkman.

‡ The narrative by Nicolai himself is given in Haslam's Medical Jurisprudence of Insanity, p. 303.

§ Collinson on Lunacy, vol. i. p. 34.

‖ On the subject of apparitions, or *spectral illusions*, see Hibbert, Alderson, and Ferriar's Essays; Bostock's Physiology, v. iii. pp. 91, 161; Edinburgh Journal of Science, vol. ii.

¶ Ridgway v. Darwin, 8 Vesey's Reports, p. 87. ** Burrows, p. 155.

considerable ill will against the prosecutor, as well as design in the execution of his purpose.

The defence set up was insanity, occasioned by epilepsy. It was proved by his housekeeper that he was taken with a violent epileptic fit in July 1811; and that from that period she had perceived a great alteration in his conduct and demeanour. He would frequently dine at nine A. M., eat his meat almost raw, and lie on the ground exposed to rain. His spirits were so dejected that it was necessary to watch him, lest he should destroy himself.

A commission of lunacy was also produced, shewing that the prisoner had been found to be insane since the 30th of March last.

Sir Simon Le Blanc, before whom the trial took place, charged the jury that it was for them to determine whether the prisoner had the power of distinguishing right from wrong, or whether he was under the influence of any illusion with respect to the prosecutor. A verdict of guilty was returned.*

After these remarks, I need hardly urge the necessity of watching the effects of this disease on the mind from time to time.

Nostalgia. This is a form of melancholy originating in despair, from being separated from one's native country. I have already noticed its leading characteristics,† and will only add that suicide is sometimes a consequence. Individuals labouring under it seldom, if ever, commit violence on others.

Intoxication. Delirium Tremens. It is a well-known and salutary maxim of our laws, that crimes committed under the influence of intoxication, do not excuse the perpetrator from punishment. The temporary alienation has been voluntarily induced; and the individual is the more inexcusable, if, by previous experience, he has learned that his angry passions are inflamed through its means.

In Ridgway *v.* Darwin, Lord Eldon cites a case where a commission of lunacy was supported against a person who, when sober, was a very sensible man; but, being in a constant state of intoxication, he was incapable of managing his property.‡

In the state of New York, we have a statute which places the property of habitual drunkards under the care of the chancellor, in the same manner as that of lunatics. The overseers of the poor in each town may, when they discover any person to be an habitual drunkard, apply to the chancellor for the exercise of his power and jurisdiction. And in certain cases, when the person considers himself aggrieved, it may be investigated by six freeholders, whether he is actually what he is described to be, and their declaration is *primâ facie* evidence of the fact.§

* Starkie on Evidence, vol. iii. p. 1704. † Ibid. p. 26.

‡ Collinson on Lunacy, vol. i. p. 71. Dr. Drake some time since made a suggestion which, if acted upon, would doubtless subserve the ends of justice and morality. A habitually intemperate man is enfeebled in his mental powers. When summoned as a witness, should his testimony have full weight? Without questioning his *competency*, should not his *capability* be called in question?—Western Journal of Medical and Physical Science, vol. i. p. 81.

§ Act passed March 16, 1821. There are other provisions in this act (which, however, it is not necessary to quote here), relating to the local powers of overseers

The Scotch law is thus explained by Mr. Alison. Drunkenness is no excuse for crimes: "But, on the other hand, if either the insanity has supervened from drinking, without the panel's having been aware that such an indulgence in his case leads to such a consequence; or if it has arisen from the combination of drinking with a half crazy or infirm state of mind, or a previous wound or illness which rendered spirits fatal to his intellect, to a degree unusual in other men, or which could not have been anticipated, it seems inhuman to visit him with the extreme punishment which was suitable in the other case. In such a case, the proper course is to convict; but, in consideration of the degree of infirmity proved, recommend to the royal mercy.*

We have, until now, been only noticing the actual state of intoxication, and the disabilities consequent thereon. It is to be recollected, that long-continued habits are apt to produce actual insanity, and that drunkenness is in fact one of its common causes. The conduct of individuals of this description should, therefore, be particularly noticed during the intervals of temperance, if any such exist. If spirituous liquors exercise such an influence as to render us doubtful concerning the state of mind at this time, we may reasonably infer that the alienation is becoming permanent.

There is, however, in addition to all this, a well-marked and distinct disease, induced from the intemperate use of spirituous liquors, or certain other diffusible stimuli, but which has only attracted attention within the present century. It is styled *delirium tremens*, or *mania a potu*, and has some peculiar and striking characters. Among these I may enumerate tremors of the hands, a weak and compressible pulse, cold and clammy extremities, and frequently long-continued sleeplessness. The mind is incessantly agitated on some one or other subject, often fanciful, and as the hallucination increases, apparitions, or unreal animals, are often seen by the sufferer, or persons are supposed to be present, or are heard in adjoining rooms, who are actually absent. Timidity and suspicion are common occurrences; but, fortunately, malignity of feeling is but seldom manifested. Though any attempt at restraint is violently resisted, yet, when once overcome, there is but little of ill-nature shewn, and the patient, if properly managed, soon becomes tractable.† There are, however, exceptions; and it is precisely these exceptions which render the subject worthy of consideration in legal medicine. Dr. Carter (and the experience of other

in such cases.—Revised Statutes, vol. ii. p. 52. A similar law was passed in Pennsylvania, in February, 1819.—See Commonwealth *v.* Coxe, in Ashmead's Pennsylvania Reports, vol. i. p. 71. And also in New Hampshire, in 1822.—Digest of the Laws of New Hampshire, 1830, p. 340.

* Principles of the Criminal Law of Scotland, p. 654.

"By the Roman law, a notorious spendthrift was put under guardianship; and by the law of Scotland a man who from drunkenness, facility of temper, or any other cause, is liable to be stripped of his property by the necessitous or designing, has the power of putting *himself* under trustees, without whose sanction no act of his can be valid. This is technically termed, *inhibiting one's self*."—Dunlop.

† In the above sketch, I have only stated the leading features of the disease. For more extended information, I refer to the writings of Armstrong, Sutton, Carter, Coates, Cross, &c.

physicians corroborates the assertion) states, that a medical friend of his nearly lost his life by the violence of a person labouring under delirium tremens.*

One circumstance connected with the history of this disease I have omitted until now, for the purpose of placing it singly before the reader, and thus pointing out a most important diagnostic. It is, that although the habitual and excessive indulgence in strong liquors or other diffusible stimuli is the predisposing cause, yet the privation of them is the exciting one. Individuals are seldom, if ever, seized until after several hours or sometimes days of abstinence. Insanity or delirium, on the other hand, may follow immediately in the train of a debauch.

The first case which particularly attracted attention in this country, was brought before the medical public by Dr. Daniel Drake, of Cincinnati (Ohio).

John Birdsall, of the village of Harrison in that state, was indicted, in 1829, for the murder of his wife with an axe, by dividing the spinal column in the neck.

He was about fifty years old, and had been married to this his second wife nineteen or twenty years, and had children by her. For some years previous, he had been subject to occasional fits of intoxication. These of late were followed by delirium tremens, which generally lasted several days, and went off spontaneously. In these paroxysms, all its physical and moral symptoms were present. He entertained great fears of his safety, and sometimes ran about the village, as if attempting to escape from pursuit. At another time, he concealed himself between the feather and straw bed in his own house. He would point his gun from his window, as if for defence against imaginary persons. He was also very watchful. The prevailing maniacal delusion was, that his wife was in combination with his neighbours (one, his son by his first wife) against his life: he had charged her, during his paroxysms, with criminal intimacy with these, and had threatened to kill her.

On Sunday he was intoxicated: Monday, Tuesday, and Wednesday, presented nothing special. On Wednesday evening he complained of being unwell, but seemed to be rational. He slept none that night, and next day the family thought him crazy, but were not alarmed. In the course of it, he took an axe and went to a neighbour, whom he desired to return with him, as he stated they wanted to kill him. He spent the day at home, apparently in terror and agitation; manifested jealousy of his wife; barred the doors, and fancied that the persons of whom he was jealous, were manufacturing ropes up stairs to hang him.

In the course of the afternoon, he suddenly committed the murder in the mode already described. His wife was sitting by the fire, and he had been walking the room. After the fatal blow on the neck, he followed it with two or three on the face. His eldest daughter seized the axe, which he yielded, and took a scythe and attempted to strike her. She defended herself until the door was opened. When arrested, he acknowledged the homicide, and knew (he said) that he would be

* Cyclopædia of Practical Medicine, art. *Delirium Tremens.*

hung, but ought to have done it sooner. He talked at this time so rationally, that many of the witnesses could not believe him deranged. He evinced no dread of punishment, but was still in great apprehension of those who, he had believed, intended to kill him. After being committed, he became regular, and expressed sorrow for what he had done.

On the trial, three medical witnesses agreed that he laboured under *mania a potu* when he committed the homicide. For the defence, it was urged that when drunkenness gives rise to insanity, it should cause immunity, and hence form a legal excuse. On the other hand, the counsel for the people remarked, that Birdsall knew that this delirium followed his intoxication, and hence it was voluntary. The law, therefore, held him accountable for actions during such a state. The verdict was murder in the first degree, and he was sentenced to death.

The case excited the interest of Dr. Drake; and in a very able paper, he clearly shewed that insanity was present in this individual. Some of his observations I shall here condense.

He remarks that the paroxysms of delirium tremens are never permanent, but always transient, or for two or three days only, and seldom extending beyond a fortnight. That in this state there is actual delusion, as much so as in common insanity. That of Birdsall was jealousy and apprehension of his wife. The court and jury seemed to hold that he was not deranged in the degree that destroyed his perception of right or wrong, in reference to the murder; and that even if he had been, still he could not have been acquitted, because his alienation originated in intemperance. Dr. Drake, on the other hand, justly supposes that he was not capable of judging between right and wrong, or at least of controlling his actions, on the subject of his hallucination. In all his maniacal attacks, he entertained jealousy of his wife, and the idea that she was in a conspiracy against him. Here were *assumed and unreal premises; deductions true to the principles of logic, but false in point of fact; and, lastly, acts consistent with his conclusions*—constituting in fact the very essence of insanity. Had he killed, in a real dispute, any one not in the conspiracy, it would have been foreign to his hallucination, and should not have been excused.

As to the remaining part of the opinion of the court, viz., that the prisoner was aware that *mania a potu* followed his intoxication, and therefore he could not be excused from his voluntary state of insanity, Dr. Drake remarks, that the disease equally arises sometimes from opium, and even from liquors not taken to intoxication. In the eye of the law, even drinking to excess is not criminal; nor did the prisoner take liquor with *malice prepense*.

From these considerations, Dr. Drake is disposed to doubt the justice of the sentence of M'Donough, for the murder of his wife.*

* This was a case which I mentioned in the former edition, as follows:—

"William M'Donough was indicted and tried for the murder of his wife, before the Supreme Court of the State of Massachusetts, in November 1817. It appeared in testimony that several years previous he had received a severe injury of the head; and that, although relieved of this, yet its effects were such as occasionally to

In consequence of a petition from many of the inhabitants of the state, who became convinced of his insanity, the punishment of Birdsall was commuted by the governor to that of imprisonment. During the period that elapsed between his sentence and this commutation, he again became insane in prison. Although on the trial he had confessed the murder of his wife, and urged that he had been insane when committing it, yet now he denied it positively, and said she was alive. He told Dr. Drake that she had not only spoken to him through the walls of the jail, but had actually visited his apartment several times. On the day previous to his appointed execution, while he knew nothing of the change of punishment, he was urged to sign a petition for pardon to the governor, in which there was an admission that he had killed his wife, but that he must have been insane when he did it. He refused it obstinately and with violence: although he wished to live, he would not consent to introduce this.

Birdsall did not use tobacco, yet during this period he spat profusely. His pulse, when unexcited, was from 86 to 94 beats in a minute. Dr. Drake supposes, with great probability, that the low diet, darkness, and solitude of his prison, may have reproduced and fixed the state of insanity, and which was continued for nearly a year after the latest period that I have seen a notice of him.*

Another case, earlier in date, but published about the same time, was tried at Boston, in May 1828.

Alexander Drew, commander of the whaling ship, John Jay, was indicted before the United States Circuit Court for the murder of his second mate, Clark, while on the high seas. It appeared in evidence that he had sustained a fair character, and was much respected in the place where he resided. He was proved to be a man of humane and benevolent disposition; but that for several months he had been addicted to the use of ardent spirits, and for weeks during the voyage had drank to excess. In August 1827 they spoke a vessel, from which Captain Drew obtained a keg of liquor. He drank until he became stupified; but when he recovered, he ordered the keg and its contents to be thrown overboard. There was now no more liquor on board of the ship.

In two or three days, Capt. Drew discovered signs of derangement. He could not sleep; had no appetite; thought the crew had conspired to kill him; was unwilling to be alone; expressed great fears of an Indian who belonged to the ship,—called him by name when he was

render himself insane. At these periods he complained greatly of his head. The use of spirituous liquors immediately induced a return of the paroxysm; and in one of them thus induced he murdered his wife. He was, with great propriety, found guilty. The *voluntary* use of a stimulus which he was well aware would disorder his mind fully placed him under the purview of the law."

After reviewing this case, I am aware that I have probably expressed myself too strongly—in a *medical* point of view; and the reason of this is aptly suggested by Dr. Drake, when he asks whether, if M'Donough had killed his wife in one of his ordinary paroxysms, he would have been condemned? The case, however, is not one of delirium tremens, as the murder was committed during the fit of intoxication; and it thus rendered him obnoxious to the usual *legal* enactments.

* Western Journal of the Medical and Physical Sciences, vol. iii. pp. 44, 215, 898.

not present,—begged he would not kill him, saying to himself he would not drink any more rum. He would sing obscene songs, and then hymns, and alternately pray and swear. He made an attempt to throw himself overboard, but was prevented. The next morning he, with Clarke and the first mate, were at breakfast, when he suddenly withdrew from the table, and appeared to conceal something under his jacket which lay in another part of the cabin. He immediately turned to Mr. Clarke, and requested him to go on deck. "When I have done my breakfast, sir," was the answer. Drew said, "Go upon deck, or I will help you;" and instantly took up the knife which had been covered by his jacket, and stabbed Clarke in the right side of the breast. As one of the witnesses was passing out of the cabin, Drew snapped a pistol at him, but it missed fire. He was secured and bound, but remained for some weeks in this state. When recovered, and he was told of the murder, he replied that he knew nothing of it; all that he was conscious of was, that when he awoke he found himself handcuffed. It did not appear that there had been any quarrel between Drew and Clarke for months previous.

Judge Story arrested the cause at this stage. "We are of opinion," said he, "that the indictment, upon these admitted facts, cannot be maintained. The prisoner was unquestionably insane at the time of committing the offence. And the question made at the bar is, whether insanity, whose remote cause is habitual drunkenness, is or is not an excuse in a court of law for a homicide committed by the party while so insane, but not at the time intoxicated, or under the influence of liquor. We are clearly of opinion that insanity is a competent excuse in such a case. In general, insanity is an excuse for the commission of every crime, because the party has not the possession of that reason which includes responsibility. An exception is when the crime is committed by a party while in a fit of intoxication—the law not permitting a man to avail himself of the excuse of his own gross vice and misconduct to shelter himself from the legal consequences of such crime. But the crime must take place, and be the *immediate* result of the fit of intoxication, and *while it lasts;* and not, as in this case, a remote consequence, superinduced by the antecedent exhaustion of the party, arising from gross and habitual drunkenness. However criminal in a moral point of view such an indulgence is, and however justly a party may be responsible for his acts arising from it to Almighty God, human tribunals are generally restricted from punishing them, since they are not the acts of a reasonable being. Many species of insanity arise remotely from what, in a moral view, is a criminal neglect or fault of the party, as from religious melancholy, undue exposure, extravagant pride, ambition, &c. Yet such insanity has always been deemed a sufficient excuse for any crime done under its influence."*

* Mason's Reports, vol. v. p. 28. United States *v.* Drew. American Jurist, vol. iii. p. 4.

In a recent trial in the western part of this state of a parent for the murder of his son, six years old, by blows and whipping, I can find no proofs of delirium tremens *before* or *during* the transaction. He would, however, appear to have had it *after* his committal to prison. I speak from reading the newspaper account only.

That this subject has not escaped the observation of European writers is evident from the following observations of Orfila.

"Drunkenness sometimes causes a short access of delirium or mania, to which the name of *delirium tremens* is given. This state may continue some days, or even weeks. It differs from drunkenness, in that the latter disappears in twelve or fifteen hours at most, if not renewed by drink. Certainly the individual seized with this delirium is not responsible for his actions; and if he is to be punished for the immorality of the cause of his reprehensible act, a large number of the insane must also be included in a similar infliction."*

I am reminded, however, by a communication from my friend the Hon. David Buel, jun., of Troy, that this plea may be, and indeed has been, carried further than the nature of the disease will warrant. It is as important to guard against this as it is to present the defence which the actual disease permits.

The following are the circumstances of the case now referred to.

"Thomas Harty, the prisoner, was addicted to drinking spirituous liquors. He resided in Albany during the winter of 1832 and 1833; and while there had several paroxysms of delirium tremens, which were of short duration. In the spring he removed to Troy. On the 31st of August he murdered his wife by a blow with an axe. He had lived three weeks previous to this period in a certain house, and during that time exhibited no marks of insanity. Some ten days previous to the homicide he had ill-treated his wife; and for a few days she refused to live with him, but at length returned home.

"After the deed was done his actions and conversation induced some persons to think he was insane. But the most intelligent individuals who conversed with him did not consider him so. And there was no proof of insanity or delirium tremens, either on the morning on which he killed his wife, or for several months before.

"The prisoner's counsel dwelt upon the proof of his having been affected with delirium tremens the winter previous, and on the evidence that he was addicted to drinking; and they endeavoured to infer from that evidence, in connexion with his equivocal conduct after the perpetration of the act, that he was *non compos mentis*. The argument addressed to the jury was to this effect. Drunkenness is allowed to be one of the common causes of insanity; and it is proved that the prisoner had paroxysms of delirium tremens during the preceding winter. Is it not an authorised presumption that he was insane when he committed the act?"

On the part of the people, Mr. Buel met this argument by distinguishing between paroxysms of delirium tremens and a permanent

* Orfila's Leçons, second edition, vol. ii. p. 127. Henke would also seem to have advanced a similar opinion: "*Ænomania* (amenta vinolenta) from the abuse of brandy." "Et de la liqueur appelée *Grog*."—Bulletin des Sciences Méd. vol. xiv. p. 184.

The Boston Medical and Surgical Journal, vol. ii. p. 569, has a well argued paper in defence of the doctrine maintained in the text. A remark is made in it which cannot be questioned, and may render judicial proceedings more secure. It is that delirium tremens is a disease that, from its striking peculiarities, cannot be feigned.

state of mental alienation; and especially relied on the absence of any proof of insanity or delirium for several months *before* the commission of the act.

The jury found the prisoner guilty; and, I apprehend, with perfect justice. If the prisoner was to be excused on the ground of *delirium tremens*, certainly proof of its presence, either *before* or *immediately after* the crime, should have been presented. I have already stated that it is a disease of short duration; and, until it begins to break down the constitution, the recovery of the patient is as perfect as from any other disease.

Again, there was certainly no indication of the presence of that insanity which is consequent on habits of intoxication.* The proofs of the presence of either should never be merely presumptive.

Old age. The following, according to Dr. Prichard, are among the striking features which attend the dementia of old age. Recent impressions and events are speedily and rapidly obliterated from the mind, while ideas long since stamped on it remain in nearly their original force, and are capable of being recalled by association or attention. The individual may scarcely know where he is, yet he readily recognises persons with whom he has been long acquainted. There is, therefore, an incapacity for attention, and for receiving present impressions, but certainly nothing that deserves the name of a maniacal illusion. It is merely a loss of energy in some of the intellectual operations, while the affections remain natural and unperverted.† Such a state may, however, be followed by actual dementia, or approach to idiocy.

As to legal proceedings, it appears now to be decided that debility of mind in consequence of old age may render a person unfit to manage his own affairs, and his property may be placed in the hands of a committee, in the same manner as that of a lunatic.‡

A case was decided on this principle in the chancery court of this state some years since. An individual, eighty-five years old, was seised of a large real estate; and it was alleged, from repeated acts, that his imbecility of mind (although not a lunatic), and his want of understanding, were such as to render him incapable of managing his affairs. The chancellor awarded a commission in the nature of a writ of lunacy, to inquire whether the facts were accordant to the above statement; and he also directed that the individual should be present, so that the jury might have the inspection of him. The inquisition was taken and returned, finding that J. B. was, and for one year pre-

* In the former edition (vol. i. p. 370) I made the following remark: "It is to be feared that cases may sometimes occur in which the dividing line between sanity and insanity may be overleaped, in the ardour to punish a foul homicide." The remarks of Mr. Buel on this subject are so just, and indeed so conformable to my subsequent experience, that I cannot avoid quoting them. "In my experience, juries in this country, in capital cases, are not apt to convict under the influence of excitement produced by the atrocious nature of the crime. On the contrary, I think there is rather an increasing readiness to find a place to hang a doubt on,— and doubts, you know, insure acquittal."

† Prichard, art. *Insanity*, in Cyclopædia of Practical Medicine, vol. ii. p. 872.

‡ Collinson on Lunacy, vol. i. p. 66.

ceding had been, of unsound mind, and mentally incapable of managing his affairs. A committee of the estate was accordingly appointed.*

Dr. Conolly, in noticing this subject, mentions a frequent source of error. It is, that persons are often appointed to make the inquiry on the supposed state of mind, who are unacquainted with the individual, and the result is, a restraint and watchfulness on the part of the aged, which naturally induces an appearance of perfect correctness of deportment. A slight suspicion excited by sordid domestics, or other interested persons, may prevent an exhibition of the actual enfeebled state of mind, and more decidedly give them up to the plots by which property is so frequently alienated from the legal heirs. These circumstances should, therefore, be remembered in all commissions, and a free and unrestrained intercourse be deemed a most essential means in forming a proper opinion.† But, on the other hand, no language is too strong to characterise their conduct who shall endeavour to make the imbecility of age an excuse for robbing its subjects of their comforts, or for confining them in an asylum.

It is impossible to extend this investigation into the numerous cases, which may present doubts as to the strength of mind of individuals. Every instance must be judged on its own merits ; and, while weakness of understanding deserves protection, it should be remembered that too nice an investigation of eccentricities and imperfections may lead to oppression and injustice.‡

V. *Of the state of mind necessary to constitute a valid will.*

Sir William Blackstone, in his introductory remarks on the study of the law, observes, that were the medical profession to inform themselves on the doctrine of last wills and testaments, or at least so far as relates to the formal part of their execution, they might often use this knowledge with advantage to families, upon sudden emergencies.‡ Having such authority, it will not I trust be deemed presumptuous, if I preface the consideration of the present subject with a brief sketch of the legal requisites for making these. This must also be my apology for

* Johnson's Chancery Reports, vol. ii. p. 232. In the matter of James Barker. See also Vesey's Reports, vol. xii. p. 446, *ex parte* Cranmer. But the greatness of a testator's age is not alone a proof of his incapacity to make a will,—for a man of one hundred years of age may yet be very competent. — Call's Virginia Reports, vol. iv. p. 423. Also Darling *v.* Bennet, Massachusetts Reports, vol. viii. p. 129. Johnson's Chancery Reports, vol. v. p. 158. Van Alst *v.* Hunter.

† Conolly on Insanity, p. 440.

‡ In the case of Lord Donegal, it was found that he was of weak understanding, although he gave rational answers about his estate, but *not to any question about figures, as to which he could not answer the most common.* Lord Hardwicke did not think that a sufficient foundation to grant a commission ; and said, that if he granted any, it must be that of idiocy.—Vesey senior's Reports, vol. ii. p. 407. On this, Lord Eldon remarked, that he does not know what his predecessors intended, in intimating that the incapacity, proved by the want of power to comprehend the most simple proposition in figures, as that two and two make four, is not evidence of an *unsound mind.* He considers that this deficiency is an evidence of it, though to be estimated with reference to age, situation, and all other circumstances.—Sherwood *v.* Sanderson, Vesey's Reports, vol. xix. p. 285.

‡ Blackstone's Commentaries, vol. i. p. 13.

noticing some points in this section, which might, with perhaps greater propriety, have been considered in previous ones.

It must be noticed, in the first place, that the law makes an important distinction between the disposition of real and of personal property. This is borrowed from the English law, but it is transferred into our own statutes.

Nuncupative wills. By this term is understood a verbal disposition of a person's property. The law concerning these has of late years been materially altered in this state. It may, however, be useful to mention the former in connexion with the present enactment.

Until 1828, it was enacted, that no nuncupative will should be good, where the estate thereby bequeathed shall exceed the value of seventy-five dollars, unless the same be proved by the oath of three witnesses at least, who were present at the making thereof, nor unless it be proved that the testator, at the time of pronouncing the same, did bid the persons present, or some of them, bear witness, that such was his will, or words to that effect — nor unless such nuncupative will be made at the time of the last sickness of the deceased, and in his dwelling-house, or where he had been residing for ten days or more next before the making of such will, except such person was surprised or taken sick, being from home, and died before his return to the same. It is further ordained, that after six months from the speaking of the pretended testamentary words, no testimony shall be received to prove any nuncupative will, except the said testimony, or the substance thereof, was committed to writing within six days after the making of the said will, and also, that no letters testamentary or probate of any nuncupative will, shall pass the seal of any court until fourteen days, at the least, after the death of the testator shall be fully expired; nor shall any nuncupative will at any time be received to be proved, unless process has first issued to call in the widow or next of kin to the deceased, to the end that they may contest the same, if they please.*

A nuncupative will has also been decided to be not good, unless it be made when the testator is *in extremis*, or overtaken by sudden and violent sickness, and has not time to make a written will. The words "last sickness" in the statute just quoted, are understood to mean the last extremity.†

By the Revised Statutes, however, the power of making these wills is nearly taken away. The following is the existing law: "No nuncupative or unwritten will, bequeathing personal estate, shall be valid, unless made by a soldier, while in actual military service, or by a mariner while at sea.‡

* Revised Laws, vol. i. p. 367.

† Johnson's Reports, vol. xx. p. 205. Prince *v.* Hazelton. In this case, the supposed nuncupative will was made several days before the death of the testator, and although ill of a liver complaint, it does not appear that he had any idea that his dissolution was so near.

‡ Revised Statutes, vol. ii. p. 60.

In Pennsylvania, where the English law is in force, the question, as to what constitutes a valid nuncupative will, lately came up under the following circumstances. The testatrix, Priscilla Yarnall, had been afflicted with pulmonary consumption for six months before her death. She seems to have been conscious of the danger of her

Secondly, a will or bequest of personal property. The hand-writing of the person bequeathing was formerly sufficient to pass property so given; but witnesses are now required, as with testaments.

Lastly. Testaments by virtue of which real property is devised, must be in writing, and signed by the party making the same, or by some other person, whom he expressly directs to sign it for him, and they must be attested and subscribed by two witnesses at least. This provision applies equally to wills of real or personal property, and the witnesses are further required to add their place of residence.*

We may now add, that none of these are valid in law, if made by any infant, idiot, or person of insane memory. Here is the point at which the subject enters into legal medicine, and under this law, it happens that the testimony of a physician is often required.

In law, a person is considered an infant until he arrives at the age of twenty-one; and the construction of this is, that if he is born on the first day of January, he is of age to do any legal act on the morning of the last day of December.† Infants, according to the ecclesiastical or civil law, if above the age of fourteen, may, however, bequeath personal property, but not real estate. This respects males, as females may make a will of personal estate at twelve.

In this state, every male of the age of eighteen and upwards, and every female, not being a married woman, of sixteen years and upwards, may give and bequeath personal property, by will in writing.‡

"Madmen, or otherwise *non-compotes*, idiots, or natural fools, persons grown childish by reason of old age or distemper, such as have their senses besotted by drunkenness--all these are incapable, by reason of mental disability, to make any will, so long as such disability lasts."§

Among the diseases which incapacitate an individual from making a valid will, or at least render his rationality doubtful, may be enumerated the following: lethargic and comatose affections, whether arising from some internal affection or from external injury. These

situation, but it is not very clear that she had abandoned all hopes of recovery. Nine days before her death, she made the alleged nuncupative will. She retained all her faculties to the last, although weak in body.

The court, among other objections, decided against the validity of the will, because such a will is not good unless made when the testatrix is *in extremis*, or is overtaken by sudden and violent illness, and has not time or opportunity to make a written will.—Rawle's Pennsylvania Reports, vol. iv. p. 46.

* Revised Statutes, vol. ii. p. 63. The revisors of the laws of Pennsylvania have proposed a similar enactment in that state, viz: that all wills shall be in writing and signed as above, except *in extremis*.—American Quarterly Review, vol. xiii. p. 44.

† As in the following case, which was decided by the House of Lords in February, 1775, on an appeal from the court of chancery. An estate was bequeathed to Thomas Sansam as soon as he should arrive at the age of twenty-one. Now he was born between the hours of five and six on the morning of the 16th of August, 1725, and died about 11 in the forenoon of the 15th of August 1746, being killed by a fall from a wagon. The question was, whether he had arrived at the full age. The chancellor (Lord Camden) had so decided. It was urged, that more than sixteen hours were wanting to complete the term; but that plea was overruled by their Lordships, and the decree confirmed, because he was living on the day that completed the period.—Dodsley's Annual Register, 1775. Petersdorff's Abridgement, vol. x. p. 536.

‡ Revised Statutes, vol. ii. p. 63. § Blackstone, vol. ii. p. 497.

suspend the action of the intellectual faculties; so also does an attack of apoplexy; and even if patients recover from its first effects, an imbecility of mind is often left, which unfits an individual for the duty in question. Phrenitis, delirium tremens, and those inflammations which are accompanied with delirium, also impair the mind. Finally, in typhoid fevers, the low state which usually precedes death, is one that may be considered as incapacitating the individual.

On the other hand, there are many fatal diseases, in which the patient preserves his mind to the last, and all dispositions of property made by him are of course valid. Of these none is more striking than the clearness of intellect which sometimes attends the last stages of phthisis pulmonalis.

The symptoms—the state of the individual, his conversation and actions, should all be canvassed, and from them an opinion must be formed.*

This, however, is only a general enumeration; and I have thought that a sketch of some of the cases scattered through law books and medical journals may prove of service, at least to the medical profession. They are contained in works not generally accessible to physicians; and a perusal of them may prevent many of those difficulties which are so apt to embarrass medical witnesses. I have arranged them under the respective diseases that were the subject of inquiry.

Apoplexy. In Cook *v.* Goude and Bennet, the testator had made a will after an attack of apoplexy, from which he recovered. He subsequently attended to business of every description, and travelled to various places. Death followed in three years after the first attack, from a second apoplectic fit. The testimony varied, and it was asserted by some that he had been frequently dull and lethargic, but Sir John Nicholl decided in favour of the will, because (along with other circumstances) incapacity was not proved.†

In Waters *v.* Howlett, Sir John Nicholl remarked, that the allegation pled an attack of apoplexy in June 1826; that the will was executed in November 1826; and that there was a subsequent attack of the disease in 1828, with consequent imbecility. He adds, that "the fifth and the remaining articles heap together a number of circumstances, which usually, or at least frequently, occur in persons who are subject to apoplectic or paralytic attacks, especially about the period of those attacks, but which also generally subside after a time, and then the patient again is rational and capable. In support of such circumstances (he observes), *persons who accidentally visit the deceased, are usually brought to depose; but their evidence almost universally turns out to be of no weight against acts of capacity at other times, particularly if there is no appearance of fraud in the testamentary act itself.*"‡

An individual was suddenly seized with a fit of apoplexy, while walking in his garden. It deprived him of his speech, which indeed he never regained, and affected his senses. Three weeks after, he

* Foderé, vol. i. p. 261. † Haggard's Ecclesiastical Reports, vol. i. p. 577.
‡ 3 Haggard's Ecclesiastical Reports, p. 790.

executed the disputed will. Although speechless, he appeared sensible; his hand was guided to make a mark. A witness deposed to his apparent understanding, and stated, that when going away, he desired the deceased to give him his hand, which he immediately did. The medical witness, however, deposed that he had never seen him, after the fit, when he appeared to have any sense; there might, however, have been intervals when he was not present. Other witnesses corroborated this. Sir George Lee decided against the will, thinking him not sufficiently capable of making and executing it."*

Dr. Hastings was required professionally to visit, on the 6th of June, 1826, a rich farmer in the county of Hereford, England, and found him in a very lethargic state. It appears that although formerly sober, yet of late years he had become a confirmed drunkard. His speech was much impaired, and he was not always able to articulate so as to express the idea in his mind. He complained of noises in his ears, and imperfect vision. His gait was unsteady, and there was a constant trembling of his hands. He, however, answered all the questions put to him with propriety, and did not exhibit any imbecility of mind. He performed a somewhat difficult sum in addition, with accuracy. He told Dr. Hastings the collect for the day, it being Sunday, and read part of it to him. He wrote down, in words, the distance of his dwelling from the adjoining town.

The bodily symptoms evidently threatened an attack of apoplexy, and such indeed was the result. After many fruitless attempts to break up the habit of intoxication, he sunk into a state of mental imbecility, and died of apoplexy in January 1827. Dr. Hastings never saw him after the first visit, until the day before his death.

The testator had made a will on the 26th of April, 1826, and its validity was contested. It seems that some time in 1825, he had been seized with symptoms of palsy, but which, by proper remedies, had been considerably relieved. He, however, was subject to fits of delirium tremens; and, during these, acted strangely and incoherently. Generally speaking, from the testimony, the state of his mind at the time of making the will was similar to that observed by Dr. Hastings. The jury, under the direction of Baron Vaughan, decided in favour of the will.†

Palsy. In the case of Clark *v.* Fisher, brought before the chancellor of the state of New York, on an appeal from a surrogate's

* Lee's Ecclesiastical Reports, vol. ii. p. 229. Bittleston, by her guardian, *v.* Clark.

† Midland Medical and Surgical Reporter, vol. i. p. 410. Dr. Hastings mentions two other cases, in which apoplectic symptoms, evidently resulting from long continued and severe disease of the brain, were still unaccompanied with any material injury of the intellectual functions. In another, the individual, aged between fifty and sixty years, roused suddenly from his stertorous sleep, "called to his brothers to attend, as he would dictate his will. To the great astonishment of all present, he, in the clearest manner, dictated a very just will, leaving his property in trust for his children. He directly afterwards, without mentioning any other affairs, again relapsed into coma; from which, before his death, he again aroused, and then gave some directions with respect to an annuity to a clerk, who had been a faithful servant to him." This, however, was a case in which the comatose symptoms supervened on an attack of erysipelas.

decision, the testator died in May 1827, aged about eighty years. Four years previous to his death, he had an apoplectic fit, which terminated in paralysis, and this continued until his death. He was confined to his bed during these four years, although able to ride out a few times, being helped into his carriage. His speech was much impaired, but he was able to make himself understood by those who were well acquainted with him. The contested will was made in May 1827, a short time previous to his death.

The chancellor (Walworth), in his opinion, states that upwards of fifty witnesses were examined before the surrogate. As usual, great diversity of opinion existed among them. Aware of the tendency of prejudice or feelings to bias their views, he reviews the evidence, and establishes from incontestable proof, that the testator's mind, at the commencement of his disease, was such as totally to incapacitate him from making a will. After the first year he was but seldom visited by those who were formerly acquainted with him; and those who did so, vary in opinion; but in 1826, it would seem that his memory was good respecting long past events. This, however, is so common during the decrepitude of old age, that the chancellor remarks, it can hardly be relied on as a proof of mental capacity. At the period, however, of executing the will, he could not make himself understood by the person who drew it, even in reply to questions directly put to him. It was all done by the direction of a wife whom he married after his first attack. The will was cancelled.*

A testator, ten years before his death, and in perfect health, executed a will, and subsequently a codicil; and two and a half years before his death, after a paralytic stroke producing at least great *bodily* infirmity, having executed a second codicil, materially departing from those instruments; and six months before his death, a third codicil, revoking the second, and reverting to the former disposition, a probate of the will, and of the first and third codicils, was granted, there being no satisfactory proof of a change in his affections, and the evidence of volition and capacity being at least as strong in support of the third as of the second codicil.†

In a case before Sir George Lee (1752), the testator having the palsy, and being dissatisfied with a former will, ordered a new one to be executed. The attorney drew it according to her directions, read it to her, and she approved it, by answering "yes," or "it is very right." She raised herself up to execute it, but the palsy in her hand was so great that she could not hold the pen. Judgment was given in favour of the unexecuted will.‡

Esquirol was consulted on the following case:—a bon vivant of

* Paige's Chancery Reports, vol. i. p. 171. See also Scribner *v.* Crane, ibid. vol. ii. p. 147.

† King and Thwaits *v.* Farley. Haggard's Ecclesiastical Reports, vol. i. p. 502. See also Marsh *v.* Tyrrel, 2 Haggard's Ecclesiastical Reports, p. 84. Dr. Burrows was called in on the day of making the last will, for the purpose of ascertaining the capacity of the testator. She had had several paralytic strokes. Dr. Burrows would only give a limited opinion, and desired a second interview. The will was in direct opposition to two previous ones, made when in perfect health. Judgment against it.

‡ Lee's Ecclesiastical Reports, vol. i. p. 130. Martin *v.* Wotton.

apoplectic make, was, at the age of 64, attacked with hemiplegia and its usual symptoms. He became morose and sluggish, and suffered under trembling of the limbs, deafness, difficulty of speech, &c. Could a person, under these circumstances, dictate and understand a will written for him two months previous to death? It was replied, that although all the above are signs of cerebral lesion, yet they do not necessarily suppose a loss of intellect. Reason may be present, although not so perfect. The number of witnesses required in France to attest a legal signature to a will, is also urged as a proof that so many persons could not have been mistaken as to the state of mind.*

General weakness and debility.—The will of a married woman, obtained when she was in an extremely weak state, nine days before death, by the active agency of her husband, the sole executor and universal legatee, and which will wholly departed from a former one deliberately made a few months before, was pronounced against, the evidence in favour not being satisfactory. She suffered much from pain and weakness, and took laudanum largely during her illness.†

Old age, implying mental imbecility.—Kinleside *v.* Harrison. In this case, the testator, between 86 and 88 years of age, made several codicils to his will, which were disputed on the ground of mental imbecility, the result of old age. A large mass of contradictory evidence was presented. It appears to be admitted that there was occasional incapacity from violent nervous attacks, but he survived two years after making the codicils, and managed his own concerns. Thus he drew drafts, all of which were accurate and conformable to the variations required in them. His memory failed him occasionally and he was deaf, yet he was able to play whist well until a few months before his death, and always paid his own bills and entered his payments as they were made, in his account-book. Sir John Nicholl decided in favour of his capacity.‡

In Brydges *v.* King. Mrs. Brydges had made a will while in a state of health, material parts of which were altered by a codicil, executed ten days before her death. She was above seventy-two years of age, had been confined to her room three months, and to her bed two months. Her complaint was visceral, and, from lying in bed, she had become excoriated so that it was necessary to dress the sores from shoulder to hip, and although her bowels were so torpid as to require injections, yet, from her weakened state, she was not able to bear them. In this condition, the codicil in favour of her personal attendants, was

* Annales d'Hygiène, vol. vii. p. 203. Dugald Stewart, although struck with palsy in 1822, and unable to take general exercise, or to use his right hand, or to articulate distinctly, notwithstanding composed the third and fourth volumes of his work on the Philosophy of the Human Mind, between it and 1828, when he died.—Brewster's Edinburgh Journal of Science, vol. x. p. 201.

† Haggard's Ecclesiastical Reports, vol. ii. p. 169. Mynn *v.* Robinson. In Scotland there is a peculiar law to protect dying persons from importunity. No settlement or gift, executed after the commencement of the disease of which the person dies, except those in the ordinary administration of the estate, are valid, and this even if the grantor be not confined to his bed. If he survives sixty days after, it is good.—Bell's Dictionary of the Law of Scotland, art. *Death-Bed.*

‡ 2 Phillimore, p. 449.

executed. The regular physician of the deceased had not seen her for several days previous and subsequent, but he deposed to her being more or less lethargic for months, and did not believe her capable of transacting important business. It was also in evidence, that her relatives and solicitor were excluded, under various pretences, from seeing her. The codicil was declared invalid by Sir John Nicholl.*

In Ingram *v.* Wyatt. Sir John Nicholl notices particularly the subject of imbecility of mind. This defect he remarks, seems to proceed from want of quickness, activity, and motion in the intellectual faculties. And thus sometimes different faculties are found failing in different persons. "For example, the memory is sometimes perfect where higher powers of the understanding are greatly defective." In an individual of imbecile mind, "the understanding has made little progress with years; it has not matured and ripened in the usual manner; yet even in such individuals, unless the imbecility be extreme, some improvement will have taken place; some progress in knowledge beyond mere infancy will have been made. By the help of memory, by imitation, by habit, such an individual will acquire many ideas, will recollect facts and circumstances, and places, and hacknied quotations from books, will conduct himself orderly and mannerly, will make a few rational remarks on familiar and trite subjects, may retain self-dominion, may spend his own little income in providing for his wants, as a boy spends his pocket-money, and yet may labour under great infirmity of mind, and be very liable to fraud and imposition."

"The principal marks and features of imbecility are the same which belong to childhood, of course (as already observed), varying in degree in different individuals; frivolous pursuits, fondness for, and stress upon trifles, inertness of mind, paucity of ideas, shyness, timidity, submission to control, acquiescence under influence, and the like. Hence these infantine qualities have acquired for this species of deficiency of understanding, the name of 'childishness.' The effect is, that where imbecility exists at all, and in proportion to its degree, it becomes necessary, especially in a case exposed to other adverse 'presumptions,' to ascertain its extent with some accuracy, to see how far the individual was liable to be controlled by influence, to submit to ascendency, to acquiesce from inertness and confidence in those acts, upon the validity of which the court has to decide."†

In Bird *v.* Bird, the will was executed ten days before death by a person of 85, in weak bodily health; but the drawer and witnesses of it were confirmed in their opinion as to capacity, volition, and free agency, by the adverse witnesses, and by the deceased's affections and declarations. Will pronounced for.‡

A testatrix was old and greatly debilitated by the disease under which she laboured when she made her will and codicil, and the usual state of her mind, until her death, was that of great torpor and inactivity; "but her mind (say the court) was evidently not deranged.

* Haggard's Ecclesiastical Reports, p. 256. † Ibid. vol. i. p. 384.
‡ Ibid. vol. ii. p. 142.

It was, in fact, rather a want of sensibility than a want of intellect, which marked her condition; for most, if not all the witnesses agreed, that she could, by any thing sufficiently interesting to attract her attention, be awakened and roused to activity; and when she was so, that she conversed intelligently, and invariably gave rational and pertinent responses to any interrogatories propounded to her." Some indeed thought, that she could not be excited for a time sufficient to make a will; others entertained a different opinion. And it was proved that she felt an extreme interest about making a will. She was a widow and childless, and had long determined against intestacy. The primary motive of this determination was the emancipation of her slaves, and this all agreed, was the object dearest to her heart. This was a subject then to excite her; and the subscribing witnesses were also decided as to her competency at the time of executing the will. The court, therefore, adjudged in favour of the will.*

It has been sometimes agitated, whether the loss of memory solely, is such a proof of mental imbecility as to render a will invalid. On this point, the remarks of Chancellor Kent, in a case before him, are decisive. "The failure of memory is not sufficient to create the incapacity, unless it be quite total, or extend to his immediate family. The Roman law," he remarks, "seemed to apply the incapacity only to an extreme failure of memory — as for a man to forget his own name, *fatuus præsumitur qui in proprio nomine errat.* The want of recollection of names is one of the earliest symptoms of a decay of the memory; but this failure may exist to a very great degree, and yet 'the solid power of the understanding' remain."†

Drunkenness. The testator was proved to have been not properly a madman, but an habitual drunkard; who, under the excitement of liquor, acted very like a maniac.

Sir John Nicholl held, that from the evidence it appeared that the testator was not under the excitement of liquor, and consequently not insane at the time of making his will; and he therefore established the will.‡

Delirium. In Evans *v.* Knight, where the condition of the testator was inquired into, eight years after his death, it was endeavoured to be shewn that he had been labouring under a delirium caused by a fatal attack of peripneumonia. This attack had been on him for some days. He made the will on the 21st of April, and died on the 24th. The physician who was called in, and who saw him only a short time, inclined to the opinion that he was not in sound mind, but denied that he was in a state of mental derangement; "and in spite of a marked confusion of intellect, he could answer questions put to him, sensibly

* Littel's Kentucky Reports, vol. i. p. 252. Watts *v.* Bullock.

† Johnson's Chancery Reports, vol. v. p. 161. Van Alst *v.* Hunter. In Turner *v.* Turner (Littel's Kentucky Reports, vol. i. p. 101), the court made a remark which is probably correct; and if so, deserves attention. "There is less presumption of insanity *at the time* when a will was executed, where the testator is shewn to have been previously afflicted with the mental debility attending old age, than there is where the mental malady is ordinary lunacy."

‡ Ayrey *v.* Hill, 2 Addams, p. 206. See also Dodge v. Meech (where the will was invalidated), 1 Haggard's Ecclesiastical Reports, p. 612.

and rationally." A friend visited him on the same day, and heard him give instructions to the solicitor, without any leading questions being put. The solicitor also was satisfied of his capacity. Verdict in favour of the will.*

Suicide, as indicative of insanity. "Instructions for a will containing the fixed and final intentions of the deceased are valid, if the formal execution is prevented by death; and, if there is no evidence of insanity at the time of giving the instructions, the commission of suicide three days after will not invalidate the paper, by raising an inference of previous derangement." Here the testator conversed sensibly and collectedly, and appeared perfectly rational when giving the instructions.†

The existence of a lucid interval. The case of White *v.* Driver, related to the validity of the will of Mrs. Manning, who was proved to have been insane for several years, but the disorder was not uniform; nor did it always attack her with an equal degree of violence. She was at large during the greater part of her life, and under her own government. From the testimony of the clergyman, the solicitor, the two apothecaries, and the nurse, "with all their suspicions awakened, and their vigilant observations called forth," it appeared that she was sane and rational during the transaction; and indeed it seems proved, that she continued so until her death, which was on the next day. The disposition of her property as made by the will, was "neither insane nor unnatural." Sir John Nicholl (the judge) therefore pronounced it valid.‡

In another case (Cartwright *v.* Cartwright), Sir William Wynne enters more in detail into the circumstances which go to prove the existence of a lucid interval. "If it can be proved and established, that it is a rational act rationally done, the whole case is proved. What can you do more to establish the act? Because, suppose you are able to shew the party did that which appears to be a rational act, and it is his own entirely, nothing is left to presumption in order to prove a lucid interval." The deceased, by herself writing the will now before the court, had plainly shewn that she had a full and complete capacity to understand the state of her affairs and her relations, and to give what was proper in the way she has done. She not only formed the plan, but pursued and carried it into execution with propriety, and without assistance. He was, therefore, in favour of the validity of the will, and this sentence was affirmed on appeal to the High Court of Delegates. §

Monomania—Hatred against relatives. One of the most difficult questions for decision is, where the charge of insanity rests on some obstinate and long-continued feelings of hatred or malice against individuals, and which are evidently groundless. Thus, Lord Erskine, in his speech on the trial of James Hadfield, speaks of a Mr. Greenwood,

* 1 Addams, p. 229. See also Lemann *v.* Bonsall, ibid. p. 383.

† Burrows *v.* Burrows, 1 Haggard's Ecclesiastical Reports, p. 109.

‡ 1 Phillimore's Ecclesiastical Reports, p. 84.

§ 1 Phillimore, p. 90. But in Groom and Evans *v.* Thomas, where the deceased was proved to have been insane both before and after making the will, testimony shewing calmness and the transaction of formal business, under the sanction of his family, was not deemed sufficient to rebut the presumption against the papers.—Haggard's Ecclesiastical Reports, vol. ii. p. 433.

who, *whilst insane*, took up the idea that his brother had administered poison to him, and this became the prominent feature of his insanity. In a few months, however, he recovered, and returned to his profession (that of a barrister), but could never divest himself of the delusion that his brother had attempted to poison him, and under its influence he disinherited him. On a trial in the Court of King's Bench, the jury found against the will, but a contrary verdict was had in the Court of Common Pleas, and the suit ended in a compromise.

Another case of the same description is that of Dew *v.* Clark, which forms the subject of one of Sir John Nicholl's most elaborate and able opinions, and I cannot omit recommending its attentive perusal to all of my young legal friends who wish to understand this intricate species of insanity.

Ely Stott died a rich man—leaving a widow (the third wife) and an only child. This child, a daughter (now Mrs. Dew), was of the first marriage, and born in 1788; and it was shewn that, from her earliest infancy, he had laboured under the strongest aversion against her, declaring that she was invested by nature with a singular depravity, was the victim of vice and evil, &c., and he continued in this opinion, and made similar assertions, as she advanced in life, and even until his death, in 1821. He left her 100*l.* per annum, and she now sought, on the ground of his *partial* insanity, to break the will.

When the first application was made to Sir John Nicholl, he explicitly stated, that "no course of harsh treatment, no sudden bursts of violence, no display of unkind or even unnatural feeling *merely*, can avail in proof of the allegation; she can only prove it by making out a case of antipathy, clearly resolvable into mental perversion, and plainly evincing that the deceased was *insane* as to *her*, notwithstanding his general sanity."

His decision on the will occupies many pages. He inquires what is the true criterion or test of the presence of insanity, and in answer, deems it comprisable in a single term, viz. *delusion*—a delusion out of which the patient is incapable of being *permanently* reasoned. The term *partial* insanity is perfectly consonant with the law of England—a man is not mad on all subjects.

In addition to the circumstances mentioned above, as to the delusion of Mr. Stott against his child, it was proved by many witnesses, that, even in early age, the burden of his conversation was her depravity and profligacy; and this went on from year to year, progressively increasing. His treatment of her was harsh to an extreme; he burst into rage whenever she appeared, and could not bear the sight of her. She never sat down to table with him, was compelled to do the most menial work, and was denied every thing, except the most common articles of dress. He stripped her naked and flogged her, and then rubbed her back with brine; and even when a woman grown, of 17 up to 21, would knock her down and strike her with a whip. She fled from these cruelties, and received, through the assistance of her friends, a situation in a school, and where she was fitted for a governess. The clergyman of the parish, to whom Mr. Stott had complained of his daughter, became acquainted with her, and was surprised to find her

far different from what had been represented. Fruitless efforts were made by him and her to produce a reconciliation, but he states that the mere sight of her appeared to excite the father, and he did not deem it safe to leave *her* in the house. "The deceased's state of mind was clearly and essentially different from that of a merely wicked man, or of one under the influence of a prejudice, however strong." It was a complete delusion, which he had no power of resisting, and which was liable to, and did, go frightful lengths, in the absence of temporary external restraints."

It appeared in testimony, that Stott had required his daughter to write down her thoughts for his inspection.

Other circumstances were proved, indicative of insanity on several subjects—such as his conduct to his first wife, his blasphemy while reading the Bible, and his extraordinary prayers.

He was a medical electrician, and conceived himself endowed with supernatural powers in the use of his apparatus. He had also imbibed an idea of the feasibility of delivering pregnant females by means of this agent, and actually proposed to a neighbouring baker, to try the experiment on his wife.

The will was declared void.*

In a recent case, the testator had been a fellow of Queen's College, Oxford, and, for the last twenty years of his life, rector of a living belonging to that college. He was always eccentric in his habits, and of late years had been very retired. In consequence of being taken very ill, and two of his servants at the same time, with vomiting and purging, he believed that an attempt had been made to poison him. On the advice of his solicitor and physician, who then thought that he had rational grounds for his suspicions, an investigation was made, but the gentlemen who conducted it were satisfied that there were none. The testator, however, remained in the belief that the eggs, milk, and butter sent to him by Harrison, his nephew-in-law, and his church-warden, were poisoned, and this continued to his death.

The will was all in the testator's hand-writing, without erasure or alteration, regularly attested by two clergymen, who, although aware of his opinion respecting poisoning, unhesitatingly swore to their belief of his perfect mind. The solicitor and physician gave similar testimony. His property was all bequeathed to Queen's College, in trust for the poor of the parish where he resided; and it appeared on the trial that he had expressed an intention of doing this long before he had the notion of poison.

The testamentary papers were opposed by the next of kin, on the ground that they were prepared and executed when the testator was impressed with the belief of poisoning, and while he was of unsound mind, and under mental delusion. Sir John Nicholl said, that, "at all events, it was a case of *monomania*, for upon every other subject, from the time in question to his death, the deceased acted as a person of sound mind, as much as he had ever been: he managed his house, his property, and his farm; granted leases, received tithes, kept accounts,

* Dew *v.* Clark, in 1 Addams, p. 279; 2 Addams, p. 102; 3. Addams, p. 79.

recognised his will, held rational conversation, and did church duty. A *monomaniac*, to effect such an instrument, under such circumstances, should be clear in point of existence, and decided in character, beyond all doubt. That the deceased thought and believed that an attempt had been made to poison him, seemed to be a fact established; but was it proved that his opinon in that respect was a mere morbid insane delusion, rendering him intestable? The question was not, whether the attempt to poison was really made, but whether he had grounds for suspecting it? or whether, as pleaded, 'the deceased had no rational grounds whatever for his belief.'" The court pronounced in favour of the will.*

The following case was adjudicated in Kentucky, in 1822. George Moore made his will on the 11th of April, 1822. He was sick and low, but in his right mind, and indeed more so than the witnesses had seen him for some time. About twenty-four years previous to his death, he had been seized with a dangerous fever, from which he, unexpectedly to all, recovered. Some years afterwards, he indulged in habits of intoxication, and these continued to the period of his dissolution. When not under the influence of liquor, he was feeble and inactive; and it was precisely in this situation that he executed his will, evincing intelligence sufficient, in the opinion both of his physician and the attesting witnesses. The court therefore observed, that they would have no hesitation in admitting the instrument to record, were it not for the following circumstances.

The testator was a bachelor, but had two or three brothers who resided within the state. He owned a female slave, his mistress, and who possessed considerable influence over him. During his severe illness, many years previous, he was completely deranged, talked much of his immense wealth, and then conceived an antipathy to his brothers, contending that they designed to destroy or injure him, although they attended him constantly in his illness. This antipathy continued, with a single exception, when he made a will in their favour (afterwards cancelled), until his death. When inquired of by one of the witnesses why he disinherited his brothers, he became violently irritated, and declared that they had endeavoured to get his estate before his death. "He cannot, therefore," said the court, in their opinion, "be accounted a free agent in making his will, so far as his relatives are concerned, although free as to the rest of the world. But, however free he may have been as to other objects, the conclusion is irresistible, that this peculiar defect of intellect did influence his acts in making his will, and for this cause it ought not to be sustained. It is not only this groundless hatred or malice to his brethren that ought to affect his will, but also his fears of them which he expressed during his last illness, conceiving that they were attempting to get away his estate before his death, or that they were lying in wait to shoot him, while on other subjects he spoke rationally. All which are strong evidences of a derangement in one department of his mind, unaccountable indeed, but directly influencing and operating upon the act which is now claimed as the final disposition of the estate."

* Haggard's Ecclesiastical Reports, vol. iii. p. 527. Shelford, p. 301.

The counsel for the appellants presented a petition (in writing) for a re-hearing, in which the objections to the doctrine of partial insanity are considered. It is well worthy of perusal, and its main object is to shew that what by many are deemed *delusions of the head*, may originate from *depravity of the heart*. The court, however, overruled the petition.*

Esquirol relates the following case as occurring in France. A respectable individual, 44 years old, of large property, and holding a very lucrative office, became exceedingly discontented with the division of some property made by his parents during their lifetime. He was suspicious of all, but particularly of his brothers and sisters. This soon extended to his domestics, whom he believed in a plot against him. He supposed himself surrounded by assassins, and went constantly armed. An anonymous letter completed his distracted state. In this condition he made his will, in which he stated his apprehension of being murdered by his relatives, domestics, &c. and left his property to several persons whom he deemed his friends. Shortly after, however, he revoked several legacies, because the individuals had proved traitors to him, revealing his secrets, and becoming accomplices of his relatives. In six days after signing a third codicil, he hung himself, and in his room a letter was found, saying, that in consequence of discovering new plots, he had resolved to destroy himself. Esquirol was consulted on the validity of the will. This change had gone on for three years, and was literally a *panophobia*—a fear of every body, although, on other subjects, he had appeared rational. He did not doubt the insanity of the testator.†

As to the mode of proving whether an individual is competent to make a will, this, of course, must be according to the ordinary rules of evidence. A testator is always deemed sane until the contrary is proved; and the *onus probandi*, as to his mental incapacity, lies on the party who alleges his insanity. But if a mental derangement has been proved, it is then incumbent on the devisee to shew a lucid interval, or the sanity of the testator at the time of executing the will.‡

An extraordinary case was tried in 1762, in the King's Bench in England, where the three surviving witnesses to the testator's will, and the two surviving ones to a codicil made four years subsequent to the will, and a dozen servants of the testator, all unanimously swore him to be utterly incapable of making a will, or transacting any other business, at the time of making the supposed will and codicil, or at any intermediate time. To encounter this evidence, the counsel for the plaintiff examined several of the nobility and principal gentry of the

* Littel's Kentucky Reports. vol. i. p. 371. Johnson *v.* Moore's heirs.

† Annales d'Hygiène, vol. iii. p. 370. A similar case, where long-continued jealousy led to suicide, was tried at Liege in 1802; and the will made under the influence of this passion was annulled.—Causes Célèbres, par Mejan, vol. xiii. p. 427.

‡ Johnson's Reports, vol. v. p. 144. Jackson *ex. dem.* Van Duzen and others, *v.* Van Duzen.

In a case, however, where the attesting witnesses were disinterested medical men, and gave evidence strongly in favour of the testator's sanity, the Ecclesiastical Court would not set aside the will, on proof by interrogatories, without plea, that the deceased, seventeen years before, had been under an insane delusion.—Haggard's Ecclesiastical Reports, vol. iii. p. 273. Kemble and Smales *v.* Church.

county of Worcester, who frequently and familiarly conversed with the testator during that whole period, and some on the day whereon the will was made; and also two eminent physicians who occasionally attended him, and who all strongly deposed to the entire sanity, and more than ordinary vigour of the testator. Other testimony corroborative of this, was adduced; the validity of the will was established, and, subsequenly, several of the defendant's witnesses were tried and convicted of perjury.*

VI. *Of the deaf and dumb; their capacity, and the morality of their actions.*

On this subject, little can be found in our jurisprudence; but the general rule deducible from adjudications, both in civil and criminal cases, is, that they must be judged of according to the intelligence and knowledge they are known to possess. A deaf and dumb person, educated at the present day under Sicard or Braidwood, or in one of the establishments of our own country, may certainly be deemed to understand the morality of actions much better than one who has never had that advantage; and he accordingly would more readily be put in possession of his civil rights, or be punished for any offence against the laws.†

A person born deaf and dumb is competent as a witness, provided he evinces sufficient understanding. This was decided in the following case:

At the Old Bailey, January sessions, in 1786, on the trial of William Bartlett for simple grand larceny, John Ruston, a man deaf and dumb from his birth, was produced as a witness on the part of the crown. Martha Ruston, his sister, being examined on the *voir dire*, it appeared that she and her brother had been, for a series of years, enabled to understand each other by means of certain arbitrary signs and motions, which time and necessity had invented between them. She acknowledged that these signs and motions were not significant of letters, syllables, words, or sentences; but were expressive of general propositions and entire conceptions of the mind, and the subjects of their conversation had in general been confined to the domestic concerns and familiar occurrences of life. She believed, however, that

* Sir William Blackstone's Reports, vol. i. p. 365. Lowe *v.* Joliffe. There is a curious case related in Scotch law books, of a man obtaining the signature of a deed from his wife whilst she was in extreme labour pains. The judges decided that she was not at that time in the full exercise of her reasonable faculties, and revoked the deed. This happened in 1686.

† "A person born *deaf*, *dumb*, and *blind*, is looked upon by the law as in the same state with an idiot, he being supposed incapable of any understanding, as wanting all those senses which furnish the human mind with ideas." But if he *grow* deaf, dumb, and blind, not being *born* so, he is deemed *non compos mentis*, and the same rule applies to him as to other persons supposed to be lunatics. — Blackstone, vol. i. p. 304.

The code of Justinian appears to have considered the deaf and dumb as incapable of receiving instruction, and unworthy of having civil rights, as it declares that they shall not have the power to make any will or disposition of property, or to free a slave.—London Journal of Education, vol. iii. p. 204.

her brother had a perfect knowledge of the tenets of Christianity, and was certain that she could communicate to him true notions of the moral and religious nature of an oath, and of the temporal dangers of perjury.

It was objected by the prisoner's counsel, that, although these modes of conveying intelligence might be capable of impressing the mind with some simple ideas of the existence of a God, and of a future state of rewards and punishments, yet they were utterly incapable of communicating any perfect notions of the vast and complicated system of the Christian religion, and thence the witness could not with propriety be sworn upon the Holy Gospels. The difficulty of arraigning a man for perjury whom the law presumes to be an idiot, and who is consequently incapable of being instructed in the nature of the proceedings against him, was also urged against the admissibility of the witness.

But the court overruled the objection; and John Ruston was sworn to depose "the truth," and Martha Ruston, "well and truly to interpret to John Ruston, a witness here produced in behalf of the king against William Bartlett, now a prisoner at the bar, the questions and demands made by the court to the said John Ruston, and his answers made to them." The prisoner was found guilty, and received sentence of transportation for seven years.*

In Scotland the deaf and dumb may be witnesses, if of sufficient intelligence to understand the nature of an oath. Thus, the chief witness in a case of rape was deaf and dumb, but had been instructed, and her intelligence proved by an examination of her teachers.†

In France, if the accused cannot write, some person intimate with him is to be appointed his interpreter. So also with a deaf and dumb witness. If they can write, the inquiry is to be conducted by question and answer.‡

The deaf and dumb are also allowed to obtain possession of their real estate, if they shew sufficient understanding. A female so situated, on attaining the age of twenty-one, applied to Lord Hardwicke (1754) for this purpose. Having put questions to the party in writing, and she having given sensible answers thereto in writing, the same was ordered.§

As to criminal cases, the following may be cited: a deaf and dumb person was indicted for larceny in Massachusetts, and being set to the bar for his arraignment, the solicitor-general suggested to the court that he was deaf and dumb, but that the evidence would prove him of sufficient capacity to be a proper subject for a criminal prosecution, and that he had formerly been convicted of larceny; and he moved that one *Nelson* then in court, and an acquaintance of the prisoner, should be sworn to interpret the indictment to him, as it should be read by the clerk. The indictment was accordingly read by a sentence at a time, and Nelson, having been sworn, explained his purport to

* Phillip's Law of Evidence, p. 14. Leach's Cases in Crown Law, p. 455.

† Alison's Practice of Criminal Law of Scotland, p. 436.

‡ Code d'Instruction Criminelle, art. 333.

§ Dickenson *v.* Blisset—1 Dickens' Reports, p. 268. See also on this subject generally, Johnson's Chancery Reports, vol. iv. p. 441—Brower *v.* Fisher.

him, making signs with his fingers. After which, the court ordered the trial to proceed, as on a plea of not guilty.*

A very curious case came before the court of justiciary in Scotland on the 1st of July, 1807. The prisoner, Jean Campbell, alias Bruce, was charged with murdering her child by throwing it over the old bridge of Glasgow. Mr. M'Neil, her counsel, stated an objection against her going to trial, on the ground of her being deaf and dumb from her infancy, and that he was totally unable to get any information from her to conduct her defence.

Mr. Drummond, counsel for the crown, now gave in a minute, stating that he was satisfied of the prisoner's being deaf and dumb from her infancy, but he offered to prove that she was capable of distinguishing betwixt right and wrong, and was sensible that punishment followed the commission of crime.

He then called the following witnesses:

Thos. Sibbald, keeper of the gaol. Prisoner has been two months in the gaol of Edinburgh; conducted herself rationally; made signs to the turnkey of a certain description when she wanted anything, and when the articles were brought her she seemed satisfied; he has also seen her make signs to himself, as if taking something out of her breast and counting it with her hands; and that when she came first into prison, she clasped her hands together and made a sign as if something had fallen from her back, and seemed to indicate distress of mind: that he has seen her weep while in prison; and, upon certain kinds of food having been brought to her, he has observed her express herself as if satisfied; and when she was weeping, as before mentioned, she made the same signals as if something had fallen from her back.

Robert Kinniburgh, teacher of the Deaf and Dumb Institution, deposed, that he had seen the prisoner once in the gaol at Glasgow, and repeatedly in the gaol of Edinburgh; that he has had communication with her by means of signs,—in general he understood her, but in particular instances he did not; that she, by her signs, communicated to him the circumstances which took place relative to her child; that the death of her child was altogether accidental, and that, when it happened she was intoxicated; that she communicated to him, that upon that occasion the child was upon her back, covered with her petticoat and duffle cloak; and, as he understood her, she had held them together upon her breast with her hand, while she rested the child upon the parapet of the bridge, over which the child fell while she was in the act of putting her hand in her breast, where she had money,

* Massachusetts Reports, vol. xiv. p. 207. Commonwealth *v.* Timothy Hill. A similar case occurred at the Old Bailey in 1773. One Jones, being deaf and dumb, was indicted for stealing. A person, to whom he had been in the habit of communicating his ideas by signs, was sworn as an interpreter to him. The trial proceeded and he was convicted. King *v.* Jones.—Leach's C. C. Cases, p. 120. See also King *v.* Steel, Ibid. p. 507.

By the law of the state of Ohio, if a person stands mute, a jury is to try whether he is so by the act of God, and if they find this, he is to be remanded to prison and not proceeded against, until he recovers. The Reviewer very properly asks, what is to be done with a person born deaf and dumb.—American Quar. Review, vol. x. p. 46.

and which she was afraid was lost, and by so putting her hand in her breast he understood she had lost hold of her child, at which time the child was asleep, and had then fallen over the bridge. She communicated to the witness, that before the act she had that day drank eight glasses of spirits. That his communications with the prisoner chiefly turned upon the accident, and that she seemed to understand him about as much as he understood her; that is, in general, but upon same particular occasions she did not: that she can make the initial letters of her name, but inverts them, C. J.; and when she does so, points to herself, which leads him to think she understands them: that she makes two or three other letters, but is not sure if they denote her children or not. He understood from her that she had three children, and that the one the accident happened to was one of them; that he rather suspected she was not married, as the children were to different individuals: that as far as the communications could take place betwixt him and the prisoner, she is a woman of strong powers of mind; that nothing appears to have been wanting, humanly speaking, to have saved her from the pitch of depravity she appears to have attained, but some hand to have opened for her the treasures of knowledge in proper time; that he conceives that the prisoner must be possessed of the power of conscience in a certain degree, and that she seems a woman of strong natural affection towards her children, as he was informed by persons at Glasgow; and which she manifested by the indignant denial of the charges of having wilfully killed her child, and her immediate assertion that it lost its life by accident, as well as from observations he has made as to the state of mind of other uneducated deaf and dumb persons, and particularly in one instance, in the report of the Institution for 1815, page 54: he is of opinion, that, if not blunted by intoxication, these feelings must have convinced her of the criminality of bereaving her child of life. That in his communications with the prisoner, he was satisfied she was sensible of the criminality of theft, but he cannot say any thing as to the abstract crime of murder in general. That she communicated to the witness her indignation at the fathers of her children for the way they had used her, and one of whom she has sometimes represented as her husband. That sometimes he could not understand whether she understood the ceremony of marriage or not, or sometimes wished to evade the questions, or did not understand them; that he has seen her use the form of a ring as a token of marriage; and she made signs that that had been taken away by the man she called her husband; that is to say, that the marriage had been dissolved by him, and he had taken another wife. That from what he saw of her at Glasgow, as well as what he observed in the gaol of Edinburgh, he is convinced she was aware that she was to be brought at Glasgow before a court of justice, and that he was confirmed in this from his having a conversation with a woman there, who seemed to understand her signs perfectly well in general; and who mentioned to him that she had made signs to her with regard to the dress of the judges; that he understood that she connected the death of her child with her appearance in court. (Being interrogated by the court whether he is of opinion that the prisoner could be made to understand

the question, whether she is guilty or not guilty of the crime of which she is accused?) Answers—that from the way in which he would put it, by asking her by signs, whether she threw her child over the bridge or not? he thinks she could plead not guilty by signs, as she has always communicated to him, and this is the only way in which he can so put the question to her; but he has no idea, abstractedly speaking, that she knows what a trial is, but that she knows she is brought into court about her child. That she has no idea of religion, although he has seen her point as if to a Supreme Being above; and communicates merely by natural signs, but not upon any system; that he could not obtain from her information where her supposed husband is, or what was his name; neither could she communicate by natural signs any particular place, unless he had been at that place with her before, or had some mark for it; and that she could not communicate to him about any person unless there was some sign by which he could bring that individual to her recollection, or had been seen together in certain circumstances; that in referring to the accident, the prisoner communicates that there was a baker's boy near her who heard the child plunge into the water and gave the alarm, and that upon this she laid her hands upon the ears of her little boy near her, but for what purpose he cannot say, unless to prevent him from crying out.

Here the court expressed a wish to see Mr. Kinniburgh put the question to the witness in open court; and she answered by signs in the same manner as he had described.

The Lord Justice Clerk thanked Mr. Kinniburgh for his attention, and the assistance the court had derived from his professional skill.

Dr. William Farquharson stated, that he twice visited the prisoner in the gaol of Edinburgh; on the first occasion alone, and on the second, along with Mr. Kinniburgh and another gentleman: that she fully satisfied him that she was not feigning to be deaf and dumb; and that when he first saw her, she did not seem to understand his signs so well as after being visited by Mr. Kinniburgh; and the witness made that observation to Mr. Kinniburgh himself: that he had communications the first time with her as to the loss of her child, and used signs in regard to a child then in prison, as if throwing it away; upon which she made the same signs as to the accident as she has now done to Mr. Kinniburgh in presence of the court: that she appeared to the witness to know as little of the distinction between right and wrong as a child of six months old; and that she did not appear to be conscious of having done any thing wrong whatever in regard to the child: that in giving the above opinion, he has formed it from the facts of the prisoner having been both deaf and dumb, and having received no education whatever.

John Wood, Esq., auditor of excise (who is deaf and partially dumb), gave in a written statement upon oath, mentioning that he had visited the prisoner in prison, and was of opinion that she was altogether incapable of pleading guilty or not guilty; that she stated the circumstances by signs, in the same manner she had done to the court; and seemed to be sensible that punishment would follow the commission of a crime.

The court were unanimously of opinion, that this novel and important question, of which no precedent appeared in the law of this country, deserved grave consideration, and every information the counsel on each side could procure and furnish. The court then ordered informations on each side to be prepared and printed.

At a subsequent period, the judges delivered their opinion as follows:

"Lord Hermand was of opinion that the panel (prisoner) was not a fit object of trial. She was deaf and dumb from her infancy; had had no instruction whatever; was unable to give information to her counsel—to communicate the names of her exculpatory witnesses, if she had any; and was unable to plead to the indictment in any way whatever, except by certain signs, which he considered, in point of law, to be no pleading whatever.

"Lords Justice Clerk, Gillies, Pitmilly, and Reston, were of a different opinion. From the evidence of Mr. Kinniburgh and Mr. Wood, they were of opinion that the panel was *doli capax quoad* the actual crime she was charged with. It was true that this was a new case in Scotland, but in England a case of a similar nature had occured. One Jones was arraigned at the Old Bailey in 1773, for stealing five guineas. He appeared to be deaf and dumb. A jury was impannelled to try whether he wilfully stood mute, or from the visitation of God: they returned a verdict, 'from the visitation of God;' and it having appeared that the prisoner had been in the use of holding conversation by means of signs, with a woman of the name of Fanny Lazarus, she was sworn an interpreter. He was tried, convicted, and transported. In the present case, the panel had described to Mr. Kinniburgh most minutely the manner in which the accident had happened to her child; and from the indignant way in which she rejected the assertion that she had thrown it over the bridge, it was evident she was sensible that to murder it was a crime. It was also observed by Lord Reston, that it would be an act of justice towards the panel herself, to bring her to trial; for if the court found she was a perfect *nonentity*, and could not be tried for a crime, it followed, as a natural consequence, that the unhappy woman would be confined for life; whereas, if she was brought to trial, and it turned out that the accident occurred in the way she described it, she would immediately be set at liberty. The court found her a fit object for trial."*

* The first part of this case I have taken from an English newspaper, and the opinion of the judges, from Smith's Forensic Medicine, p. 430.

"The sequel of this is worthy of record. The woman was brought to the bar, and the indictment read in the usual form; the question was then put, guilty or not? Mr. M'Niel, the counsel for the prisoner, then rose, and stated that he could not allow his client to plead to the indictment, until it was explained to her that she was at liberty to plead guilty or not. Upon it being found that this could not be done, the case was dropped, and she was dismissed from the bar *simpliciter*. Thus, though it is established that a deaf mute is *doli capax*, no means have yet been discovered of bringing him to trial.

"Another interesting discussion took place last winter in the High Court of Justiciary, as to whether or not a deaf mute was capable of giving evidence. A rape had been committed on a deaf and dumb girl, and her evidence was objected to by

There are several points connected with the subject of mental alienation, which properly belong to MEDICAL POLICE. Of this nature are the general causes, and the possibility of their removal; the treatment the insane should receive; and the care that the government should bestow on their safe-keeping.*

the counsel for the prisoner, who argued, that though it was admitted, to the fullest extent, that she had a perfect idea of the existence of a Supreme Being and a future state, and though she might be perfectly convinced of the obligation under which she lay to speak the truth, yet every one had as perfect a knowledge at least of these facts and obligations as she could possibly have, yet their testimony went for nothing unless confirmed by an oath; and as it was obvious that she could not give an oath, her testimony must go for nothing."—Dunlop.

* There have been some recent trials of deaf and dumb persons for robbery, in Paris. They appear to have been uneducated, and were acquitted.—Causes Célèbres du xix siècle, vol. iv. p. 193. One of the cases is noticed in the American Jurist, vol. iii. p. 158.

CHAPTER XIV.

PERSONS FOUND DEAD.

Duties of the office of coroner—imperfect manner in which it is often executed—duties of medical witnesses. Frequency of sudden death independent of violence.

I. Medico-legal dissection. Preliminary directions. Examination of external lesions—of the head—spine—thorax and abdomen. Distinction between natural appearances and the effects of violence. Hæmorrhage—fluidity of the blood—ecchymosis—effect of blows on the dead body—sanguineous congestions—wounds—pseudo-morbid appearances. Examination of the skeleton—cases. Whether the hair grows after death. Changes induced by putrefaction. Observations of Orfila on this—not to prevent medico-legal dissection.

II. Of sudden death from natural causes. From apoplexy—rupture of aneurisms or cysts—affections of the heart—hæmorrhage—idiopathic asphyxia. Christison's remarks on latent diseases—directions for discriminating.

III. Of death from violent causes. Explanation of the term *asphyxia*—anatomical changes that accompany it. Whether death arises from suicide. A. Of persons dead from cold. Its effects—appearances on dissection. Death from drinking cold water, and its probable cause. B. Of persons dead from hunger. Appearances on dissection in man and animals. C. Of persons dead from lightning. Appearances. D. Of persons found burnt to death. Effects of burns on the dead and living body. Præternatural combustibility of the human body—cases—theories to explain it. E. Of persons dead from wounds. Meaning of the word *wound* in legal medicine. Whether the wounds are the result of suicide, accidents, or homicide. Wounds from fire-arms—cases. Examination of the skeleton—cases in which murder was detected. Chemical investigations to ascertain the peculiarities in the blood of man and other animals. F. Of persons dead from noxious inhalations. 1. Carbonic acid gas—modes in which it may be generated—symptoms and effects—appearances on dissection. 2. Sulphuretted hydrogen—effects—appearances on dissection. G. Of persons found hung. Modes in which death occurs. Signs of strangulation by hanging—notice of the value of each—appearances on dissection. Whether the person found hung has been suspended before or after death—cases. Whether the hanging is the result of suicide, accident, or homicide—cases. H. Of persons found strangled. Whether this has been actually the cause of death—cases—appearances on dissection. Of manual strangulation. Whether the strangulation is the effect of suicide, accident, or homicide—cases. Strangulation detected long after death. J. Of persons found smothered. Infants by accident—adults by accident, homicide, or suicide—cases. K. Of persons found drowned. Modes in which death is produced. Signs that distinguish death previous to submersion from death after it—examination of the relative importance of each sign. Effects of immersion on the dead body—its floating—formation of adipocire—progress of putrefaction at various periods—cases. Whether the drowning was the effect of suicide, accident, or homicide—cases.

DEATH, even when it is the consequence of disease, is often an unexpected event. But if an individual expire under his own roof,

surrounded by friends and relatives, we are disposed to consider it as an ordinary dispensation of Providence, and one to which all of us are sooner or later doomed. The features of the case differ materially, when a person is found dead on the highway, on the banks of a river, or in a lonely place. Indeed, if he be discovered to have paid the last debt of mortality, either in a sudden manner, or at a distance from his home, the laws of civilised society demand an investigation of the cause, and over this investigation the officer called a coroner is appointed to preside.

It will readily be observed from the above remarks, that the office in question is an important one. The duty of the coroner extends to an examination of the circumstances connected with every case of sudden or suspicious death, and he is to make this with the aid of a jury, summoned by him for the purpose. Future proceedings are regulated by the verdict that they may pronounce.

That the duties of this office are imperfectly understood, and often most negligently performed, hardly admits of a doubt. The individuals appointed are frequently unfit for the situation, both from habits and education, while the jury are, too commonly, desirous of hurrying through the investigation. It has been proposed to remedy the first difficulty, by selecting coroners from among medical men, and there is no doubt that the administration of criminal justice might be promoted thereby.* Every inquest involves a medical question, and even although the case may at the first glance appear so clear, and the facts so certain, as hardly to need a professional examination, yet before the trial is ended, there will often be extreme regret, that a medico-legal dissection had not been pursued.

The medical witness has, however, several obstacles and discouragements to encounter in the performance of his duty. The power of the coroner and his jury to stop him in the progress of his examination seems unquestioned, at least it is constantly exercised, in spite of his remonstrances. "On a late occasion, one of these grave bodies declared that they would apply to the governors of a London hospital to put a stop to *unnecessary* dissections, and in many cases they have told an inspecting surgeon to stop in the midst of his work, *because they themselves were satisfied.*"†

Again, no compensation is allowed to the surgeon for the dissection, nor to the chemist for his analysis, while he incurs at the same time the high responsibility of deciding on the guilt or innocence of the accused. Certainly, no plan could be suggested more effectually to deter all and every medical man from engaging in these thankless investigations.‡ In my remarks on medical evidence, I shall offer some

* In England considerable efforts have been made of late to procure the election of medical coroners.

† Edinburgh Medical and Surgical Journal, vol. xxii. p. 190.

‡ "On a trial of an indictment for manslaughter, the surgeon will only be allowed for his attendance on the trial, and not for his fee for opening the body by order of the coroner." 5 Carrington and Payne, p. 301. Rex *v.* Taylor. Our Revised Statutes of New York (vol. ii. p. 742) declare, that "it shall be the duty of the coroner to cause some surgeon or physician to be subpœnaed to appear as a witness upon the taking of an inquest," but does not notice the compensation.

In France, the judicial officers, or those of the police, are expressly ordered to

suggestions for improving this very imperfect portion of our criminal code. At present, conceding that the physician or surgeon is obliged to attend, when summoned, at these inquests, I will offer for his consideration some preliminary cautions.

The first is, not to permit sudden prejudice to warp his mind. There is nothing more common among the populace, who crowd around the bodies of persons found dead, than to suspect that they have been murdered, and the idea, instead of being judiciously combated, if untrue, is permitted to gain strength by repetition. Against charges of this nature, the physician should always be prepared, and never allow them to have any influence over him. He should proceed to the examination of the body with a mind free from prejudice. He should also recollect, that sudden death is not an uncommon event, and that those who, at one moment, we see before us in the full enjoyment of life, may, at the next, be cold and inanimate. The secret, operating causes of this change may remain unknown to us, and we can perceive only its effects. In addition to this, there are many circumstances which may be the origin of the sudden decease, and to which the person affected has been for a time exposed, without any knowledge of their consequences. Of this nature, are the breathing of noxious gases, the use of improper aliments, or of unhealthy water. The passions, also, if highly excited, or a purely accidental cause, may respectively have induced the sudden death. And lastly, the destruction of life may have been caused by the person himself. All these *possible* circumstances should be recollected before a case of this kind is referred to a criminal court, on the decision of a physician. The importance of medico-legal dissection is thus inculcated, not only by every sentiment of professional pride, but even by the dictates of common humanity. It is but a sorry excuse, after a suspected individual has lain for months in a gaol, on the strength of his opinion, then to come into court and say, that he drew wrong inferences from external appearances, or, on the other hand, to meet a brother practitioner, who invalidates his opinion, and demonstrates the crudeness and insufficiency of his investigations.

In further noticing this subject, I shall consider it under the following general divisions.

I. Of medico-legal dissection.

II. Of sudden death from natural causes.

III. Of death from violent causes.

The subject of wounds generally, and of poisons, would, probably, in perfect strictness, belong to the present title; but, as they are very extensive and important in their nature, I prefer considering them in distinct chapters, and this separation will also allow us to notice their effects on the living body.*

subpœna medical men, to make the necessary examinations, in all cases of violent death, or where the cause of sudden decease is unknown. If circumstances render a disinterment necessary, the police officers must be assisted in that duty by a physician or surgeon. — Code d'Instruction Criminelle, articles 44, 81.

* I am obliged, from want of space, to omit a notice of the signs of real and apparent death. Should I ever publish my proposed work on Medical Police, it will receive an equally appropriate place.

I. *Of medico-legal dissection.*

Under this head, I propose to give general rules only for the examination of dead bodies, applicable to all the cases that may be supposed to occur. Every species of violent death requires an investigation peculiar, in some degree, to itself, and the minutiæ of this will be more profitably noticed in succeeding sections and chapters.* I am also to suppose the reader acquainted with ordinary anatomical dissection, and hence may be allowed to omit many things contained in elementary treatises on the science.

Before proceeding to the dissection, and particularly if called before the body is removed from the place where it was found, it is proper to notice its situation and attitude, the state of the clothes, and the condition of the ground, whether it bears the marks of footsteps, and their direction. We should remark, also, whether there are any indications of struggling, or any weapons left in the vicinity.† In our first general survey of the body, the following rules may be observed. 1. If death be apparently caused by a wound, the body should be first viewed, if possible, exactly in the position in which it was found. By moving it, the attitude of the extremities may be altered, or the state of a fracture or a luxation changed, since the internal parts vary in their position with one another, according to the general position of the body. If it is absolutely necessary to remove it, it should be done with great caution. 2. The clothes should be removed, as far as is necessary, and it should be noted what compresses or bandages (if any) are applied to particular parts. 3. After these preliminaries, we must examine the colour of the skin, the temperature of the body, the rigidity or flexibility of the extremities, the state of the eyes, and of the sphincter muscles, noting at the same time whatever swelling, ecchymosis, wound, ulcer, contusion, fracture, or luxation, may be present; also any fluid flowing from the nose, mouth, ears, sexual organs, &c., and indeed every thing

* The following are the principal authorities on this subject:—Marc's Translation of Rose's Manual. Mauchartius' Dissertation in Schlegel, vol. i.; and which, indeed, anticipates the former in many respects. Chaussier on Medico-Legal Dissection, and on Ecchymosis, &c. These two dissertations, which occupy the greater part of his "Recueil de Mémoires," were given, as he states, the one to Dr. Renard, and the other to Dr. Rieux, for their respective inaugural dissertations; and, by referring to the catalogue, it will be seen that they have been published by those gentlemen. Foderé, vol. iii. chap. 1. Mahon, vol. ii. p. 217. Dease's Remarks on Medical Jurisprudence. Paris's Medical Jurisprudence, vol. iii. Dr. John Gordon, in art. *Anatomy*, Supplement of Encyclopædia Britannica, vol. i.

† A few illustrations will serve to shew the importance of attending to these circumstances. Mr. Jeffries was murdered at Walthamstow, in England, in 1751, by his niece and a servant. Here the perpetrators were suspected to be domestics, from the single circumstance of the dew on the grass surrounding the house not having been disturbed on the morning of the murder, which must have happened, had the murderer left the premises. Mr. Taylor of Hornsey, was murdered in December 1818, and his body thrown into the river. No investigation was needed to ascertain whether he had gone alive into the water, as the *hands were found clenched and contained grass, which, in his struggle, he had torn from the bank.* Again, the marks of footsteps, measured and found to correspond with the shoes of the suspected persons, have, in more than one instance, led to the detection of the guilty.—Paris, vol. iii. pp. 38, 41.

varying from the natural state. The above cavities should be inspected, and particular attention must be paid to the state of the skin, so as not to mistake that bluish-brown tinge which indicates the commencement of putrefaction, for ecchymosis. The distinction between these we shall presently explain.

From the period when the dissector commences until he concludes, there should be a clerk at hand to take down all the facts he may from time to time communicate, and this should not be delayed until the examination is completed, as many circumstances of importance may then have escaped his memory.

If there be an external lesion present, it should first be examined, and its nature described—its length, breadth, and depth—also whether it has been inflicted with a cutting, pointed, or round instrument—whether it is accompanied with inflammation or gangrene, and whether any foreign bodies are found in it, such as balls, or pieces of cloth. The scalpel should then be employed to trace its extent, but with judgment, so as not to render our researches useless, and to prevent a comparison of the external wound with the internal injury. The nerves and blood-vessels, and particularly the arteries that are wounded, should be named, as should also the viscera, if any are in that state. *If there be a contusion without a solution of continuity*, the injury found in the internal parts should be particularly noticed, such as extravasation, rupture of vessels, &c. *If the cause of death is a burn*, its degree and extent should be examined, together with the state of the parts affected, whether inflamed merely, or covered with blisters, the fluid contained in these blisters, and the condition of the neighbouring parts, whether sphacelated or gangrenous. *If a luxation or fracture be present*, notice the surrounding soft parts—the nature of the injury, whether simple or complicated, and the phenomena indicating the progress of disease or of recovery.

Having stated all these circumstances, it is next necessary to proceed to the dissection in a systematic manner, and the common rule is, to commence with the examination of the abdomen. Chaussier, however, dissuades from this, and advises that it be the last, as putrefaction is there first developed, and the offensive odour may be in a great measure avoided, by previously noticing the other parts. In all our examinations, care must be taken, not "*to make wounds while we are examining for them*;" and we must not desist because we suppose that the cause of death is perfectly discovered in one or the other cavity: all of them should be inspected.

On viewing, the head, the integuments, and all injuries done to them, are first to be noticed. In particular, if a wound appear to be inflicted by a sharp-pointed instrument, its depth, direction, and connexion with the brain, should be minutely traced. The presence of inflammation, œdema, or sphacelus, must also be remarked. These observations apply also to injuries from cutting instruments. And in all of these examinations, the hair should be previously removed, either by cutting or with a razor. We next proceed to lay the bones of the cranium bare. This is done by an incision from one ear to the other over the top of the head, and then another transverse to it, from the top of the nose to

the occiput. On dissecting these flaps, we shall be able to discover whether any injury has been done to the hard parts. Search is to be made if there be any fractures or fissures, taking care at the same time not to mistake irregular sutures for them; and for this purpose, they should be rubbed over with ink. The strength of these bones is also deserving of minute inspection, as they are not unfrequently so thin or soft as to render a blow, that under ordinary circumstances would only produce slight injury, very destructive. The fracture should always be followed throughout its whole extent.

The skull-cap may now be removed; and this requires to be done with extreme caution, lest we wound the dura mater. Dr. Gordon advises that this should be done by sawing through the outer table, and then breaking through the inner with a chisel and mallet. On the other hand, Renard directs that four holes be made with the trephine at proper distances, and through these openings, the cranium separated from the meninges with the handle of a delicate scalpel. The saw is then to be used in the direction of the trepannings, and the skull-cap is readily raised and removed.

This, however, will not suffice in all cases, since many fractures occur in the occipital portions, and at the base of the brain. Here similar careful incisions are necessary with the proper application of the saw, to discover the extent of the injury.

The membranes and the substances of the brain must now be carefully inspected. Let it be noticed whether any pus or blood is interposed between the dura mater and the bones, or whether it is detached or inflamed. So also of the other membranes, and the brain itself. All morbid appearances in structure deserve attention; and the state of the blood-vessels, the quantity of fluids present, and their situation, are highly deserving of attention. It should, however, be remembered, that an extravasation or an injury is not unfrequently found on the side opposite to which the blow was given: and, again, that death sometimes follows from blows on the head, when no internal lesion can be found on dissection. It has been abundantly proved, that the connexion between the brain and the viscera of the thorax and abdomen, is the cause of this, and the injury must in such instances be looked for in the latter.

There are several sources of fallacy in the examination of the brain, which will be presently noticed.

We should not neglect an examination of the base of the brain, since by this, fractures, otherwise scarcely discoverable, have been found. I allude particularly to cases where injury has been inflicted through the orbits of the eyes.*

The vertebral column must be viewed through its whole extent, as to its being fractured, or dislocated, or contused. In any doubtful case, it requires strict attention, since injuries of it are often of a very complicated nature. Foderé quotes a case from Jaeger, of a person who was struck on the neck, by a loaded wagon, with such violence, that both his upper and lower extremities became paralytic. He died in eighteen hours after the accident. No external appearances of injury

* Paris, vol. iii. p. 51.

could be observed, although an examination readily indicated that the seat of the disease was somewhere near the sixth cervical vertebra, and accordingly, on dissection, its spinous apophysis was found broken at its base, and separated from its body, while blood was extravasated to the amount of four ounces. In such and similar cases, it may be expedient to remove the whole of the cervical column, and which may be done by sawing off the transverse processes, and raising it from its position. All indications of inflammation, or of a want of mobility, should be duly considered.

In examining the neck, Chaussier and Gordon advise us, first, to make an incision from the chin to the sternum, then from the upper point, to cut along the margin of the lower jaw to its angle, and from the lower point towards the clavicle. By continuing the dissection, every part may thus be examined in succession. If necessary, the jaw may be removed by a saw.

We should inquire carefully, whether the neck bears any marks of external injury, or traces of ecchymosis, or pressure on it. Examine the great blood-vessels, whether they are filled with blood or empty, and the nerves, whether they are in their natural state. The larynx, trachea, pharynx, and œsophagus, and their contents, must be noticed in succession, removing or reverting the former when we have completed our investigation. If wounded, detail the extent, depth, and shape of the injury, and particularly if the lesion is caused by fire-arms; its course, also, and the loss of the substance, together with the inflammation or suppuration (if any) existing, should be stated.

On proceeding to the thorax, it should first be ascertained whether the injuries it has received are superficial, affecting the integuments and muscles merely, or whether they extend to its cavity. This cannot be determined satisfactorily, without an inspection; and for this purpose "an incision is made through the integuments, from the top of the sternum to the pit of the stomach. The flaps are then to be dissected down to the ribs, and backwards about an inch and a half beyond the junction of the cartilages with the osseous substance of the ribs. Cut through these cartilages close to their joining, beginning with the second rib, and ending with the seventh. Pull forward the lower part of the sternum a little; introduce a scalpel behind it, and detach the diaphragm and mediastinum; then saw through it immediately below the connexion of the first rib. The cavity of the chest will thus be sufficiently exposed."

The viscera require very careful examination. The lungs and their internal as well as external condition, the pericardium and its contents, the heart and its great vessels, the thoracic duct, all should be inspected. Remove the blood with a sponge, so as to ascertain the exact degree of colour that is present in the various parts, and, in particular, attention must be paid to the degree of consistence, or fluidity of the blood. The importance of these directions will be presently explained.

Lastly, as to the abdominal cavity: its external covering forms a subject of inquiry. Every spot, swelling, or extravasation should be noticed; as, also, whether hernia be present, and whether there is any tumefaction of the part. The mode of opening into the cavity needs

hardly to be detailed. A crucial incision may be made, and if this be not sufficient, the pubal bones on each side may be removed with the saw. The condition of the peritoneum then requires attention, and the presence or absence of fluid in the cavity. The organs peculiar to either sex should be examined, and also the various viscera contained here—the stomach, mesentery, liver, spleen, gall-bladder, intestines, bladder, &c. &c. We should view each part as to the quantity of blood which naturally belongs to it; trace all extravasations, as to their quantity and nature; and particularly inquire whether the changes observed are the result of disease, or of sudden injury. Professor Mahon recommends the use of a blunt-pointed bistoury in examining the intestines, as this may prevent injury during the dissection.

Although I shall have occasion hereafter to notice the subject in detail, I must not omit to remark, that if there be any suspicion of poisoning, the whole of the alimentary canal, from the œsophagus to the rectum, should be carefully removed for further inspection. Dr. Gordon's directions may be followed for this purpose. He advises that a double ligature be applied at the very commencement of the jejunum, and the intestine divided between the two threads; a similar ligature is then to be applied to the ileum, close to its termination in the colon, and the tube divided in the same manner. The root of the mesentery being now cut through, the whole jejunum and ileum are removed together. A double ligature is next to be applied to the rectum as low down as possible: and being divided between the cords, it is to be removed with the whole of the colon. The œsophagus, stomach, and duodenum, are then to be extracted together, taking care previously to tie a ligature round the top of the œsophagus.

The mode of conducting the analysis of the contents of these parts, will find a place under the head of Poisons.*

The above remarks do not apply exclusively to the stomach. If any viscus appears to require a more strict investigation than can be given to it *in situ*, it should be removed from the body after the general dissection; and I may add, that it is often of extreme importance to preserve those parts, on the appearance of which our evidence is founded. Thus in cases of supposed poisoning, the stomach and duodenum may be preserved in alcohol, to meet any conflicting testimony, or to elucidate doubts; and Dr. Paris has well illustrated the value of this advice in its full extent, by referring to the preservation of the uterus in the case of Miss Burns.

Having completed the dissection, the notes should be taken and reduced to order; and in preparing the report, or in giving testimony, it should be as plain and simple as possible, avoiding all those terms which are unintelligible to a court and jury.

It is evident, even from the brief notice that I have now given, how necessary an accurate knowledge of anatomy is in these doubtful cases, and how important it is not to mistake natural appearances for extra-

* How necessary it is to be very cleanly in these operations, is illustrated by the observation of Renard (p. 116), who states, that in one instance, the stomach was negligently laid on some fine white sand. At the subsequent examination, particles of this were found, and gave rise to an idea of poison by means of powdered glass.

ordinary occurrences, or the effects of disease or death for those of violence. The ignorant are ever ready to make mistakes on these points, and we should be prepared to encounter them. A notice of the more prominent will, therefore, form a proper commentary on what has been said, in order to establish such distinctions as may be applicable in these investigations.

Hæmorrhage is supposed by many to indicate the existence of the circulation when it commenced; and, accordingly, they deem its occurrence as *prima facie* evidence that life was present when the supposed violence was offered. Such an opinion, however, if adopted universally, must lead to dangerous errors. It is frequently observed by anatomists, on opening the bodies of those dead from apoplexy, or various forms of protracted or malignant fevers, that blood flows from the mouth, nose, or ears. In these instances, however, it is of a dark colour, and evidently more fluid than in the natural state. Again, blood often flows also from incisions on the dead body, on altering its position; and this has unquestionably, in many instances, given rise to the idea of its occurrence when the murderer approached. In our remarks on Persons Dead from Wounds, some cases of this kind will be noticed.

Hæmorrhage, then, if observed on the dead body, is of itself no proof that a lesion has been inflicted on the living one; and in order to warrant an opinion of this kind, the large vessels should be found empty, and the blood of a florid red colour.

But hæmorrhage may be wanting, and on dissection the blood is found fluid in the heart and its large vessels, the spinal canal, the lungs, or the brain. *Is this to be deemed a proof of violent death?* I apprehend not. All that can be said is, that fluidity is most common in such cases, as from narcotic poisons, lightning, and the like; but it is also observed in sudden death from ordinary causes, and particularly in apoplexy, and even is occasionally not wanting in the usual forms of disease that come under the examination of the anatomist.* The reason of this diversity we cannot explain, but the fact is undoubted. "Although vital effusions," says Professor Christison, "are usually coagulated, they are not so always." On the other hand, "where blood flows from a body after death, or where a wound has been made after death, the blood is never found in a state of coagulation."†

* This question was agitated not long since in London, in consequence of the late Mr. Brookes stating, under oath, that he had never seen the blood fluid after death from a natural disease. The case which gave rise to this testimony, and the subsequent discussion concerning it in the London and Westminster Medical Societies, was that of an individual who, after extreme intoxication, was found dead, and on dissection, a large quantity of fluid blood was observed in the brain and heart. It became a question whether strangulation or apoplexy had been the cause of death. The proofs in favour of the first were extremely slight, and only acquired importance in consequence of the above testimony. For an interesting discussion on this subject, between many of the most eminent men in London, see Lancet, N. S. vol. iv. pp. 48, 84, 119. On the fluidity of the blood after death, see Elliotson's Blumenbach, p. 13; Bostock's Physiology, vol. i. p. 354. And for cases of its occurrence after ordinary diseases, see Medico-Chirurgical Review, vol. xv. p. 186.

† Paris, vol. iii. p. 31. "It may not always be easy to distinguish internal hæmorrhage, according as it occurs before or after death." The most discriminating

What I have now stated concerning blood and its effusion, will better enable us to discriminate between divers appearances that are frequently noticed on the dead body, and which are liable to be confounded. They have various names attached to them, according as they are supposed to originate from different causes; and with an explanation of these, I shall introduce this intricate but important point.

The term *contusion* is derived from the Latin word *contundere*, to bruise or pound; and hence conveys a similar meaning. *Ecchymosis* is a Greek term, and is equivalent to effusion or spreading of blood into the cellular tissue. It is present whenever the contusion is sufficiently violent to induce the rupture of a blood-vessel; and the natural result is to communicate a colour more or less livid to the skin. When the quantity of blood is sufficiently large to produce a tumour or swelling of any magnitude, it is called a *thrombus*.

These various states are deemed to indicate the existence of life when they occurred. Ecchymosis is a sub-cutaneous hæmorrhage, generally arising from external causes, although it may also from strictly internal ones, as coughing, vomiting, efforts at stool, &c.; and its course is gradually to diminish in intensity of colour at its circumference, retaining the livid appearance longest at the centre. The shades produced by the gradual absorption of the blood are familiar to all medical men, and they serve to shew the distinction between livid spots occasionally noticed during life, and which are uniform in colour throughout their whole extent.

If this then be recognised as the effects of injury, whether intentional or accidental, *during life*, it remains to designate the post mortem appearances that may be mistaken for it. For them the term *sugillation* has been proposed by Belloc and others, and, although objected to by Chaussier, may serve in the place of a better. It is applied to those livid spots, of various sizes, which are noticed on the bodies of the dead, generally after they become stiff and cold. They are seen on depending parts, as the back and loins; but occur also on the neck, head, and genitals. They are of a uniform colour, and according to Chaussier and Renard, consist in a *congestion of blood in the capillary tissue alone, and not extending to the subcutaneous.* This can be proved by cutting into them; and Dr. Paris proposes, as these discolorations are often mistaken for signs of violence, to prevent the possibility of dispute, "that a layer of the skin where such lividness is present be removed, to shew that it is confined to this organ, and is not attended with infiltration of blood into the cellular membrane."*

This livid appearance, now described under the name of *sugillation*, is to be ascribed to the effects of gravitation. The blood obeys physical

circumstances, according to Christison, whom I now quote, are the marks of compression on any organ within the cavity; the extent of the hæmorrhage; the coagulation of the blood; and particularly the rupture of an artery, with its correspondent effects. All these indicate that it has happened during life.—Edinburgh Medical and Surgical Journal, vol. xxxi. p. 250.

* Chaussier, pp. 385–430. Belloc, p. 315. Rieux, p. 251. Renard, p. 86. Paris, vol. iii. p. 104. I have thought myself justified in somewhat varying the definition of sugillation, as given by Belloc.

laws in the dead body, and hence it is found in the most depending situations, as the back of the body, and the posterior portion of the lungs. So well is this established, that if the body be reversed and placed with its face downward, the lividity will change places, and occupy the front part of the body. Dr. Beatty, indeed, states that he had seen the lividity already formed on the back, to disappear when the body was turned before it became cold.*

It is an illustration of the acuteness of Zacchias, that he should propose, in the infancy of the science, the following as a discriminating mark between ecchymosis and sugillation: When the discoloration is the effect of external violence, a congestion of thick *concrete* blood will be found; but in the spontaneous spot, the blood, on incision, will be seen *fluid*.

We are not, however, to imagine that the blood in every case is confined to the capillary tissue. With the progress of putrefaction, the fluid blood collects in the more lax and distensible parts of the subcutaneous tissue, as the loins, scrotum, &c. This pseudo-ecchymosis is, however, uniform in its colour, and explains its doubtful points by its situation and the progress of decomposition.†

Probably the most puzzling cases will be those in which severe epidemics, as petechial fevers or small-pox, have been the cause of death, while suspicions of violence are at the same time excited. The system here is, during the last stage of life, verging to putrefaction, and extravasated blood of considerable consistence is not unfrequently found.‡

Belloc relates an instructive case which came within his own observation, During the prevalence of an epidemic small-pox, a husband maltreated his wife, who was five months advanced in pregnancy. He gave her several kicks on the thighs and abdomen. A week afterwards, she was seized with the small-pox, and died in a fortnight after the injury, covered with dark-coloured spots, and also with marks of the disease. In this condition she was buried, but her relatives, hearing of the ill treatment she had received, complained of the husband, and the body was accordingly disinterred and examined by physicians. They decided, both from the symptoms present during her illness, such as violent hæmorrhage from the nose, and from the appearances observed on the bodies dead from this epidemic, that the cause of death was the small-pox, and that the sugillations were the consequences of its malignity.§

* Cyclopædia of Practical Medicine, vol. iii. p. 321, Art. *Persons found dead.*

† Orfila's Leçons, 2d edit. vol. ii. p. 238.

‡ Mahon, vol. ii. p. 210, who quotes, in illustration, some dissections of Stoll.

§ Belloc, p. 317. See also Bose *de sugillatione in foro cauté dijudicanda* in Schlegel, vol. iv. p. 67. The following case may be read with profit by all medical men. John Stringer was tried at the Lent assizes, held at Kingston in the county of Surrey, in the year 1765, before the late Chief Baron Smythe, for the murder of his wife, and found guilty. It appeared that they had frequently quarrelled, and *a young surgeon gave it as his opinion, that some appearances in the corpse were somewhat the appearances of a mortification occasioned by bruises.* Mr. Carsan, an eminent surgeon in the neighbourhood, had, on the report of the murder, from mere curiosity, examined the body, and it was so clear that there were no marks of violence thereon, that he had not the least apprehension of the possibility of Stringer's being convicted;

Rieux, in the conclusions of his remarks on this subject, proposes the question, whether contusions, and their consequence, ecchymosis, can be produced on the dead body? The inquiry is important, not only from the possibility that injury may be inflicted on a corpse for the purpose of implicating an innocent person, but particularly from the rough treatment that bodies brought to the dissecting room often receive. We should, at least, understand whether these have been subjected to violence during life.

Our author does little towards solving the case. If the blows (he observes) have been given shortly after death, when the body is still warm, the blood fluid, and the muscles retain their contractility, some difficulty may be experienced in discriminating; but even here, he adds, there will be no tumefaction, no infiltration, and the blood issuing from the lacerated orifices will remain fluid.*

Dr. Christison, however, in some investigations consequent on the murders by Burke and his accomplices at Edinburgh, has materially added to our knowledge. The spine of the murdered female Margery Campbell was ruptured in several of its ligaments, and a mass of thick, black, semi-fluid blood was collected on the sheath. There was, in several parts of the body, effusion of semi-fluid blood, but not indicated by any external mark. Having good reason to believe that some of the injuries, and particularly that to the spine, had been inflicted after death, he was lead to ascertain, by experiment, the effect of blows on the dead body, within a few hours after life had departed.

The conclusions deduced from these are the following:—"For some hours after death, blows will cause appearances which, in point of colour, do not differ from the effects of blows inflicted recently before death. The discoloration, like lividity or sugillation, generally arises from an effusion of the thinnest possible layer of the fluid part of the blood on the outer surface of the true skin, but sometimes also from an effusion of thin blood into a perceptible stratum of the true skin itself. Dark fluid blood may even be effused into the subcutaneous cellular tisssue in the seat of the discolorations, so as to blacken or redden the membranous partitions of the adipose cells, but this last effusion is never extensive."

Thus *severe blows inflicted after death, will exactly imitate slight contusions inflicted during life.* It is evident that the blows producing the last must be trivial.

When the blow during life is more severe, it leaves several effects not to be found on the dead subject; such as swelling from the extent of the extravasation—a yellow margin round the black mark—effusion of blood into the cellular tissue, and an incorporation of blood with the whole true skin, rendering it black, and increasing its firmness and resistance. It is possible that clots of blood might occur from lacerating a considerable vessel in the neighbourhood of loose cellular tissue; but this he had never noticed on the dead body.

but hearing of it, he stated the case to the Archbishop of Canterbury, obtained a respite from Baron Smythe, and finally was the means of obtaining a complete pardon from the king.—Phillip's Laws of Evidence, Appendix, p. 105.

* Rieux, p. 272. Chaussier, p. 470.

Even the inconsiderable appearances of injury first noticed, could only be produced within about three hours after death. As soon as the body became cold, and the muscles acquired rigidity, contusions could hardly be imitated.

Internal hæmorrhage, from the laceration of a considerable blood-vessel, and more especially of a vein, may be produced by violence on the dead body. And the fluid part will have a tendency to collect in the lowest part.

Another fact, noticed by observers and corroborated by Dr. Christison, is that the blood will remain fluid in some parts, as in the vessels within the head and spine, while it coagulates in others.*

Sanguineous congestions are often found in persons who have been subject to disease. They may also be the effect of violence. And in addition to this, they may be formed after death. The texture of the organs themselves become affected by transudation of blood, and this is particularly seen in the brain, heart, lungs, stomach, and veins. To distinguish these appearances they have been styled *pseudo-morbid.* I must preclude myself from going into detail concerning them. The most important changes thus induced in reference to legal medicine, are those of the stomach and intestines, and these I shall hereafter have occasion to notice.

It would appear that they can be artificially imitated. Thus Chaussier, by injecting ink into the veins, found it to tinge the neighbouring organs within a short time.† So also with blood introduced after death. It is important not to mistake these alterations for the supervention of gangrene.‡

In hot climates, and in the warm season in our own country, the

* Edinburgh Medical and Surgical Journal, vol. xxxi. p. 244. The following authors on ecchymosis &c., are worthy of consultation. Chaussier, Renard, and Rullier, in the Dictionnaire des Sciences Médicales. "Christison," says Professor Channing in a letter to the author, "in his admirable paper on the effects of blows after death, says that he has known the blood coagulate firmly *eight hours* after death. I have seen the blood coagulate firmly as it flowed in a post mortem examination, in one case, twelve hours after death, and in another, upwards of thirty hours after."

† Page 230.

‡ The following are important authorities on this subject: Chaussier, pp. 244, 269. Dr. Yelloly on the vascular appearance of the stomach, which is frequently mistaken for inflammation of that organ, in Medico-Chirurgical Transactions, vol. iv. Rigot and Trousseau on the changes that take place after death in the appearance of the blood-vessels, lungs, &c. in Edinburgh Medical and Surgical Journal, vol. xxviii. p. 149. Andral's Pathological Anatomy, vol. i. p. 43. He divides hyperæmia (or preternatural accumulation of blood in the capillary vessels) produced after death, into three species, from dependent position, from transudation of the blood or some of its component parts, and from chemical affinities. Cyclopædia of Practical Medicine, vol. iii. art. *Pseudo-morbid appearances*, by Dr. Todd. Cruveilheir lays it down that all uniform redness without vascular injection or dotting is cadaverical. Professor Channing, of Harvard University, has been kind enough to mention to me the following case: "A man died at the hospital so calmly that those about him hardly knew of the event. I saw around his right wrist a broad discoloured circle, deeply livid as if it had been violently beaten. I called the attention of the students to this case, and begged them to observe, that here, quite *round* the wrist, was a mark that might most easily and, as we say, naturally have been taken for violence during life."

progress of this change is proportionably rapid. Thus, Dr. John Davy, at Ceylon, found that if the interval between death and the examination was twenty or thirty hours, the serous and mucous membranes appeared red and inflamed, and particularly those parts which are most exposed to the action of the blood, as the valves and the lining membrane of the heart and blood-vessels. The viscera also were dark and livid. He attributes this to the exudation of bloody serum, tinging the parts.*

The presence or the quantity of serum must be considered with reference to the remarks already made. Magendie has shewn that a certain portion is natural to the brain, and we shall hardly be safe in drawing unfavourable inferences from its accumulation. The same remark applies to what are deemed appearances of inflammation in the head and lungs. The membranes are to be examined more in reference to any change of structure that they may have undergone, than as to redness or congestion. So also with the heart.†

Wounds, accompanied with a solution of continuity, if received before death, are marked by red, bloody, and separated edges. Blood is also more or less collected in the cellular tissue. While those inflicted afterwards are livid, and their edges close to each other. It would, however, seem, from the experiments of Orfila, that a wound inflicted with a cutting instrument *immediately after death*, is with difficulty discriminated.‡

"The question whether there has been a *fracture* of the cranium previous to death, is sometimes more difficult to decide than a person who is not accustomed to make dissections would imagine. If the fracture has occurred immediately before the patient's death, there will be coagulated blood found upon the bones and in the fissures; if the patient has survived for some time, there will be marks of inflammation and, perhaps, pus in contact with the skull; but if a fracture has been produced in making the examination (which sometimes happens in even a very careful dissector's hands), the blood in the fracture will not be coagulated, nor will there be any effusion around the portions."§

Mr. Alcock, some years since, stated in a public lecture at London, that he had known a fracture of the base of the skull produced by the awkward and violent tearing of the upper portion, the saw not penetrating deep enough to divide the bones; and this was mistaken, by the inexperienced operator, for fracture of the skull producing death.

* Medico-Chirurgical Transactions, vol. x. p. 89. The lungs, as I have already intimated, are often gorged, and in most instances, this occurrence can be explained on the principles now laid down. If, however, the lower part be peculiarly congested, while the body has lain in its usual position, on the back, does it not indicate that the body has been for some time in an erect posture, and may it not have arisen from violence, as suspension by the neck?—Chaussier, p. 83. Renard, p. 109.

† Some useful remarks on the examination of the head may be found in Shaw's Manual of Anatomy, vol. i. See also Andral on the serous fluid, vol. i. p. 235. The following extract from Lizars deserves to be remembered. "The cavity which first ceases to contract at death is the left ventricle; secondly, the left auricle; thirdly, the right ventricle; and, lastly, the right auricle, which continues the longest to vibrate. Hence, when the heart is laid open, very little blood is found on the left side, while it is accumulated on the right." Anatomical Descriptions, p. 144.

‡ Orfila's Leçons, 2d edit. vol. ii. p. 540. § Shaw's Manual, vol. i. p. 45.

Being a medico-legal case, it might have led to melancholy consequences, had not the error been detected by an observer.

The following remarks are copied from Dr. Godman; "We frequently find the bones of subjects brought for dissection, singularly fractured; sometimes the skull is broken and depressed, or the pelvic junctions separated, with other injuries of a similar character. These, if found on a body submitted for medico-legal investigation, would be readily enough attributed to violence done previous to death. Perhaps the best mode of deciding in these cases, will be to examine the muscles, which are usually broken in the dead subject at the same time with the bone, and exhibit no effusions of blood, whereas it would be found in quantity, if the injury preceded death."*

I may now conclude this portion of my subject with the following narrative as illustrative of the difficulties that attend it, and the caution that is required.

The widow Montbailly of St. Omers, aged sixty, and of a very gross habit, was much addicted to intoxication, and in fact was inebriated daily. On the 27th of July, 1770, at 7 A.M. she was found dead in her chamber, lying on a trunk which had sharp edges. A physician and surgeon visited the body on the next day (thirty-two hours after her death had been discovered), and reported that they found ecchymosis and contusions on the arms, thorax, and particularly over the third, fourth, and fifth ribs. The neck and upper part of the breast were also ecchymosed. The head was swelled — blood was extravasated under the skin of the face, and the nose was filled with clotted blood. On the eyelid there was a wound of nine or ten lines in extent, which penetrated to the orbit, and which might have been caused by a sharp or cutting instrument, but could not, in their opinion, have produced sudden death. On opening the body, all the internal parts were found in a natural state.

The reporters gave it as their opinion, that the ecchymosis, the swelling of the head, and the extravasated blood, were occasioned either by a fall, or by blows from an opposing body, and that the female had died either from the hæmorrhage occasioned by the wound, or from suffocation.

A physician, who from curiosity had attended the examination, but who was not of the commission, stated that the eye was ecchymosed, and that the edges of the wound were irregular and indented.

On combining the result of this inspection with the fact that the defunct had formerly repeated quarrels with her son and daughter-in-law, it became the prevailing opinion that they had murdered her. The superior court of Arras, before whom the cause was tried, condemned Montbailly and his wife to be broken on the wheel, and it was actually executed upon him. The wife claimed a delay on account of her pregnancy, which was granted. During this interval, a revision of the trial was procured, and the celebrated Louis was consulted as to the point whether the facts stated proved that the woman had been assassinated. The result of his investigation was, that there was no certain proof of

* Physiological Investigations.

the commission of murder, and that all the circumstances enumerated were stronger proofs of the individual having died from apoplexy than from any other cause. The following are some of his reasonings and remarks :—

Intemperance predisposes to sanguineous apoplexy ; and the reporters have neglected their duty in not opening the head of the deceased, since, by doing so, the condition of the internal parts would have explained the cause of the hæmorrhage. Again, a person in a state of intoxication, and predisposed to this complaint, would, on falling against any sharp-edged substance, naturally lose a considerable quantity of blood, and also have the arteries and veins of the head much distended. He totally discards the idea that the hæmorrhage from the wound of the eye was a cause of death.

As to the ecchymosis, or livid spots, found on the thorax and arms of the deceased, and which the reporters attributed to blows or falls, M. Louis observes, that they are the ordinary appearances found on those who die in a state of intoxication ; and, among others, quotes the following case in confirmation from Morgagni. A beggar went to bed drunk, and died suddenly during the night. This was at the end of January 1746. On the next evening he was carried to the anatomical hall in Padua, and on the third day after his death he was dissected. Morgagni found the body still warm. The scrotum was ecchymosed, of a red colour ; the face filled with blood, not only under the skin, but all the muscles ; the membrane that separated them and the glands appeared engorged. Louis remarks, that these spots should have been particularly examined, in order to have founded any charge upon them.

It appeared further, that the body was examined at the end of the month of July. Might there not have been some incipient putrefaction present, and would not this account for the swelling of the head, the lividness of the thorax, and other similar symptoms? As to the wound in the eye, the reporters themselves leave its effect uncertain, while the cause might have been accidental.

On these grounds, Louis gave it as his opinion, that the report was inconclusive, and that there were no proofs of assassination. The Superior Court of Arras accordingly, in 1772, revoked their decision, exonerated the memory of Montbailly, and enjoined the physicians and surgeons thereafter to extend the examinations to every part of the bodies of those found dead, and also to state in their reports the scientific reasons for all opinions they might give.*

* Foderé, vol. iii. p. 64, from the *Causes Célèbres*. See also, at page 98, a similar case from the same, *Cause de Chassagnieux*.

The following case I find mentioned in the lectures of the late Mr. Ashmun, Professor of Law at Harvard University. Those relating to Medical Jurisprudence are in a course of publication in the American Jurist.

On board a ship coming from Calcutta there had been a disturbance, and one of the sailors was said to have received a blow in the side from a handspike. The evidence was discordant as to his condition subsequent to this. Four months, however, after this, and when he had been in port several days and was freely on shore, he one day ate a large dinner and drank freely. He was taken ill, and a physician was sent for, but he died before any aid could be administered.

An examination took place. The stomach was highly inflamed, and still retained

It will readily occur to the reader, that the preceding observations are incomplete, unless some notice be taken of the SKELETON. Its examination is often necessary, either as a whole or in part; and this, both from the decay of the soft parts and the period that may have elapsed since death. It is highly necessary to be familiar with the variations induced by *age* and *sex*. In children the bones have a larger portion of gelatine, in youth this and the earthy matter are probably equal, while in old age the phosphate of lime greatly predominates. This explains why sutures are then obliterated, and the alveolar processes absorbed. The following table, taken from the Memoir of Sue,* will serve in determining the *mean proportions* of the skeleton at various *ages*.

A child of one year old measures in length 1 foot 10½ inches; length of the trunk (from the vertex to the symphysis pubis) 13 inches 6 lines; of the superior extremities (from the edge of the acromion to the extremity of the fingers) 9 inches; and of the inferior extremities (from the symphysis pubis to the soles of the feet) 9 inches.

	Length of trunk.	*Sup. extr.*	*Inf. extr.*
Child of three years	2 feet 9 inches;	19 inches;	14 inches; 14 inches.
Child of ten years ...	3 ft. 8 in. 6 lines;	2 feet;	1 ft. 7 in.; 1 ft. 8 in. 6 l.
14 *years*	4 feet 7 inches;	2 ft. 4 in.;	2 ft. 6 lines; 2 ft. 3 in.
20 *to* 25 *years*	5 feet 4 inches;	2 ft. 8 in.;	2 ft. 6 in.; 2 ft. 8 in.

After the last age, subjects present no variation in their proportions.

Dr. Gordon of Edinburgh, on the other hand, assuming the mean stature of the male, at the time of maturity, to be five feet eight inches, English measure, gives the following measurements:

	Inches.
From the crown of the head, to the top of the pubes	34·00
From the crown of the head, to the lower margin of the chin	9·75

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the food of the previous day. The liver was much diseased, and there were numerous abscesses in it. The gall-bladder was also natural. The fifth and sixth ribs were found to have been fractured so near the sternum, as to occasion a slight depression of it; but the bones were so entirely united as to give no indication of the age of the fractures. The heart and lungs were sound.

On these appearances the medical examiner gave it as his opinion, that there was a probability that the *fracture of the ribs had produced the diseased appearance of the liver*, and that the influence of the latter had extended to the stomach. The persons accused of injuring the deceased were on this testimony committed by a justice of the peace to take their trial for murder.

They were, however, soon brought up again on a writ of habeas corpus before two judges of the Supreme Court of Massachusetts; and, in the meanwhile, the Professor of Anatomy in Harvard University had made a further examination of the disinterred body. The stomach was found to contain a quart of undigested food, mixed with gin. Its internal surface was highly inflamed, and particularly at the cardiac orifice. There were four or five ounces of water in the pericardium. In the liver were several tubercles, one of which had suppurated, but it had no connexion with the fractured ribs. Indeed, the "liver was so situated that it could not have been wounded by the fractured ribs without penetrating the diaphragm and the lower part of the lungs." Yet these parts were sound.

The blood-vessels of the heart were highly congested, the ventricles contained much serum, and there was a general dropsical effusion throughout the body.

No other opinion could be given than that the present was a case of general disease induced by intemperance, and that the immediate cause of death was the overloaded state of the stomach. The prisoners were in consequence discharged.—American Jurist, vol. xiv. p. 20.

* Quoted by Orfila, Leçons, vol. i. p. 79.

	Inches.
From the lower margin of the chin, to the top of the breast	3·85
From the top of the breast, to the pit of the stomach	6·08
From the pit of the stomach, to the navel	6·08
And from the navel to the top of the pubes	6·08
From the top of the prominence of the shoulder, to the fold of the elbow	12·06
From the fold of the elbow, to the top of the hand	10·02
The hand, measured in the palm, from the lower fold of the wrist, to the point of the middle finger	7·75
From the top of the inside of the thigh, to the inside of the joint of the knee	14·06
From the last, to the sole of the foot	18·05
The foot, measured on the sole, from the posterior margin of the heel, to the point of the great toe	9·75

The average height of the female he considers to be about five feet five inches; and, of course, the length of the different regions is proportionably less.*

It is very important to remember that the height of a skeleton is less than that of the individual during life, by about one inch; as for example, a person measuring 5 feet 8 inches, his skeleton will be 5 feet 7 inches. The weight of the skeleton of a middle-sized adult, ranges between 160 and 200 ounces; and that of the female a little lower, from 100 to 150 ounces.†

In none of the osseous parts is the distinction between the *sexes* more marked than in the pelvis. No less than six differences are pointed out by Dr. Blundell. "In the male there is a certain roughness, and bulkiness, and weight, which strikingly contrast it with the lighter, and smoother, and more elegant pelvis of the female. In the male pelvis, the ilia or wings of the ossa innominata are more erect; in the female, more expanded. In the male, the brim is more rounded, though somewhat tending to an ellipse, the long diameter of which stretches from before backward; in the female, the brim, though somewhat rounded, is generally oval, and the long diameter lies between the sides. The male pelvis is deep, the female, shallow; the male outlet is very small, the female, very capacious. Lastly, in the male the arch of the pubis is contracted; in the female it is capacious, to make room for the ready passage of the head."‡

With regard to all the bones, indeed, the female ones are, *cæteris paribus*, smoother and rounder; the cylindrical more slender, and the flat thinner.§

After this unavoidably general sketch, it may be useful to give some illustrations of the necessity of attending to the subject.

* Supplement to the Encyclopædia Britannica, vol. i. p. 255.

† Ibid. on the authority of Soemmering. Craigie's Anatomy, p. 78. Dr. Craigie found a male skeleton measuring 5 feet 6 inches, to weigh 168 ounces, or 10½ pounds avoirdupois. I presume that a skeleton *anatomically prepared* will be proportionably still less in height than what is stated above.

Orfila, from a number of recent experiments, thinks we should add from an inch and a half to two inches to the height of the skeleton.—Exhumations, vol. ii. p. 380.

‡ A comparative table of the dimensions of the pelvis of various human races, by Dr. Vrolik, is given in the Bulletin des Sciences Médicales, vol. ix. p. 290.

§ Elliotson's Blumenbach, p. 412.

An individual in one of the northern settlements of Upper Canada was suddenly missed, after having been seen to go into the woods. Diligent search was made, but in vain. About twenty years afterwards, portions of a human skeleton were discovered by some labourers; and remembering the above circumstances, they were taken to the deceased's friends. Anxiety was excited to ascertain by these the age of the person; and for this purpose, the lower jaw, from which all the teeth had fallen out, was selected. Great diversity of opinion arose concerning it, both on the spot and in London; but most of the medical examiners pronounced it to be the jaw of an adult, and probably an aged one. On a more minute investigation, however, the permanent teeth were seen cased in their sockets, not one of them having appeared above the level of the alveolar process. It was evidently the jaw of a child.*

In 1800, at the English Devon assizes, Thomas Bowerman was preferred to the grand jury for the murder of a bastard child, by pushing an awl into its head. The body had been disinterred by order of the coroner; and on the inquest, a hole was found on the side of the head near the ear, agreeably to the testimony of a witness. Mr. Sheldon, a surgeon of Exeter, hearing of this case, attended the grand jury. He examined the skull, and found that the supposed hole was the natural perforation of a vein; and in proof of this, pointed out a sort of enamel round the opening, which could not have been there if made by force or art. In further illustration, he exhibited several skulls, all having similar perforations, and each hole having a small channel, and the rim or edge of the hole smooth and polished.†

Eugene Aram, the recollection of whose case has been recently revived by the popular novel of Mr. Bulwer, was indicted, in 1758, for the murder of Clarke in 1745. An accomplice indicated where the bones could be found, viz. in St. Robert's Cave, near Knaresborough. The skull of Clarke was produced in court. "On its left side was a fracture, that, from its nature, could not have been made but by the stroke of some blunt instrument, and could not be replaced but from within. Mr. Locock, the surgeon who produced it, gave it as his opinion, that no such breach could proceed from any natural decay; that it was not a recent fracture by the instrument with which it was dug up, but seemed to be of many years standing."

Aram, in his celebrated defence, suggests that these might have been the bones of hermits or anchorites. and cited cases of caves or cells where such had been found. As to the fracture, he stated that in 1732, the remains of William, archbishop of York, were taken up by permission, and the bones of the skull were found broken; yet no violence had been offered to him while living. Knaresborough, also, had a castle besieged during the time of Parliament, and many were killed near it.

Notwithstanding the ingenuity and force of these remarks, he was convicted; and before execution confessed his crime.‡

* Lancet, vol. x. p. 758. † Paris, vol. iii. p. 80.

‡ Dodsley's Annual Register, 1759, p. 355. For his defence, see Paris, vol. iii. p. 311. The whole trial has been recently republished at Boston.

I will only add the following case, and I have no doubt that its interest will compensate for the necessary detail.

A Piedmontese soldier, aged 46, named Bonino, had retired to a village near Montpelier. He disappeared in 1823, and it was reported that he had gone to Spain; but soon after it was whispered that he had been assassinated by a girl with whom he lived, and a person named Diamont, who had long been intimate with her, and married her nine months after the disappearance of Bonino. Two years more, however, passed before an investigation, when the authorities caused a search to be made, and a body was found in the garden of the suspected person. The only peculiarity recollected about Bonino was, that he had a sixth finger on the right hand and a sixth toe on the left foot.

On the 30th of April, 1826 (three years after his disappearance), Dr. Delmas attended the disinterment, at the request of the magistrate; and it is his narrative which I am now giving.

At the depth of eighteen inches, a human skeleton was found lying on its back; the head was slightly bent forward, and the lower jaw was separated from the upper. The arms were crossed on the breast. The ribs, still retaining the form of the thorax, were separated from the sternum, which was found lying on the opposite vertebræ. Some black hair and a metal button were imbedded in a moist earthy matter, which covered the anterior surface of the sternum. The vertebral column, unbroken, had retained its relations with the head and pelvis. The inferior extremities, stretched out, and on the same level as the trunk, followed the direction of the axis of the body, and inclined towards each other. The right foot, which alone we saw in place, was still in the shoe, a little bent on the leg, and inclined to its outer edge; the left had, in digging, been removed with the shoe, in which we found only a part of it.

The head, removed from its position, was dry in the frontal region, while the occipital was still moist and lubrified by a fatty matter, among which some black hair was seen. On attentively observing the skull, a deformity was observed at the right external orbitar angle, but evidently arising from an injury long anterior to death, since nature had produced a cure. Another lesion, but also of ancient date, existed on the left side of the coronal suture. The left temporal bone, however, attracted most attention. Its squamous portion, almost separated from the parietal bone, was divided into three portions by three cracks, which proceeded from the circumference of the bone, and before the external auditory canal, united to a fourth, which, turning round the base of the zygomatic process, terminated in the glenoid cavity. The form of this fracture, and the soundness of the zygomatic arch and mastoid process, induced us to suppose that it was made with a blunt instrument of small size. From the absence of any apparent operation of nature to effect a cure; from the separation of the osseous pieces, and the oozing which took place through the different points of the fracture, we think it had taken place at a time very near death. Indeed, it is evident that the injuries observed were the result of a violent blow, that must have brought on a cerebral commotion, which, without

considering other accidents, would instantly deprive the individual of the use of his senses and every means of defence.

The shoes in which the bones of the foot were found, some pieces of woollen cloth surrounding the vertebræ of the neck, metal and wooden buttons, a knife, of which the blade was folded in the handle, and found at the left side of the breast, some fragments of cloth and velvet, all these inclined Dr. Delmas to believe that the body had been buried, covered with a part, at least, of its clothes.

As to the time during which this body had lain, it probably was three years, according to the descriptions generally given on this subject. This was confirmed by the absence of all gaseous products; by the fœtid odour being replaced by an odour of mouldiness; and by the remains consisting of earthy, friable, fatty, brownish and black matter. The only soft parts found were vertebral ligaments, and these, as assimilating more nearly in composition to the nature of bone, ought, of course, to be the last to disappear.

The bones were now all collected, and the examination continued on the subsequent day. The vertebræ, ribs, and bones of the pelvis were articulated. The outlet of the pelvis was narrow, the width of the passages small compared with the depth, the descending rami of the pubis had their anterior face directed outward, with but a small separation. All these led to the opinion that it was the skeleton of a *male*.

Next as to *age*. The complete developement of the bones, that of the processes to which the muscles are attached, the state of the teeth, being complete, with the exception of the fourth molar of the right side of the lower jaw (which had been long out, as the alveolar cavity was ossified), these induced the witnesses to say that he had attained his 40th year. According to the comparative tables of Professor Sue, his height was determined at about five feet five inches.

The bones of the extremities were nearly complete, and the right foot, which was preserved in the shoe, was articulated. Some bones of the left foot were lost in digging. They found only the os calcis, astragulus, scaphoid and cuboid, the five metatarsal and three phalanges. This prevented any articulation, and they were unable to ascertain whether any thing was peculiar. The head of the fourth metatarsal was rounded, extending outwards, and presenting a small articular surface, "which might have been produced by an extra articulation; but not having seen in what manner this bone was articulated with the first phalanx, we could not determine if there had been a sixth toe attached to it."

Except some small bones of the carpus, all those of the right hand were found. The fifth bone of the right metacarpus at once attracted attention. Shorter and thicker than that of the other hand, its extremity towards the phalanx separated into two parts, one of which, truly articular, smooth, narrow, rounded, and prominent, had the direction of the axis of the bone, whilst the other, corresponding to the cubital edge, formed with it an angle of about eight degrees—not continued so far as the first, it was equally smooth, and presented an articular surface, which differed from it only in its less rounded form. Having

tried to articulate the first phalanx of the little finger, it fitted exactly upon the first articular head, and presented upon the side corresponding to the second, a depression, the obliquity of which was in relation with the direction assigned to the second surface.

It was evident, from this examination, that a sixth finger must have existed, although the bones could not be found. The left hand exhibited no peculiarity.

The deductions made by Dr. Delmas were, that the individual whose skeleton he had inspected was a male, of the age of forty or upwards; that he had six fingers on his right hand, and possibly a sixth toe on the left foot; that he had been murdered by a violent blow from a blunt instrument, which fractured the left temporal bone; and that he had been buried in his clothes. Diamont and his wife were tried and convicted, and, before execution, confessed to Dr. Delmas their guilt in the manner specified by him.*

The HAIR is another part of the body which continues long unchanged, and its presence may hence aid us in identifying individuals. It is frequently found in a perfect state on bodies buried a century or more, and indeed is seen but little altered on the mummy. Whether it *grows after death*, is at present a disputed point with many. Dr. Good informs us that examples of this may be found in Heister and Camerarius, where not only the beard was found grown, but hair had sprouted forth from every part of the body. Many of the old writers mention such cases. Pariset and Villermè, in the French Dictionary of Medical Sciences, both profess their credence in this occurrence; and the former relates of a father who preserved the remains of a much loved son for some time, and when he went to view them, the beard, which had been shaven after death, was so grown, that he could scarcely persuade himself but that it was a sign of life.† Bichat remarks, that it is a generally received opinion that the hair and nails grow after death; but while he concedes that we have but few well-established facts, he observes that he has certainly noticed a lengthening of the beard in one instance, where the head was submitted to maceration for several days.‡

On the other hand, we may quote as an unbeliever, the name of Haller, a host in itself. He conceived it to be only apparent and not real, and owing to a shrinking of the skin. "Among the older writers," says Dr. Bostock, "we meet with narratives, apparently well authenticated, where the hair is said to grow after death, and even to attain an extraordinary length; but upon whatever authority they may appear

* This remarkable case, I have taken from the North American Medical and Surgical Journal, vol. iv. p. 176. That Journal, however, copied it from the Edinburgh Journal of Medical Science, who again translated it from the *Ephemerides Médicales* of Montpelier. It is also quoted in full by Orfila (Exhumations, vol. ii. p. 360), who, while he allows due credit to Dr. Delmas for his successful investigation, makes the following objections to his deductions:—The age is not at all certain; it might have been of a person aged 25 or 30, as well as one aged 40 and upwards. It is equally impossible to fix the period since interment, with so much precision. And, lastly, the facts presented do not *positively* prove that the fracture was inflicted before death.

† Dictionnaire des Sciences Médicales, Articles *Barbe* and *Poil*.

‡ Anatomie Générale, vol. iv. p. 825.

to rest, we may safely conclude that there is some fallacy or inaccuracy in the statement."*

If we turn to individual cases, which might be supposed to settle the question, we find no corroborating proofs. It has been said that the hair of Charles the First of England was found grown; but Sir Henry Halford does not mention this, and it certainly would not have escaped him. The body of Hampden was disinterred a century and a half after his death—his hair was found in a *perfect state of preservation*, but nothing is said of its growth. †

On the whole, I look upon this as a point which must have been long since settled by anatomists, from their own experience. Generally, I believe, they discredit it, except as to the beard, and its partial elongation; and for this we have a sufficient explanation in the opinion of Haller. I shall, however, presently quote a case, in which this growth after death was contended for.

It will form a proper conclusion to this section, to notice the subject of PUTREFACTION, in its bearing on legal medicine.

The earliest changes that take place in the body after life has departed, are coldness, stiffness, and lividity. The last I have already noticed. Of the others I may remark, that their supervention is far from being uniform. The bodies of the aged take them on much sooner than those of the young; and again, the nature of the disease has a manifest influence. Thus, in apoplexy the temperature of the body is often maintained far beyond the usual period. "It has, indeed, been laid down as a general rule, that the more sudden the death, the longer is cadaverous stiffness in taking place."‡ After a certain period these are succeeded by the occurrence of putrefaction; but many circumstances are found to develope or delay its progress. Heat, humidity, and the contact of air, accelerate it; and it is almost always rapid when, from the presence of a typhoid disease, it appears to commence before life is extinguished. Interment, also, if made early, procrastinates it. Some species of earth have a similar effect. It is not, however, all degrees of heat that accelerate it. If it be too high, it may even be prevented, owing to the rapid dissipation of moisture. In the route from Tripoli to Mourzouk, Dr. Oudney often found the ground strewed with the skeletons of the unfortunate victims of the slave-trade. The skin and membranous substances were seen shrivelled and dry, and the thick muscular and internal parts were alone decayed. If the dry and hot air of the desert produces such effects, we can readily imagine how similar causes, although acting in a less powerful manner, may operate in different countries, at particular seasons of the year.

Cold, on the other hand, is also well known to retard putrefaction. "Below 50° Fahr., the process is slowly performed, and at 32° it is altogether suspended. The temperature most favourable to its perfection is from 60° to 80° or 90°. This is the temperature of our summer, and hence at this time, putrefaction most readily goes forward."§

* Physiology, vol. i. p. 74.

† London Quarterly Review, vol. xlvii. p. 516. ‡ Paris, vol. iii. p. 24.

§ Dr. Beatty, Cyclopædia of Practical Medicine, Art. *Persons found dead*, vol. iii. p. 322. "Nous savons que tout étant égal d'ailleurs, la putrefaction s'empare plus lentement du cadavre d'un individu mort par hemorrhagie, que de celui dont les vaisseaux sont distendues par le sang."—Orfila's Exhumations, vol. i. p. 329.

These observations will serve to elucidate the following case, which excited great interest, some years since, in the United States. The leading points agitated were, *the period when putrefaction supervenes*, and the *growth of the hair after death*.

Francis Baker left Moore's tavern, in the town of ——— (Kentucky), after having slept there, at about sunrise of the 2d of November (Tuesday), 1824. He proceeded to Doggate's and breakfasted, in company with Desha and others, at an early hour. Baker and Desha left Doggate's at very nearly the same time, and were again seen together at a quarter of a mile from that tavern. Baker was not seen after this, until he was found a corpse six days after (Monday). His throat was cut, and there were five wounds on the side of his head, apparently from blows, as the skin was broken. There appears, also, to have been a wound on the breast, but concerning this there was some conflicting testimony.

The place where the body was found was a hollow, though not steep until you approached near to the body. One of the witnesses, on being asked whether the sun could shine on it, replied, that he did not suppose that it could; it was his impression that the body was rather from the sun. The woods were tolerably thick around the place, there being a good deal of undergrowth. The body was lying near a log; the thighs were next to the road, and the head down hill.

Desha was indicted for his murder; and it became an important question to ascertain whether the state of the body was compatible with the idea of violent death inflicted *six days previous*. I shall endeavour to condense all the evidence on this point.

One witness (Major Lacey) stated that the weather was as usual at that season of the year. Friday of the first week of November had a cold rainy morning. Gen. Reed said that the weather was fine, and he did not think it was cold enough to have fire. J. Douglas was laying brick during the first week in November; at night, the mortar would freeze. It was too cold for him to commence work in the morning before breakfast. It snowed on some of the last days of the week. Mr. Holt said that the weather was unusually warm for the season. Indeed, some of the members of the legislature apprehended much sickness from this circumstance. It rained on Thursday. Mr. Coleman corroborated this testimony. Tuesday and Wednesday were fine days. "On Friday, it rained and snowed a little. On Saturday, we (the legislature) sat in the church; the members thought it too cool to be without fire; the chimneys which were erected to the church dried very soon. Sunday was pretty cool. On the whole, I call it mild weather for the season." *Question*. Although the days were pleasant for that season of the year, were not the nights frosty? *Answer*. I think it is probable there was frost; though the first three or four days was charming weather, the last of the week was somewhat colder. Mr. January deposed that the nights were cool, as the workmen were obliged to cover their work at night. He heard them say that some scales came off that were frozen.

The corpse was a little stiff when taken up; but, after carrying it for some time, it became limber. It had no smell of putrefaction. On

Tuesday there was no alteration in it, and but little on Wednesday. On Thursday it turned black, and was somewhat offensive. The wounds appeared to be fresh, and bled much, when Dr. John Drake examined them. The body was not swollen when found; but on Wednesday, or shortly before it was interred (which was on Thursday), the abdomen and face were greatly swollen. A fire had been kept in the large room where the corpse lay.

Dr. John Drake examined the body on Wednesday, after it had been washed and dressed. He thinks there were five wounds on the head, all severe, and generally two inches in length. There was a large wound of the throat, about four inches in length; another on the breast, and another on the shoulder. There were no symptoms of putrefaction about the body, and hardly any smell. Dr. Charles Scudder saw the body (probably) on Wednesday, and observed some blood or bloody water issuing from the wound. This, he stated, was such as would result after the corpse had lain for some time, and not as from a fresh wound. In answer to a question whether he inferred that the wounds had been recently made, he replied, that he did not examine those on the head, but that on the throat did not appear fresh.

The discussion elicited by these facts is not without interest. Dr. Drake was asked, whether it was according to the animal economy, that the body of a man after death should be ten days without putrefying, unless it was frozen? *Ans.* If there was a discharge of much blood, as I suppose was the case with this man, it might. *Quest.* Would not the contents of the stomach produce putrefaction? *Ans.* They would, unless there had been spirits drunk. *Quest.* Do you think that spirits would lie in the stomach of a dead man for ten days? (It appeared that Baker had drunk twice before leaving Doggate's.) *Ans.* I am not prepared to say, but I think it would have its effect to a certain extent. *Quest.* Unless the body was frozen, did you ever know an instance of the suspension of putrefaction? *Ans.* I don't know that I have, but I suppose there might be an instance. *Quest.* Would you suppose one would lie seven, eight, or ten days in the woods, without attracting the buzzards? *Ans.* It would depend much on the season, and on the posture in which the body lay. Mr. Lacey deposed that he had known dead bodies, such as hogs, dogs, &c. to lie a considerable time at that season of the year, without becoming putrid. Gen. Reed, on the contrary, never knew any thing to lie that length of time (eight or ten days), without exhibiting greater signs of putrefaction than Baker did. It was remarked (he says), the morning after the corpse was found, that he did not look as if he had been killed more than one night.

Dr. Frazer stated that it was not unusual for a corpse, in eight or ten days after death, to become limber; and upon being moved, to discharge from the wounds, nostrils, &c. a part of the serous portion of the blood, inasmuch as a relaxation of the muscles, and a loss of the coagulable powers of the blood, were the first symptoms of putrefaction; that the length of time before any symptoms of prutrescence can be discovered, depends much on the weather, whether cold or warm,

and on the manner of death; as he had known bodies to lie throughout the winter without exhibiting any symptoms of it; and as the process of putrefaction is much slower to commence in a body that has died from great loss of blood than in ordinary cases of death.

The counsel for the prisoner, of course, dwelt much on this absence of putrefaction, as a proof that the death must have been recent. The judge (Shannon) himself inclined to this belief. "It is difficult to suppose (said he) that a body, at this or any season of the year, could have remained that long, without exhiting some symptom of putrescence: connect, also, that in two or three days after it was found, it did shew such symptoms as in that time might naturally be expected."

As to the other point, it would appear from the testimony on the inquest, that the beard was quite short when first seen, and had the appearance of being recently shaven. In the interval between Tuesday and Thursday, it appeared to have got a little longer. It was stated, at the same time, that the face had become swollen.

The counsel for the prisoner appears to have taken it as a conceded fact, that the *beard will grow after death*. Mr. Rowan, an eminent advocate, said that the fact was tested in numerous instances of disinterred bodies. "An acorn (said he), after it has fallen, produces the oak. Cut down a buckeye in the spring, when the leaves are just budding, and they will grow until the sap which is up is exhausted: just so in relation to the beard."

If this position was deemed correct, it furnished another proof against the supposed period of the murder. The medical witnesses, however, were far from agreeing to so positive an opinion. They conceded that, in some cases, the beard appeared to grow after death; but that this was owing to the collapse or shrinking of the flesh, which thus gave it a more prominent appearance.*

The presence of the putrefactive process is not, however, to deter us from the necessary examination. We have an efficient agent in the chloride of lime or soda to remove any unpleasant odour. And it should be sprinkled around the room, or on the table where the body lies, and not on the body itself, since it is found to change both the colour and consistence of the parts. Not unfrequently, indeed, a subcarbonate of lime has been formed on the surface, from the union of the liquor with the gases that are emanating.

Although dissection may thus be pursued with advantage, and often to the elucidation of doubtful cases, yet this is precisely the period when disputes concerning the *identity* of dead bodies frequently occur. The characteristic features become lost, and we can only depend with safety on such peculiar physical marks as may have been present.

* "Trial of Isaac B. Desha, for the murder of Francis Baker, held at Cynthiana, Kentucky, before the Hon. George Shannon: reported by Robert S. Thomas and George W. Williams, Lexington, 1825." I am indebted for this pamphlet to the kindness of Dr. Daniel Drake, of Cincinnati. Desha was found guilty, but a new trial was granted on some legal grounds, and he appears to have escaped from the United States into Texas, where he died some years since. On his deathbed, he is said to have confessed the murder; but I have no authority for this except the newspapers.

On a trial that took place some years since at Edinburgh, for stealing subjects where the body had been interred nine weeks before the recognition, Dr. Barclay, the anatomist, testified, that the longest time he ever knew, during which the features remained recognisable, was a fortnight. Yet a witness swore particularly to the identity of the body.*

For an accurate knowledge of the successive changes of the body in its progress to complete decomposition, we are indebted to the indefatigable labours of Orfila, and I will conclude this section with a short abstract of the more striking facts noticed by him.

The *epidermis* is very rapidly destroyed. It separates from the surface, is converted into a greasy, reddish-brown substance, and finally disappears. If, however, it has been detached during life by an effusion of serum beneath it, it will then long resist putrefaction. The *nails* soften, and are readily detached. They lose their semi-transparency, and in process of time become dry. The *hair* strongly resists decomposition, and remains unaltered for years. The *cutis* is at first yellowish, but soon takes a greenish, reddish, and violet tint. At a later period, small sand, like granulations, consisting of phosphate of lime, form on it. It gradually dries, becomes darker in colour, and is covered with the greasy mould already spoken of. The *subcutaneous cellular tissue* dries on the anterior portion of the body; but becomes infiltrated, soft, and tender, on the dependent part. At a later period the adipose part of it begins to saponify, and is of a grayish-white colour, and of the consistency of suet. This, however, is not invariable. Finally, what is not thus converted becomes dry, brown, and is at last destroyed.

The *muscular tissue* softens at first, takes a greenish tint, is gradually reduced to a jelly, and in fat bodies changes to soap; in others it dries. The *aponeuroses and tendons* preserve for a long time their brilliancy and firmness, but after a while become yellow and then brown. The tendons resist putrefaction longer than any other part. The *ligaments and cartilages* resemble the tendons in their changes. The last, however, before they disappear, become black and fragile. The *bones and teeth* are indestructible by this process. The *serous tissue* becomes gray, and softened, then from blue to black before they disappear. Orfila recognised the pleura, in a body interred in a thick coffin, and raised fourteen months after death. The brain does not putrefy so rapidly as might be supposed from what happens when it is removed out of the cranium. For several weeks after interment, if the weather be moderate, it preserves so much of its natural appearance that we can trace its different parts. After this, however, it softens gradually to a thin greenish paste, at first intolerably fœtid, but finally without this, and much diminished in bulk. The *nerves* remain permanent for many months. The *eyes* sink and rapidly decay. Nothing is then

* G. Smith's Forensic Medicine, 2d edition, p. 506. There must, however, be sufficient latitude allowed for the season and the nature of the ground in which the body has been interred. All I mean to urge is that grievous mistakes are often made from too great confidence. In the notes to the chapter on *Age and Identity*, several instances are given by Dr. Dunlop.

found but the fat peculiar to dead bodies. In not a single instance of disinterment did Orfila find a vestige of them four months after death.

The *lungs* are at first congested in the manner we have already described, and their structure does not alter rapidly. They finally become green, soft, and shrunken, and, lastly, dry and black. The *diaphragm* also decays slowly, and both it and the lungs have often on their surface the white granulations of phosphate of lime. The *heart* softens, grows gradually darker in colour, collapses, and is reduced to a few blackish filaments. The *blood-vessels* for two or three months after interment contain a certain amount of black blood, either fluid or coagulated. They also change in colour, and their respective coats are readily separable. The *stomach* presents a great variety of appearances shortly after death. Much of this depends on the quantity of blood accumulated in its vessels, and the comparative state of health or disease in that organ during life. So, also, with the *intestines*. In a short time, the mucous membrane of both becomes greenish and sensibly softened, then dark and black, and, finally, the whole substance dries into membranes, which at last are converted into a moist black mould. The *liver* softens, forms granulations on its surface, then becomes blackish-brown, and not unfrequently, instead of drying, is converted into a black substance, resembling the grease of wheels.* The *gall-bladder* alters slowly. The other viscera soften soon, lose their texture, and are converted into the greasy matter already noticed.

In all his examinations of disinterred bodies, every portion of the face was destroyed between the third and fourth month, although the bones still remained slightly attached by their articulations. The thorax rarely undergoes any change for the first three months. So, also, with the abdomen, except the change of colour in its integuments. After that it collapses, and its parietes become very thin.

Orfila also observed, that the shorter the time between death and burial, the more slow will be the progress of putrefaction. So also in proportion to the depth of the grave. If buried naked, it occurs more rapidly than when clothed. Contrary to the received opinion, which assigns at least three years, he has, in a majority of cases, found bodies reduced to a skeleton at the end of 14, 15, or 18 months, even when buried in coffins and wrapped in clothes.

With respect to the fat or soapy matter, of which I have repeatedly spoken, Orfila conceives that it is never formed but in those parts of the body in which there exist fat and azotic matter. This is the *adipocire* of the older chemists, which, according to Chevreul, consists principally of margaric and oleic acids, and ammonia. Nearly three years are necessary to convert bodies buried in earth into it, while in

* Ollivier d'Angers and Chevallier have recently discovered a peculiar substance produced from all or most of the soft organs, but particularly the liver, about three months after interment. It is a white, hard matter, in the form of irregular granulations, and disposed either in bands or zones. It is found on the surface or in the interior of the liver, and on the internal wall of the veins and arteries. On analysis, it was found to consist of an ammoniacal salt, a fatty matter, muriate of soda, and traces of some other salts. It is thus evidently formed from the decomposition of the body, and cannot be mistaken for poison.—Edinburgh Medical and Surgical Journal, vol. xl. p. 488.

water, as we shall hereafter shew, the transformation is much more rapid. The soil, also, and the number of bodies interred together, have a striking effect in producing this change. If not fat, but dry and meagre, and lying in separate graves, saponification rarely occurs.*

In some instances, margarate and oleate of lime, and carbonate or sulphate of ammonia, are formed, owing, as Orfila supposes, to water containing the salts of lime, infiltrating through the earth to the bodies.†

II. *Of sudden death from natural causes.*

Sudden death from natural causes most commonly originates from one or other of the following affections: apoplexy; rupture of an aneurism or of a large vessel into one of the cavities; bursting of purulent cysts; ossification of the valves of the heart; rupture of this organ; bursting of some blood-vessels into the air-passages, and idiopathic asphyxia. And of all these, the passions, whether exciting or depressing (but most commonly the former) are frequently the agents in producing the fatal termination.

Apoplexy is a disease which in some instances may be mistaken in its early symptoms, and may terminate fatally in situations which preclude any observation of the event. We should here attend to the conformation of the body—the large head, short neck, and plethoric frame; to the posture in which the person is found; the food that he has recently eaten; the ligatures that surround any part; and, above all, to the appearances on dissection. There is, however, a form of this disease, denominated *simple apoplexy* by Dr. Abercrombie, which is often fatal within the twenty-four hours, and leaves in the dead body no traces, not even congestion of the vessels within the head. Here, if there be no marks of injury, we are, of course, precluded from a charge of violence; and it is only necessary to remember that persons seized with apoplexy may have fallen from a height, and thus wounded themselves.‡

The ruptures or burstings that I have enumerated have sometimes been indicated by premonitory symptoms; but, even if their previous history be unknown, dissection will explain their nature.§

Idiopathic asphyxia was first described by Mr. Chevallier. The patient often apparently in perfect health, becomes faint, and suddenly expires. On dissection the heart is found flaccid, and all its cavities are empty of blood. Dr. Beatty relates a case that occurred to him of

* Orfila's Exhumations, vol. i. p. 22.

† This is, of course, but a very brief analysis of the *Exhumations Juridiques* of Orfila. The parts relative to bodies found in water, I shall notice under the head of *Persons found drowned*, and the state of the stomach and intestines under that of *Poisons*. I must add, that I have been indebted to an excellent analysis of the first volume in the North American Medical and Surgical Journal, vol. xii. p. 42.

‡ Dr. Bright mentions several instances that came under judicial examination, in which the cause of death was shewn to be apoplexy. In some of these he found nothing but very slight effusion, and *tumours in the choroid plexus*.—Medico-Chirurgical Review, vol. xx. p. 7.

§ See art. *Rupture of the Heart*, by Dr. Townsend, in Cyclopædia of Practical Medicine, vol. iv. Rupture of the aorta, mistaken at first for poisoning, Lancet, N.S. vol. viii. p. 227.

a healthy female in the ninth month of pregnancy, who suddenly expired, after a very slight sickness and attempt to vomit. Every part was carefully examined, and he observes, that he had never seen a healthier condition of the organs. The heart, however, though sound, was flaccid, and all its cavities were empty, while its proper veins were much distended with blood.*

As examples of sudden passion hurrying these diseases to a fatal crisis, the following may be cited from Paris: "Dr. Gordon Smith mentions the following case as occurring in one of the midland counties of England. In the course of an altercation between a man and his wife, the woman died, and a clamour was raised that the husband had murdered her. An inquest was held, a verdict returned against him, and he stood his trial at the following assizes. He was, however, acquitted, for it appeared in evidence that he had not even touched his wife during the quarrel. The diseased was a person of extremely violent temper; and on opening her body, it was found that she had been labouring under suppuration of the liver, and that an abscess had burst into the cavity of the abdomen, in consequence of the agitation into which she had been thrown." Again, Barron Larrey describes the case of a person who had been severely wounded in the thorax, in a duel, but was progressively recovering, when, in the fourth month from the period of the injury, he died suddenly during a violent fit of anger. On dissection, the heart and pericardium exhibited traces of inflammation.†

Dr. Christison, in a recent publication, has added some very valuable observations and useful cautions to this branch of our subject.‡ The facts, that "sudden death from latent causes frequently occurs, where collateral circumstances lead to a suspicion of violence, and that these are apt to prove suddenly fatal, from the operation of slight violence, or of circumstances incidental to violence, as anger, struggling, and the like, and that the appearances they leave may present the same characters with those from death by violence," are so many strong circumstances to demand a careful examination.

The principal diseases that he enumerates as often existing for a long time, without seriously incommoding the patient or alarming his

* Chevallier and Wood's cases, Medico-Chirurgical Transactions, vol. i. p. 157.—Beatty, Cyclopædia of Practical Medicine, vol. iii. p. 325. The total want of blood in the heart would not, however, appear to be invariable, as Professor Christison quotes an undoubted case from Rochoux, in which the auricles contained a large quantity of it.—Edinburgh Medical and Surgical Journal, vol. xxxi. p. 242.

† Paris, vol. iii. p. 15. There is also a remarkable case related by Professor Mott, of sudden death in a female deserted by her paramour. She had been dissolute and probably intemperate, but was robust, and had not complained of any indisposition beyond slight rheumatic pains. She was dejected on going to bed, and in the morning was found dead, without any appearance of suffering. On dissection, the left ventricle was found ruptured, and an abscess was also seen in its parietes. The pericardium contained a large quantity of coagulated blood.—Transactions of the Physico-medical Society of New York, vol. i. p. 151. A case of rupture of the duodenum without external injury, but originating in a fit of anger, is mentioned by Dr. Dupuy, in the Journal Medical de la Gironde, vol. vi. p. 147.

‡ Cyclopædia of Practical Medicine, vol. iv. art. *Latent diseases*. There is also a good article on the causes of sudden death in the London Medical Repository, vol. xxvii. p. 25.

friends, are, of the *head*, sanguineous apoplexy and inflammation of the cerebral membranes, or of the substance of the brain. As to the first, he remarks, that the presence of a clot in the brain, particularly if it be plainly of some standing, would not of itself be enough to account for death. Inflammation of the membranes may proceed to such an extent as that considerable effusions and even suppuration be present, without marked symptoms. And this circumstance is applied to a medico-legal case. A son, in a state of intoxication, was left struggling with his father, aged seventy, of passionate disposition, but in good health. Seven minutes after, the old man was found dead, on his back, with the mark of two blows on the nose and forehead, not particularly severe. On dissection, no fracture, extravasation, or laceration could be found; but there was an effusion of half a pint of reddish serum in the ventricles, and also towards a pint of serum in the cavity of the pleura on each side of the chest. Some medical men ascribed death to the effusion, and the effusion to the blow. But undoubtedly this effusion could not have occurred in seven minutes, and was more propably the result of previous disease. Softening or ulceration of the substance of the brain is also frequently observed in those dying suddenly.

Of the latent diseases of the *chest*, Professor Christison enumerates pleurisy, peripneumony, and organic diseases of the heart. Each of these may persue their course for a long period, without exciting suspicion. So, also, of ulcerations of the membranes of the *stomach* and intestines, chronic derangements of the viscera, extra-uterine conceptions of various kinds. Some develope themselves sooner than others, but all have occasionally concealed their formidable nature until the last moment.

In recurring to the fact, that all of these are most apt to prove suddenly fatal under the operation of violence, and thus bring the case before a legal tribunal, Dr. Christison advises attention to the following sources of exculpatory evidence. 1. When the morbid appearances indicate that derangements of structure or function have been induced, incompatible with the continuance of circulation or respiration. As when a rupture of the heart produces a large effusion of blood into the pericardium. 2. When appearances are seen which, although not incompatible, as we should suppose, with life, yet are known seldom or never to occur, except where death speedily follows. Of this may be mentioned, rupture of the gall-ducts or gall-bladder, or a recent perforation of the stomach. 3. Another description of evidence is derived from the symptoms immediately before death corresponding with the appearances discovered. 4. We can often decide, and particularly in cases of suspected poisoning, that the circumstances noticed will not bear out the idea. 5. It is not an unfrequent occurrence for sudden death from latent disease to take place during the early stage of convalescence from other diseases; from some unusual or violent exertion; or from some emotion of mind, and particularly anger.*

* On the first appearance of malignant cholera at Sunderland, a female attacked with it died in twenty-four hours. She had been engaged in a brawl the day before, and had received a slight wound with a fork. "This death occurred at an early

III. *Death from violent causes.*

This division of our subject may, with justice, be considered as the most important in the whole range of medical jurisprudence. It is so, not only from the number but the variety of cases that come under examination. In commencing their investigation, it is necessary to remark, that a particular term has of late years been much employed to express the peculiar mode of death that occurs in most of them. I refer to the word *asphyxia*. As at present understood, it means "those cases of the cessation of the heart's action which arise from a particular cause, namely, the interruption of respiration—or, to speak more correctly, the interruption of the effect produced by that function on the blood."

The phenomena of respiration are two-fold—mechanical and chemical. To the former we refer the motion of the ribs and diaphragm in performing inspiration and expiration, and to the latter, the inspiration of oxygen and its results. Now, it is rather the popular idea to consider asphyxia principally in reference to the chemical changes induced. There cannot, however, be a doubt but that mechanical obstructions are equally efficient agents. The following division of asphyxia, by Savary, and many other modern writers, will illustrate these ideas.

1. *Asphyxia from mechanical impediments to respiration*, as by compression of the chest and abdomen, and seen in cases of a large quantity of ground falling on persons digging, &c.; by air entering into the cavities of the chest or abdomen; by a wound of the diaphragm, with pressure of the abdominal viscera towards the stomach. 2. *Asphyxia for want of power in the respiratory vessels*, as from a division of the spinal marrow; from lightning; from cold; and from general debility, as in new-born children. 3. *Asphyxia from want of air*, by its rarefaction; by suffocation; by submersion; by strangulation. 4. *Asphyxia from want of respirable air*. And, lastly, 5. *Asphyxia from irritating or deleterious gases*.

While each of these causes has phenomena in some degree peculiar to itself, and which will be most usefully considered under its appropriate head, there are still some common to all, which may be here briefly indicated.

The symptoms consequent on impeded respiration are more or less striking, as well as rapid in succession, according as the obstruction to it is more or less complete. Among the earliest are a sensation of distress, and an effort to dilate the chest. The struggle is longer or shorter, according to circumstances, and convulsive movements accompany it, with suffusion of the face, swelling of the veins, protrusion of the eyes, &c. Torpor, before long, succeeds—often with a general relaxation even of the sphincter muscles. The heart, however, even now con-

period of the epidemic, when many influential persons, including some medical men, were loudly asserting that no unusual disease existed in the town. It was, therefore, very generally asserted, that the patient had died of the wound and of blows on the head and face, the marks of which, it was said, were so very obvious. The body was examined in the presence of medical men of both opinions, and the questions finally set at rest by a coroner's jury.—Edinburgh Medical and Surgical Journal, vol. xxxviii. p. 124.

In the section on *Strangulation*, I shall mention some cases of Accidental death or rather of apoplexy mistaken for it.

tinues, for a brief period, to propel the venous blood it receives from the pulmonary vessels. This also ceases, and life is at the instant of departing.

In more protracted cases, it has been noticed that there is less suffusion of the face, but a more extensive discoloration of the skin on other parts of the body.

On examination after death, these spots are found, and they are distinguished from those observed in dead bodies kept in one position, by being seen in all parts, and according to Dr. Roget, by having their seat chiefly in the mucous membrane of the skin. Rigidity occurs early; the eyes are distended, and the pupils prominent.

A great accumulation of blood is observed in the pulmonary vessels, and in the right auricle and ventricle, and their great veins; while the left auricle and ventricle are comparatively empty. The liver, spleen, and kidneys, are gorged, the lungs distended, and the blood thick and dark-coloured, and but rarely coagulated. If the struggle has been violent, the vessels of the head are found full, particularly the veins and sinuses; and a section of the cerebral substance exhibits an unusual number of red points, and this last is often accompanied with an effusion of serum in the ventricles. On the contrary, when the death has been easy, the vessels of the brain are often natural.

These are the principal appearances noticed. There are others, which will hereafter be pointed out as peculiar to various causes.

My limits preclude me from going into detail concerning the theory of asphyxia. In addition to a reference to authorities worthy of examination, I will only remark, that the earliest opinion entertained was, that the cessation of the motion of the heart in these cases was owing "to some mechanical impediment to the transmission of the blood through the lungs, arresting its course, and preventing its access to the left auricle. But the experiments of Goodwyn and others have sufficiently proved that no such mechanical obstruction exists, and that even after the fullest expiration, the air remaining in the air-vesicles of the lungs distends them sufficiently to permit the blood to circulate freely through them." Hence the prevailing opinion at the present day is, that chemical changes take place in the blood. It can no longer be converted from venous into arterial blood, and in this state is deleterious to the organs to which it is sent. To Goodwyn and Bichat we are indebted for this theory. The blood is supposed by the latter to act on the brain, and through it on the whole nervous system. Whenever, then, this in its venous state reaches the brain, the loss of sensibility takes place, and not before. Hence, also, the convulsions that occur. The effect of this now poisonous fluid is extended to the capillary vessels of the lungs. They transmit less and less blood, until finally the action of the heart ceases, leaving the right side full and the left nearly empty.

Among later experimenters on this subject are Edwards, Williams, and Kay. Dr. Williams, from his investigations, deduced the following conclusions: That the passage of blood through the lungs is obstructed on the suspension of respiration, while its circulation through the other parts of the body is continued; that this obstruction is not mechanical,

but arises from the deprivation of pure atmospheric air; that this obstruction or interruption to the motion of the blood through the lungs, is one of the principal causes of the emptiness of the arteries after death; and finally, that the immediate cause of the cessation of the action of the heart, is a privation of its natural stimulus, arising from the interruption of the movement of the blood through the lungs.

The experiments and inquiries of Dr. Kay have led him to the following deductions: That the circulation is arrested after respiration ceases; because from the exclusion of oxygen and the consequent non-arterialisation of the blood, the minute pulmonary vessels which usually convey arterial blood are incapable of conveying venous blood, which then stagnates in the lungs. The functions of the muscular organs cease in asphyxia, because the circulation is thus arrested in the lungs; and, as a result from these opinions, he infers that venous blood does not possess any noxious quality, but is simply less nutritious and stimulating than arterial blood.*

In further noticing this subject, I shall arrange my remarks under the following subdivisions:

A. Of persons found dead from cold.
B. Of persons found dead from hunger.
C. Of persons found dead from lightning.
D. Of persons found dead from burns.
E. Of persons found dead from wounds.
F. Of persons found dead from noxious inhalations.
G. Of persons found hung.
H. Of persons found strangled.
J. Of persons found smothered.
K. Of persons found drowned.

The subject of poisoning, as I have already stated, is so extensive, that I shall postpone it to a distinct chapter.

I may also premise, that in many medico-legal cases a most difficult question often arises, after all doubt is removed as to the immediate cause; and that is, whether death is owing to suicide or homicide.

* I refer those who are desirous of studying this subject to the following authorities;

Dictionnaire des Sciences Médicales, vol. ii. art. *Asphyxia*, by Savary.
Cyclopædia of Practical Medicine, art. *Asphyxia*, by Dr. Roget.
Copland's Dictionary, art. *Asphyxia*.
Mr. Brodie's views in Paris's Medical Jurisprudence, vol. ii. p. 16.
Goodwyn, Kite, Kay, on Asphyxia.
Williams, in Edinburgh Medical and Surgical Journal, vol. xix. p. 524; Kay, in do., vol. xxix. p. 37; and in North of England Medical and Surgical Journal, vol. i. p. 453.
Lancet, N.S. vol. xiv. pp. 315, 387.
Reviews of Kay, in Edinburgh Medical and Surgical Journal, vol. xlii. p. 216; Medico-Chirurgical Review, vol. xxv. p. 92; and London Medical Quarterly Review, vol. iii. p. 46.
Review of Roget in Edinburgh Medical and Surgical Journal, vol. xxxix. p. 394.
Goodwyn's Answer to Bichat, Edinburgh Med. and Surg. Journ. vol. xxxiv. p. 74.
Thomas on Asphyxia, in Lancet, N.S. vol, ix. p. 814.
Hodge on Sedation, American Journal of Medical Sciences, vol. x. p. 104.
An Analysis of Edwards on the Influence of Physical Agents on Life, Medico-Chirurgical Review, vol. xxii. p. 1.

I shall have occasion to notice this under most of the subdivisions, and will now only direct the reader's attention to some preliminary inquiries.

The moral history of the individual should, if possible, be ascertained—his disposition of mind, and his worldly condition. The insane, we know, are very prone to commit suicide, and therefore any circumstance tending to establish a disordered state of mind deserves notice. It is proper to ask, whether the individual has met with any losses or disappointments, whether he has been solitary in his habits, and whether any of his family or connexions have an interest in his death. It is sometimes said, that, apart from the influence of fanaticism or insanity, suicides will generally select a certain and easy mode of death; but this is too broad an assertion for all cases. In some, however, the mode itself is presumptive either for or against.

The season of the year may have some effect, and in very many instances, dissection developes some chronic affection of long standing, which may have had its influence. Thus, Morgagni found in the brains of maniacs an extraordinary hardness; and Durande and Fourcroy, along with this condition, observed an induration of the liver, and calculi in the gall-bladder. Esquirol and Osiander mention scrofula, affections of the genitals, organic diseases of the heart, chronic enteritis, &c. as especially predisposing to the commission of suicide.

Each case, however, has its peculiarities, and demands a close and deliberate examination.*

A. *Of persons found dead from cold.*

Death from exposure to cold, if it happen at a distance from towns or dwellings, is generally characterised by circumstances not to be mistaken. It may, however, occur in populous places, and is then more liable to misconstruction and suspicion.

The common and early effects of severe cold are sleepiness, stupor, and numbness. The individual is unwilling to be roused from this state, and has no apprehension of its fatal consequences. In the march from Moscow, where, however, the French soldiers laboured under the combined effects both of hunger and cold, the insensibility and disposition to sleep often came on while they were walking; and, although able to continue this for a short time, yet they could not be made to understand any thing addressed to them. Beaupré remarks, that the muscles of the trunk were the last to lose the power of contraction. The pulse was small and insensible, and there was a quiet delirium present.*

* The following case (from Hecker's Annalen), in addition to several others that I shall notice particularly, under Wounds, will serve to shew the difficulty that sometimes happens in discriminating.

A Silesian butcher caught his wife in the act of adultery. The effect was to drive him into a state of distraction. He dashed his head several times against the wall, but, finding this ineffectual, took a cleaver and struck himself violently on the forehead with the edge of the instrument, until he fell dead from the loss of blood. It is supposed that he must have inflicted at least one hundred wounds on himself.

This was done in the presence of several persons: but suppose his dead body had been found with these marks of injury upon it, and no countervailing evidence, would not murder have been suspected?—London Medical Repository, vol. xxviii. p. 83.

* Beaupré on Cold, translated by Dr. Clendenning. Larrey's Surgical Memoirs,

It is evident that the effects of extreme cold are to contract the external capillaries, and thus drive the blood to the internal parts; and some explain the constant tendency to lethargic apoplexy, to the determination to the head that is thus induced.

According to Mr. Brodie, the effects of cold are—1. To lessen the irritability and impair the functions of the nervous system. 2. To impair the contractile power of the muscles. 3. To cause contraction of the capillaries, and thus lessen the superficial circulation, and stop the cutaneous secretion. As to the mode of its operation, he imagines that "it probably destroys the principle of vitality equally in every part, and does not exclusively disturb the functions of any particular organ." *

We have but few accounts of dissection in these cases. Dr. Kellie of Leith examined the bodies of two persons found dead after a severe storm, on the night of the 3d of November, 1821. There was nothing remarkable in the external appearance of either. But little blood flowed on dividing the scalp. The dura mater was congested and suffused, and its sinuses loaded with black blood. The pia mater was turgid and congested. In each, also, between three and four ounces of serum were found in the ventricles and at the base of the brain. Not only did the appearances in the head thus correspond in these two individuals (a male and female), but even the stomach and small intestines were precisely similar. The stomach was of its usual pale colour, the small intestines were deeply coloured, from a general and minute injection of their vessels. The liver was congested.

Dr. Kellie does not deem the effusion of serum a *post mortem* production, and inclines to the opinion that it was produced in the short interval between their exposure and death. Its occurrence in both is certainly a forcible argument in favour of this supposition; but it may, as in a former case, have been existing previous to the accident.

Our author states that he could find but one recorded dissection on this subject, and that is by Quelmalz, in the 6th vol. of Haller's Disputationes. Here "the vessels of the brain were turgid with blood, and in the ventricles was an effusion of serous lymph."† Other authorities, as Rosen, Cappel, and Martin (but all uniting in the same statement), are, however, quoted by Kay and Copland.

The absence of any marks of injury is a guide in cases of this kind, especially when other circumstances point to the cause in question. "When a person is found dead from the effects of extreme cold, there are no marks of external violence, nor internal suffering. The body lies as if in a deep and calm sleep, without any external appearances to guide us as to the cause of death, except, perhaps, a swelling of the extremities, which has come on prior to death."‡

p. 78. Any thing that weakens the nervous system, as hunger, intoxication, &c., renders the individual insensible to the effects of cold.

* Paris, vol. ii. p. 61.

† Edinburgh Medico-Chirurgical Transactions, vol. i. p. 84. There is also a case of recovery from the effects of cold, given by Dr. Kellie, in the Edinburgh Medical and Surgical Journal, vol. i., p. 302.

‡ Dunlop's MS. Lectures on Medical Jurisprudence. Dr. Ozanam of Lyons mentions the following case, as another mode in which cold may cause death. A

As a supplement to this division, I must say a few words on sudden death from *drinking cold water*, although I am not sure but that its appropriate place is under that of sudden death by apoplexy. Dr. Rush was the first writer who distinctly noticed it. He states, that during the warm weather of summer, but seldom unless the heat is above 85°, as many as four or five persons have died in a day, from drinking a large quantity of cold water. The symptoms induced were dimness of sight, muscular weakness, so that the patient suddenly falls down, difficult breathing, rattling in the throat, suffused countenance, livid extremities, imperceptible pulse, and death, all in the course of some five or ten minutes. Others, again, were seized with spasms, and died in them.

The fatal consequences at the season in question are not, according to Dr. Rush, restricted to cold water alone, as he has known punch, beer, or toddy, drunk under similar circumstances, to produce equally fatal effects.

It has, however, been strongly questioned whether the cold water is so important an agent in producing these effects as was supposed. It is urged that the heat of the body varies but little at any time; that farmers during harvest constantly drink water drawn from wells, which is decidedly colder than the water in cities, and yet these effects are unknown in the country. Again, Dr. Dickson of Charleston, South Carolina, a city in the "fervid south," states that such cases are unknown there. He has never heard of one during the whole period of his practice, and yet ice and iced waters are in constant use. An English traveller, speaking of Naples, observes, "It surprises some strangers to see that the Neapolitans, at the hottest time of the day, and when they are in a state of the most profuse perspiration, from the effects of work or of walking in the broiling sun, will stop before one of these temples, and take off a large glass full of the coldest water at a draught, and with impunity. But this they all do daily in the hottest weather several times in the course of the day. We believe, also, that few foreigners live long at Naples without doing precisely the same thing, and with just the same impunity."*

Many physicians are hence inclined to believe that a state of commencing apoplexy is present, induced by the heat of the sun, or *isolation*, as it is called; by the exhaustion from severe labour, for it is generally labourers who are attacked; and by the previous irregular habits, since some, though not by any means all, have been intemperate. The drinking of a large quantity of cold water at once, when these symptoms are impending, and the patient already feels a great

cruel stepmother, after a long course of ill treatment by beating and starvation, took her daughter, aged eleven, on a cold morning in December, and forced her to enter a barrel filled with water. Although extricated by a servant after some time, she was again replaced by the brutal mother, and in it she died. On the trial for this crime, she was condemned to imprisonment for life. This refined species of cruelty, remarks Dr. Ozanam, presents a new subject for inquiry in legal medicine. There was no submersion, nor the ordinary effects of cold, nor any internal lesion, but an actual *assideration* (a word which I confess I do not understand), produced by the external application of cold. (Annales D'Hygiène, vol. vi. p. 207.)

* Penny Magazine, 1834, p. 348.

degree of muscular debility, probably has a decided effect in instantly developing the disease. Cold, also, to the stomach, in these cases, may sometimes act like a blow in suddenly paralysing the powers of life.

The rapidity with which the bodies of persons thus dying pass into putrefaction, and the season of the year, have prevented us from deriving any information by means of dissections. The publicity and alarm that is excited are generally sufficient to exclude the idea of violence.*

B. *Of persons found dead from hunger.*

The crime of permitting or causing individuals to die from hunger is, no doubt, rare in civilised countries. Instances have, however, happened; and an account of the appearances observed after death is therefore proper.

The body is much emaciated, and a fœtid, acrid odour exhales from it, although death may have been very recent. The eyes are red and open. This appearance is uncommon from other causes of death. The tongue and throat are dry, even to aridity, and the stomach and intestines are contracted and empty: this last mark has been repeatedly noticed. Haller dissected the body of a person who destroyed himself by hunger, and found the organs in question entirely empty; not the least vestige of fæces was to be seen in the intestines. The gall-bladder is puffed with bile, and this fluid is found scattered over the stomach and intestines, so as to tinge them very extensively. The lungs are withered, but all the other organs are generally in a healthy state. The blood-vessels are usually empty.†

* The following are all the authorities that I have been enabled to collect on this subject:—

Rush on the disease occasioned by drinking cold water in warm weather, in Medical Inquiries and Observations, vol. i. p. 181, 2d edition.

Dr. Higginson, in Boston Medical and Surgical Journal, vol. iii. p. 289.

Dr. Watts, in New York Medical and Surgical Register, p. 81.

Prof. Dickson, in American Journal of Medical Sciences, vol. iii. p. 262.

Prof. T. D. Mitchell, in North American Med. and Surg. Journal, vol. x. p. 379.

Dr. Brewster, in Chapman's Journal, N. S., vol. ii. p. 93.

Dr. Bartlett, in Boston Medical Magazine, vol. iii. pp. 86, 174.

Most of these writers concur in considering the phenomena as altogether those of apoplexy. New York, Philadelphia, Boston, and Albany, seem to be the places in which most of these sudden deaths occur.

† Foderé, vol. ii. p. 276; vol. iii. p. 231, who quotes the observations of Morgagni, Redi, Valsalva, and Haller.

London Medical and Physical Journal, vol. xv. p. 510. Case of death from spontaneous abstinence, by Dr. Desgenettes of Paris. Here the lungs were sound, but the gall-bladder and stomach were in the state described above.

American Cyclopædia of Practical Medicine, Art. *Abstinence*, by Dr. Hays. He quotes the case of a prisoner, who, in two months, starved himself to death at Toulouse. The brain was paler than usual; the lungs nearly natural; œsophagus contracted, but not the stomach, which contained a little fluid; the lower portion of the small intestines red, softened, and highly injected; large intestines natural, and containing fæcal matter; the gall-bladder much distended with black thick bile; the muscles much attenuated.

In Kelsey's case (related by Dr. M'Naughton, in the Transactions of the Albany Institute, vol. i. p. 113), who lived for fifty-three days on water alone, the stomach was loose and flabby, and the mesentery, stomach, and intestines, extremely thin and transparent; the gall-bladder, as in all the preceding cases.

Prof. Horner, in consequence of some observations made by him, is of opinion that the substance of the brain in these cases becomes many shades lighter than natural, shewing the destitution of red blood. This is confirmed by a case below.*

There is, however, some distinction to be taken between the effects of death from fasting, or from hunger. The former is slower in its progress, and consequently may occasionally present appearances different on dissection. An Italian writer has recently endeavoured to designate these, and mentions as among the peculiar results of death from hunger, inflammation of the stomach and intestines, and a rapid tendency to putrefaction.† Of the two, however, the last is more frequently mentioned than the first.

Collard de Martigny's experiments on animals tend to elucidate this subject. He starved dogs and rabbits, and the effects were excessive emaciation, and a diminished size and colourless state of the muscles. The heart and large vessels contained but little blood, and the lungs were empty; the viscera generally pale, but the gall-bladder large and distended with limpid greenish-yellow bile; the stomach contracted, as were also the intestines, which last were tinged with bile. In three cases only, out of eighteen, did he find any marks of inflammation in the digestive canal. The quantity of fibrin in the blood was sensibly diminished. He does not seem to have examined the brain.‡

Dr. Duncan, whose authority on all subjects connected with the science is of great value, remarked, in a clinical lecture delivered not long before his lamented death, that "it was a matter of notoriety, when persons in health were deprived of their usual food, or when animals were starved for experiment, that the intestines were found inflamed and ulcerated; this circumstance has also been remarked in some recent cases of criminal trials for wilful murder by starvation."§

As several of the signs enumerated are characteristic and peculiar, they will serve to exclude the other causes of violent death.

In 1768, the daughter of a notary at Nevers, in France, aged 15, died of an unknown disease. She had been already buried, when it was rumoured abroad that her father had caused her death by hunger. The information laid before the judge was of such a nature that he directed the arrest of the parent, and the disinterment of the body. This was twenty-four hours after the burial. The report of the medical examiners was as follows:—

The whole body is extremely emaciated. The skin is very thin, and its colour livid; an unpleasant odour is exhaled; the eyes are open and red; contusions and excoriations appear on various parts of the body; and the anus and vagina are covered with small white worms in great quantity, and these parts, and particularly the first, are much excoriated and dilated. On opening the body, the stomach was seen

* Horner's Pathological Anatomy, p. 360.

† American Journal of Medical Sciences, vol. i., p. 472.

‡ North American Medical and Surgical Journal, vol. vii. pp. 196, 221 (from Magendie's Journal).

§ Lancet, N. S. vol. vi. p. 449.

in a healthy state, containing a wineglassfull of serous, greenish bile; the pylorus was contracted; the duodenum, together with the right side of the ileum and jejunum, was inflamed; the gall-bladder was swelled with bile, and the intestines were entirely empty, The remainder of the viscera, together with those of the thorax and head, were in a healthy state, except that the right lung was a little withered. The report concluded by giving an opinion, that the girl had died in a state of extreme weakness and languor, but it assigned no cause.

Public opinion continued to implicate the parents, and they sought a defender in the celebrated Petit, from whom an answer to the following questions was requested: 1. Whether the facts stated above were sufficient to prove that the child died from hunger? 2. Whether there was any circumstance to indicate that a length of time had elapsed between the death and burial? To both these, he answered in the negative, and for the following reasons: Extreme emaciation is rather a proof of long illness than of starvation, because it is very common for persons of a tolerable degree of fatness, when they refuse food, to die before they lose much flesh. The emptiness of the intestines was more indicative of colliquative diarrhœa from long disease, than of any other cause. The state of the gall-bladder proved (in Petit's opinion) nothing on one side or the other, nor did the excoriations; while the natural state of the stomach was an argument against death by famine, since in such cases that organ is observed to be much contracted. Finally, the worms might have been present in the parts for some time before death, nor was the smell of the body by any means so offensive as to indicate putridity of long standing. On these grounds, though unwilling to assign a cause of death, he was decidedly of opinion that famine had not induced the fatal termination.

It is impossible to read this opinion, and compare it with the observations of anatomists on persons known to have died from hunger, without agreeing with Foderé, that Petit appears rather as the advocate of the accused than the impartial investigator of truth.

On the trial, it was conclusively proved, that the parents had been guilty of mal-treatment; and though, after the opinion of Petit, their lives could not be affected, yet the father was sentenced to the galleys for life, and the mother to perpetual banishment.*

C. *Of persons found dead from lightning.*

As to death by lightning, it may be remarked, that it is usually distinguished by a variety of appearances. Sometimes the viscera are destroyed, without any external mark being present; while in others there is nothing but a small hole. Again, there will be great external injury observed: but the most common accompaniment is discoloration

* Foderé, vol. iii. p. 223. In addition to the references on this subject, I may quote, Cyclopædia of Practical Medicine, art. *Abstinence*, by Dr. Marshall Hall. Copland's Dictionary, art. *Abstinence*. A case by Mr. Griffith, London Medical and Physical Journal, vol. xliii. p. 99. Percival's Essays, vol. ii. p. 260. Lancet, N.S. vol. ii. p. 158; vol. iii. p. 486. Dr. Ogston's case of Melanosis of the stomach, Edin. Med. and Surg. Jour. vol. xxxviii. p. 259.

of the skin, generally in the form of streaks. These are of a red colour; and it has been remarked, that they are peculiarly to be traced in the direction of the spine. Others, again, receive wounds, or the integuments are extensively burnt, and blisters form.*

The bodies of those killed in this manner are, generally, but not always, flaccid, and the blood is in a fluid state.

As to the cause of death by lightning, two theories have been maintained. John Hunter supposed that there was an instantaneous and total destruction of the vital principle in every part of the body, and, consequently, that the muscles are relaxed and incapable of contraction. Hence their flaccidity, the fluidity of the blood, and a rapid tendency to putrefaction. Mr. Brodie, on the other hand, concludes from his experiments that this does not take place; but that in a majority of cases, the effects of lightning are expended chiefly in disturbing or destroying the functions of the brain. He found the heart acting in an animal apparently dead from an electric shock. In this way, also, he explains the many symptoms imitating apoplexy or affections of the head, which arise from injury of this nature.†

In making up an opinion in a doubtful case, much depends on the place and situation where the body is found. If a person be dead in an open place, or under a tree, shortly after a thunder-storm, with the ordinary appearances now enumerated, we may attribute his death to lightning; and particularly so, if any metallic substances about him are found melted, and his clothes torn or burnt, while dissection exhibits nothing adverse to the idea.‡

D. *Of persons found burnt to death.*

The same circumstances to which we have directed the attention

* In illustration of this, I may refer to the following. The case of Mr. Boddington and his lady, both struck by lightning in England. The injuries received by her were actual wounds, while his were only burns.—London and Edinburgh Philosophical Magazine, vol. i. p. 191. Very extensive burns, with a raising of the epidermis.—Edinburgh Medical and Surgical Journal, vol. xli. p. 493. The epidermis nearly destroyed, and the hair burnt—a French case.—Lancet, N.S. vol. vi. p. 910. Two German cases, one with livid streaks, and the other, extensive burns.—Lancet, vol. vii. pp. 255, 445. Extensive blistering of the skin.—New York Medical and Surgical Register, p. 55. Case by Professor Stevens.

† Thus, Dr. Macauley (Edinburgh Medico-Chirurgical Transactions, vol. i. p. 360) found apoplexy to succeed, with all its external appearances, and in two other cases, epilepsy. Mr. Godfrey, surgeon of the Cambrian (London Medical and Physical Journal, vol xlvii. p. 369), relates of a sailor struck dumb and blind. Deafness is not at all an uncommon result; so, also, paralysis. Dr. Young (American Journal of Medical Sciences, vol. xiii. p. 54) and Dr. Stevens both observed dilated pupils.

‡ Many cases of death or injury by lightning, together with the appearances observed, are to be found in the Philosophical Transactions. See vol. i. pp. 222, 247; vol. v. p. 2084; vol. xix. p. 311; vol. xx. p. 5; vol. xxi. p. 51; vol. xxii. p. 577; vol. xxvi. p. 137; vol. xxxiii. p. 366; vol. xxxiv. p. 118; vol. xxxvi. p. 444; vol. xlviii. p. 86; vol. li. p. 38; vol. lii. p. 515; vol. lxii. p. 131; vol. lxiii. pp. 177, 231; vol. lxvi. p. 493; vol. lxxi. p. 42; vol. lxxvii. pp. 61, 130; vol. lxxx. p. 293. There is, also, an interesting account of the celebrated death of Richman, at St. Petersburgh, vol. xlix. p. 61. Another by Lomonossoff, will be found in Dr. Granville's Travels to St. Petersburgh, vol. ii. p. 112. There was only a red spot on his forehead, the legs were blue, and one shoe was torn, but not burnt.

of the examiner in previous sections, are to be noticed in cases of this nature. Dissection, if it be practicable, must not be omitted.

There is an instance related by Foderé, which presents a most instructive lesson. In 1809, a wretch murdered several individuals with an axe, and then set fire to the house. The medical officer did not deem it worth while to examine the bodies, and certified that their death was owing to the fire. Meanwhile, an individual was discovered murdered about one hundred paces from the house, and suspicion being excited, the bodies were disinterred. It was found that the flames had only burnt the flesh superficially, and that the marks of the axe were still distinctly visible.*

So, also, in the State of Maryland, a few years since, a ruffian murdered a whole family, and then fired the log-house in which they lived. On the body of the father, however, a fracture of the skull was found; and in consequence of a bed from the upper room falling on the mother, her body was so far uninjured as to exhibit three incised wounds, one of them penetrating the stomach. The murderer was detected, by finding on him articles of dress belonging to the family.

Apart from the possibility of such cases, it not unfrequently becomes necessary to ascertain whether the burning has happened during life. A person may have been strangled, and the clothes subsequently fired, to present the appearance of accidental death.

A case bearing on this point occurred, some years since, to the late Dr. Duncan, in Scotland. A husband and wife, living on bad terms, were heard to struggle; and after a short time, the neighbours were alarmed by a strong smell of fire. All attempts to enter were for some time fruitless, owing either to the real or pretended deep sleep of the husband. At last, on obtaining admission, the body of the female was seen burning on the hearth. On examination before the coroner, the abdomen was found reduced to a cinder, but on the face and extremities there were marks of reaction; some spots were red and inflamed, others scorched to a hard and transparent crust, but surrounded with distinct redness; and "a great many blisters filled with lymph, perfectly different from those produced on the dead body, which are not filled with a fluid, but with air or vapour. In short, we found (says Dr. Duncan) appearances exactly similar to those of fire on a living body; and therefore we reported, as our unanimous opinion, that the deceased was burnt to death."

As there was no proof that the prisoner had been the cause, he was found not guilty; and it is indeed possible (although there were some suspicious circumstances against him) that this may have been a case of preternatural combustibility, as I shall hereafter describe it. Such, indeed, is Prof. Christison's opinion: a part of the clothes were unburnt; the chair from which she had fallen was entire, and yet the abdomen was nearly destroyed.

However this may have been, the present case appears to have led

* Foderé, vol. iii. p. 18. Dr. Dunlop (MS. Lectures) mentions a similar case occurring at Glasgow in 1809. A man murdered his wife, and then set fire to her clothes. There were, however, marks of external violence sufficient to convict him.

Prof. Christison to perform an interesting series of experiments, in order to ascertain the criterions by which a burn inflicted during life may be distinguished from one produced after death.

From his observations, it follows, that "the only effects of burns which appear immediately after the injury, and remain in the dead body, are, *first*, a narrow line of redness near the burn, not removable by pressure; and, *secondly*, blisters filled with serum: that the former is an invariable effect, but that the latter is not always observable when death follows the burn in a few minutes."

In order to meet the inquiry which readily suggests itself, "whether these appearances can be produced or imitated immediately after death, while vitality still lingers in the body, or, to use Bichat's phrase, while organic vitality survives the extinction of animal life?" Prof. Christison performed several experiments.

In a stout young man who poisoned himself with laudanum, a very hot poker and a stream of boiling water were applied to the skin of the chest, and inside of the arm, one hour after death. On the next day, no blisters or redness were visible on or near the burns. At the parts burnt with scalding water, the cuticle appeared as if ruffled, and could be very easily rubbed off, but there was not a trace of moisture on the true skin beneath. At the parts burnt with the poker, the whole thickness of the skin was dried up, brownish and translucent, but entirely free of redness or blistering on or around them.

In another case of poisoning, where the patient was comatose, heat had been applied four hours before death, and again was applied half an hour after it. The body was examined in thirty-eight hours. Some of the spots burnt during life presented a uniform blister filled with serum; and even where the cuticle was gone, and the true skin dried, there were drops of serum, and also particles of the same fluid dried by evaporation: around all of them, also, there was more or less scarlet redness, and this redness was not diminished by pressure. Some of the spots burned after death were charred on the surface, and not elevated: two presented vesications, but the blisters were filled with air; the cuticle over them was dry and cracked, and the surface of the true skin beneath was also quite dry. On the white parts of the skin there was no adjacent redness, and the lividity which occurs in dead bodies was immediately removed by moderate pressure.

These and other experiments with similar results, led Prof. Christison to the conclusion, that the application of heat to the body, even a few minutes only after death, cannot produce any signs of vital reaction mentioned above; and he concludes his observations by remarking, "that, as far as the preceding experiments go, a line of redness near the burn, not removable by pressure, and likewise the formation of blisters filled with serum, are certain signs of a burn inflicted during life."*

There is another question that may arise in cases where persons are found burnt to death, which is alike interesting and curious; and that is, *Can there be such a thing as* PRETERNATURAL COMBUS-

* Edinburgh Medical and Surgical Journal, vol. xxxv. p. 320.

TIBILITY OF THE HUMAN BODY?* Several cases are recorded of this nature.

It is stated in the Transactions of the Copenhagen Society, that, in 1692, a woman of the lower class, who for three years had used spirituous liquors to such excess that she took no other nourishment, having sat down one evening on a straw chair to sleep, was consumed in the night time, so that next morning no part of her was found but the skull, and the extreme joints of her fingers; all the rest of her body was reduced to ashes.†

The Countess Cornelia Bandi, of Cesena, in Italy, aged 62, and in good health, was accustomed to bathe all her body in camphorated spirits of wine. One evening, having experienced a sort of drowsiness, she retired to bed, and her maid remained with her till she fell asleep. Next morning, when the girl entered to wake her mistress, she found nothing but the remains of her body in the most horrible condition. At the distance of four feet from the bed was a heap of ashes, in which the legs and arms were alone untouched; between the legs lay the head. The brain, together with half the posterior part of the cranium, and the whole chin, had been consumed; three fingers were found in the state of a coal, and the rest of the body was reduced to ashes, which, when touched, left on the fingers a fat, fœtid moisture. A small lamp which stood on the floor was covered with ashes, and contained no oil; the tallow of two candles was melted on a table, but the wicks still remained, and the feet of the candlesticks were covered with moisture. The bed was not deranged; the bedclothes and coverlid were raised up and thrown on one side, as is the case when a person gets up. The furniture and tapestry were covered with a moist kind of soot of the colour of ashes, which had penetrated into the drawers and dirtied the linen.

This case is related by Bianchini, and confirmed by other writers.‡

Grace Pett, the wife of a fishmonger of the parish of St. Clement, Ipswich, aged about sixty, had contracted a habit, which she continued for several years, of coming down from her bed-room every night, half dressed, to smoke a pipe. On the 9th of April, 1744, she got up from bed as usual. Her daughter, who slept with her, did not percieve that she was absent till next morning, when she awoke. Soon after this, she put on her clothes, and, going down into the kitchen, found her mother stretched out on her right side, with her head near the grate. The body was extended on the hearth, with the legs on the deal floor, and it had the appearance of a log of wood consumed by a fire, without

* In a former edition, I used the term *spontaneous combustion*, to express this phenomenon; but as that takes for granted what is denied by many, I have preferred the present appellation, the correctness of which, I believe, will not be denied by any who have examined the accumulated testimony on the subject.

† Coxe's Emporium of Arts and Sciences, vol. i. p. 161, from an article entitled "*On the combustion of the human body, produced by the long and immoderate use of spirituous liquors*," by Pierre Aime Lair. This essay was originally published in the Journal de Physique. In my subsequent quotations from it, I shall for brevity use the word *Lair* only.

‡ Lair, p. 162, who quotes the Annual Register for 1763. See, also, Philosophical Transactions, vol. xliii. p. 447.

apparent flame. On beholding the spectacle, the girl ran in great haste and poured over her mother's body some water, to extinguish the fire. The fœtid odour and smoke which exhaled from the body almost suffocated some of the neighbours who had hastened to the girl's assistance. The trunk was in some measure incinerated, and resembled a heap of coals covered with white ashes. The head, the arms, the legs, and the thighs, had also participated in the burning. This woman, it is said, had drank a large quantity of spirituous liquor, in consequence of being overjoyed to hear that one of her daughters had returned from Gibraltar. There was no fire in the grate, and the candle had burnt entirely out in the socket of the candlestick, which was close to her. There were also found, near the consumed body, the clothes of a child, and a paper screen, which had sustained no injury from the fire. Her dress consisted of a cotton gown. *

Le Cat relates the following case, which was communicated to him by M. Boinneau, curé of Plurguer, near Dol. It occurred in 1749. Madame de Boiseon, eighty years of age, who had drank nothing but spirits for several years, was sitting in her elbow-chair before the fire, while her waiting-maid went out of the room for a few moments. On her return, seeing her mistress on fire, she immediately gave the alarm, and some persons having come to her assistance, one of them endeavoured to extinguish the flames with his hand, but they adhered to it, as if it had been dipped in brandy or oil on fire. Water was brought and thrown on her, yet the fire appeared more violent, and was not extinguished till the whole flesh had been consumed. Her skeleton, exceedingly black, remained entire in the chair, which was only a little scorched; one leg only, and the two hands, detached themselves from the rest of the bones. It is not known whether her clothes had caught fire by approaching the grate; but she was in the same place in which she sat every day, there was no extraordinary fire, and she had not fallen.†

By a letter from General William Shepherd, it appears, that on the 16th of March, 1802, in one of the towns of the state of Massachusetts, the body of an elderly woman disappeared in the space of about an hour and a half. Part of the family had retired to bed, and the rest were gone abroad. The old woman remained awake to take care of the house. Soon after one of the grandchildren came home, and discovered the floor near the hearth to be on fire. An alarm was given—a light brought, and means taken to extinguish it. While these things were doing, some singular appearances were observed on the hearth and contiguous floor. There was a sort of greasy soot and ashes, with remains of a human body, and an unusual smell in the room. All the clothes were consumed. The fire had been small.‡

* Philosophical Transactions, vol. xliii. p. 463. † Lair, p. 168.

‡ Coxe's Emporium of Arts, vol. i. p. 326, who quotes from Tilloch, vol. xiv. p. 96. The same case is also mentioned by Foderé, vol. iii. p. 208. I have cited the cases in the text, not so much with reference to their peculiar features as their geographical position. There is a case respectively from Denmark, Italy, England, France, and America. Several other instances are on record, to which I refer the reader for further details. They are,

Some deductions are drawn from these cases, by Drs. Lair and Marc, which it is proper to mention. 1. The subjects were nearly all females; and they were far advanced in life. The Countess of Cesena was 62, Mary Clues, 52, Grace Pett, 60, Madame de Boiseon, 80, and Mlle. Thuars, more than 60. 2. Most of the individuals had for a long time made an immoderate use of spirituous liquors, and they were either very fat or very lean. 3. The combustion occurred accidentally, and often from a slight cause, such as a candle, a coal, or even a

1. Mary Clues, aged fifty, at Coventry (Eng.), *Wilmer*, Philosophical Transactions, vol. lxiv. p. 340.

2. An anonymous case, by Vicq d'Azyr, of a woman aged fifty years.

3. A case, by Henry Bohanser, of a female at Paris.

4. The wife of Sieur Millet, at Rheims, in 1725, related by Le Cat.

5. Mary Jauffret, at Aix, in Provence, related by Muraire, a surgeon, in the Journal de Medicine.

6. Mademoiselle Thuars, at Caen, in 1782, related by Merille, a surgeon, in the Journal de Medicine.

7. Two anonymous cases of females in Caen.

All these are mentioned by Lair.

8. An anonymous case of a female, at Paris, in 1779. Foderé, vol. iii. p. 207.

9. The Priest Bertholi, in 1776, in Italy. This is a very remarkable case, and some particulars mentioned by Battaglia, the surgeon who attended him, may with propriety be added in this place. Bertholi was travelling about the country, and at evening arrived at the house of his brother-in-law. He immediately desired to be shewn to his apartment, and, when brought to it, requested that a handkerchief should be placed between his shirt and shoulders. This was done, and he was left to his devotions. A few minutes had scarcely elapsed before a noise was heard in his room, and the cries of the priest were particularly distinguished. On entering the room, he was found extended on the floor, and surrounded by a light flame, which receded as they approached, and finally vanished. On the next morning, M. Battaglia was called and examined the patient. He found the integuments of the right arm almost entirely detached from the flesh, and between the shoulders and thighs the integuments were injured. There was a mortification of the right hand, and this, in spite of scarification, rapidly extended itself. The patient complained of burning thirst, and was horribly convulsed; he passed by stool putrid bilious matter, and was exhausted with continual vomiting, accompanied with fever and delirium. On the fourth day, after two hours' comatose insensibility, he expired; and, a short time previous to his death, M. Battaglia observed, with astonishment, that the body exhaled a most insufferable odour — worms crawled from it on the bed, and the nails had become detached from the left hand.

The account of the patient was, that he felt a stroke like the blow of a cudgel on the right hand, and, at the same time, saw a bluish flame attack his shirt, which was immediately reduced to ashes, the wristbands, in the mean while, remained totally untouched. The handkerchief between the shoulders and shirt was entire, and free from any trace of burning. His breeches were also uninjured, but though not a hair of his head was burnt, yet his cap was entirely consumed. There had been no fire in the room, except that the lamp, which had been full of oil, was now dry, and its wick reduced to a cinder.—Foderé, vol. iii. p. 210. London Medical Repository, vol. i. p. 332.

10. A female in Paris, in 1804, aged sixty-eight, related by Dr. Vignè. Foderé, vol. iii. p. 216.

11. A female in France, aged 28, communicated by Dr. Prouteau, in Leroux's Journal de Medicine. New England Journal, vol. iv. p. 194.

12. Mrs. Laire, at Saulieu, in 1808, aged 60 years. Ballard, p. 414.

13. Ignatius Meyer, aged 48, in the village of Waertelfeld, bailiwick of Schwalenberg in Germany. This occurred on the 17th of January, 1811. Meyer was a very intemperate man. The parts of the body under the bed-clothes were not affected. This case is related by Dr. Scherf of Detmold.—London Medical Repository, vol. iii. p. 239. New York Medical Repository, vol. xviii. p. 87.

14. Mrs. P——, aged 90, and her servant, aged 60, at Nevers, in France, on

spark. 4. The combustion proceeded with great rapidity, usually consuming the entire trunk, while the extremities, as the feet and hands, were occasionally left uninjured. 5. Water, instead of extinguishing the flames which proceeded from the parts on fire, sometimes gave them more activity. 6. The fire did very little damage, and often did not affect the combustible objects which were in contact with the human body at the moment when it was burning. 7. The

the 15th of January, 1820. Case by Dr. Charpentier, London Medical and Physical Journal, vol. xlv. p. 347.

15. M. Vatin, at Beauvais (France), aged upwards of 60. This happened in January 1822. He was corpulent and intemperate. Related by Drs. Colson and Lelarge, in Journal Compliment. Edinburgh Medical and Surgical Journal, vol. xix. p. 653; vol. xxii. p. 233. American Medical Recorder, vol. vi. p. 764.

16. Margaret Heins, at Hamburgh, January 1825. This case somewhat resembles Bertholi's. From Hecker's Annalen. Edinburgh Medical and Surgical Journal, vol. xxvi. p. 215.

17. Mrs. Soret, aged 57, in December 31, 1825; occurred at Rouen, and related by Dr. Hellis. Medico-Chirurgical Review, vol. ix. p. 544.

18. A case of combustion of both hands, from attempting to extinguish the clothes of a brother, which were on fire. A blue flame continued for several hours over the parts, and it required constant immersion in water to extinguish it. Dr. De Brus, in the Archives Generales for March 1829. Edinburgh Medical and Surgical Journal, vol. xxxii. p. 227.

19. A female, at Lexington, Kentucky, November 15, 1829. Case by Professor Short. Transylvania Journal, vol. iii. p. 143.

20. Four cases in Ireland within the present century; two in Dublin, one at Limerick, and the other at Coote Hill, county of Cavan. All were females and intemperate. Related by Dr. Apjohn. Cyclopædia of Practical Medicine, art. *Combustion, spontaneous.*

21. The case of Jane Lapiter, an aged woman, *very temperate*, occurring at Cheltenham (England), a few years since, is related by Dr. Newell, in Midland Medical and Surgical Reporter, vol. i. p. 248. A portion of the bones and the whole of the viscera were reduced to ashes. The fire extended to within about three inches of the ancle-joint, and yet neither the shoe, the stocking, nor the skin and flesh below, were injured. Paris mentions that Plouquet enumerates 28 cases in his Literaria Medica. The greater number, I presume, are not contained in the above list.

"The following is the latest, and consequently best authenticated, case on record. After this, it is to be hoped that we shall hear nothing more of the excess of incredulity on this subject, which M. Foderé asserts is the great bar to philosophical discovery in the present age.

"Another case which occurred in the neighbourhood of Bourdeaux, in September 1822, has been related in the last volume of the Nouveau Journal de Medicine; but, though the particulars were sworn to before a magistrate, our readers will not be at a loss to discover good reasons for doubting its authenticity. A sober, healthy blacksmith was returning home in company with a girl one very hot afternoon, when he suddenly felt an acute pain in the right index, and was astonished to behold it burning and smoking. He rubbed it against his thumb to extinguish the flame, but the flame caught both the thumb and middle finger. He then rubbed them on his trowsers, but burnt two holes in them; next, he thrust his hand into his pocket, and set it on fire too; and, finally, he happened to touch the fore and middle fingers of the left hand, when these caught fire also. In vain did he plunge them into a bucket of water; they continued to burn. In vain did he stick them in the mud; the virtue of the mud was not more potent. At last, a devout female reminded him that faith saves us; he dipped them in holy water, and the flames were speedily extinguished. Since the well-known story of the priest Bertholi (see Foderé's Med. Leg., vol. iii. p. 210), this is the only instance of alleged spontaneous combustion where the sufferer has been seen during life. The most amusing of the whole story is, that the relater doubts none of the circumstances, except the efficacy imparted to the water by its sanctification."—Dunlop.

combustion of these bodies left, as a residuum, fat fœtid ashes, with an unctuous, stinking, and very penetrating soot. 8. The combustions have occurred at all seasons, and in northern as well as southern countries.*

As to the cause of this remarkable phenomenon, various opinions have been promulgated, which I shall very briefly state. Lair and others suppose that there is an alcoholic impregnation of the body, and that the actual contact of fire is necessary to produce it. To this, it is replied, that there is no proof of such a saturation of the organs, and if it were so, it would not, judging from comparative experiments, render the body combustible. Julia Fontenelle immersed pieces of meat for a length of time, in alcohol, but on firing it, their external surface alone was scorched.

Another theory, supported by Maffei, Le Cat, Kopp, and others, refers the combustion to the agency of the electric fluid. Marc, however, appreciating the weakness of such an opinion, has endeavoured to fortify it by supposing that inflammable gases may accumulate in the cellular tissue, and thus render the body predisposed to this state, and in a system, charged with ideo-electricity, the slightest inflammable substance may commence the combustion. The gas he deems to be hydrogen and its compounds, and thus explains why water often fails to extinguish it, and why, also, contiguous substances are so seldom injured, the heat required for its inflammation being low. It is difficult, however, on this hypothesis, to explain the rapidity of the combustion, and the complete reduction of the body or its parts to ashes. Julia Fontenelle, after expressing his disbelief in either of the above, refers it to an internal decomposition, and the formation of new products, which are highly inflammable. If to this, we add the opinion favoured by Professor Apjohn, that phosphuretted hydrogen may be generated in the system, an explanation is presented, which will almost justify the term in common use, of spontaneous combustion.

I must, however, refer the curious reader to the references below, and proceed to point out how these cases differ from the effects of ordinary combustion.†

We are authorised in asserting, both from the history of ancient

* Lair, p. 171. Foderé, vol. iii. p. 217.

† See the elaborate article of Marc on *Spontaneous Combustion*, in the Dictionnaire des Sciences Médicales, vol. vi., translated by Dr. Drake in his Western Journal vol. i. p. 130; Julia Fontenelle's memoir, in Jameson's New Edinburgh Philosophical Journal, vol. v. p. 164; Cyclopædia of Practical Medicine, art. *Combustion, spontaneous*, by Dr. Apjohn; Edinburgh Medical and Surgical Journal, vol. xxxix. p. 416; American Medical Recorder, vol. v. p. 489, where the alcoholic theory is defended by Dr. Thomas D. Mitchell; and Transylvania Journal, vol. vii. p. 128, where it is opposed by Dr. Caldwell.

A dissection by Dr. Bally is deemed corroborative of the opinion advanced by Marc. He attended a case of typhus, acompanied with general emphysema; and after death, gas was found in large quantities in the cavity of the peritoneum, and even the vessels of the *pia mater* contained air. This gas, from whatever part it was extricated by puncture, took fire on bringing a candle to it, and burnt with a blue flame.—Edinburgh Medical and Surgical Journal, vol. xxxvi. p. 221.

The existence of oil in the serum of the blood, first noticed, I believe, by Professor Traill, and nearly altogether in persons intemperate, has also been supposed to illustrate the combustibility of the system. See Traill in the Edinburgh Philosophical Journal, vol. xiii. p. 375; Edinburgh Medical and Surgical Journal,

nations who employed this mode of sepulture, and the narratives of the martyrs and others burnt to death, that large quantities of fuel are needed to convert the body to ashes. It is necessarily *slow* in its progress, and the heat required, being high, would extend itself to surrounding substances. The combustion, also, in ordinary cases, would often be incomplete, and particularly so as to the bones. Again, if the body be not wholly unconsumed, there will be blisters, scars, &c. on various parts.

How strikingly this differs from the phenomena mentioned above, I need scarcely urge. The empyreumatic odour, and the moist and sooty matter resting on the furniture and walls, are wanting; and if Fontenelle be correct, a still more striking distinction occurs. In these cases of preternatural combustibility, the hair, the most combustible part in the human frame, is never burnt, while the liver and spleen are always so.

The application of these distinctions, in medico-legal cases, is manifest; and there is one instance on record, which justifies the notice that I have taken of the subject.

The case is related by Le Cat, and is that of the wife of the Sieur Millet, at Rheims. She got intoxicated every day, and the domestic economy of the house was managed by a handsome young female. This woman was found consumed on the 20th of February, 1725, at the distance of a foot and a half from the hearth in her kitchen. A part of the head only, with a portion of the lower extremities and a few of the vertebræ, had escaped combustion. A foot and a half of the flooring under the body had been consumed; but a kneading trough and a tub, which were very near the body, sustained no injury. M. Chretien, a surgeon, examined the remains of the body with every juridical formality. Jean Millet, the husband, being interrogated by the judges, declared, that about eight in the evening of the 19th of February, he had retired to rest with his wife, who, not being able to sleep, had gone into the kitchen, where he thought she was warming herself; that, having fallen asleep, he was awakened about two o'clock by an infectious odour; and that, having run to the kitchen, he found the remains of his wife, in the state described in the report of the physicians and surgeons. The judges formed an opinion that he had conspired with his servant to destroy the wife, and he was condemned to death. On appeal, however, to a higher court, this decree was reversed, and it was pronounced a case of human combustion; but his health and fortune were irreparably destroyed, and he died in a hospital.*

vol. xxiv. p. 421; also, Dr. Adam, in Transactions of the Medical and Physical Society of Calcutta, vol. i. p. 74. Dr. B. G. Babington (Medico-Chirurgical Transactions, vol. xvi.) appears to have detected an oil as constantly existing in healthy blood.

* Lair, p. 167. Dupuytren would seem to have been a sturdy disbeliever. He asserts that frequently, when dissecting, he put the debris of the human body in the fire at evening, and they were all consumed in the morning. As to the cases, he imagines that being all fat, and in a state of insensibility from drunkenness, their clothes take fire, and the carbonic acid thus produced increases the asphyxia; while, the skin being burnt, the fat melts and runs out, and thus the process of destruction goes on. Without derogating from his acknowledged talents, I will only add, that Dupuytren was a better surgeon and anatomist than chemist. His remarks are contained in the North American Medical and Surgical Journal, vol. x. p. 181.

E. *Of persons found dead from wounds.*

The observations already made in the section on medico-legal dissection, and the necessity of considering the subject of wounds on the living body in a distinct chapter, will necessarily contract the remarks that I have to make under this head.

I must again urge the importance of a medical examination in all these cases. An instance mentioned by Foderé, will shew how culpable any neglect on this point may become. A dead body was found in the fields, in the arrondissement of Trevoux, during the month of May 1811. The surgeon, deterred by the putrefactive smell, reported generally that he had discovered no marks of violence. Meanwhile some ditchers, on interring the body, remarked that, *on the fall of a handkerchief which covered the head*, the bones of the cranium detached themselves, and the brain issued out. The imperial attorney ordered a special examination of the head, and it was found that the deceased had received three blows with a cutting instrument, which separated the parietal bones from the skull. The assassins, after committing the crime, had replaced these, and secured them with a handkerchief bound very tight; they were afterwards discovered and punished.*

It is important to understand that in legal medicine, the term *wound* is used in a much more comprehensive sense that in surgery. In the latter it means, strictly, only a solution of continuity; in the former, injuries of every description that effect either the hard or the soft parts; and accordingly under it are comprehended bruises, contusions, fractures, luxations, &c. In this sense, then, the term wound is to be understood in this work.

The important question to be decided in every case of persons found dead from wounds, is, whether the *wounds are the result of suicide, accident, or homicide.*

Besides noticing the surface of the body, and ascertaining whether ecchymosis or suggillation be present, we should pay great attention to the following circumstances: The situation in which the wounded body is found, the position of its members and the state of its dress, the expression of countenance, the marks of violence, if any be present on the body, the redness or suffusion of the face. The last is important, as it may indicate violence, in order to stop the cries of the individual. The quantity of blood on the ground or on the clothes should be noticed, and, in particular, the probable weapon used, the nature of the wound, and its depth and direction. In a case of supposed suicide, by means of a knife or pistol, the course of the wound should be examined, whether it be upwards or downwards, and the length of the arm should be compared with the direction of the injury. Ascertain whether the right or left arm has been used; and as the former is most commonly employed, the direction should correspond with it, and be from right to left.†

* Foderé, vol. iii. p. 72.

† "By observing this law of nature, murder by another person, instead of *felo de se*, has been detected, as by the discovery of the impression of a bloody left hand upon the *left* arm of the deceased. So the murderer, Patch, was convicted, partly

When a wound is alleged to have been committed by accident, we may inquire into the probability of this by comparing the stature of the body with the person who caused the accident, and thus ascertain whether the wound could have been received in its existing direction.* The place where the accident has happened, and a comparison of the instrument with the injury inflicted, may also give useful light.

It has, at various times, been a subject of anxious discussion, whether there are any proofs to be drawn from the nature of the wound, discriminative of the injured individual falling on the weapon, or of it having been thrust into him. This question was put to the medical faculty of Giessen under the following circumstances:—On the 29th of November, 1685, at night, J. Scheffer of Arheilgen was found dead in the city of Giessen. The examiners discovered a wound in the right side, two fingers' breadth below the nipple, and between the second and third ribs. It penetrated through the muscles, the superior lobe of the right side of the lungs, the pericardium, and the vena cava, to the left side of the lungs.

The accused said that the deceased had rushed on his sword. The companions of the latter were throwing stones, and with his drawn sword he ran forward to the prisoner, and, falling, met his fatal wound. The fiscal, on the other hand, denied the possibility of this. The deceased was not thrust through the body, but the wound was inflicted on the right side—a position in which he could not have been placed unless he had run side-ways.

The medical faculty of Giessen, on being consulted, answered in favour of the prisoner for the following reasons:—The deceased was drunk and in a great rage, and the motion which the French call the *passade* might have inflicted the wound while he was rushing with great fury on his antagonist.†

Foderé quotes another case from Kopp illustrative of this question. "A miller was assassinated at his own door by a butcher, who pretended that he had no intention of killing him, but had only threatened

by the proof that the loaded pistol must have been discharged by a left-handed person, and that Patch was left-handed."—Chitty's Medical Jurisprudence, p. 37.

"In Patch's case the evidence went to shew that the murder was committed by means of a pistol shot by a left-handed man. Sergeant Best, in a conference with the prisoner before the trial, pressed him to say whether he was left-handed, but he protested that he was not: yet, on the trial, being called to plead and to hold up his hand, he answered *not guilty*, and held up his left hand."—Dr. A. T. Thomson, London Medical and Surgical Journal, vol. vi. p. 454.

* Two men of different height fought a duel some years since at Marseilles, with swords, on a public walk. The weapon of each reached the heart of the other at the same moment, and they fell dead together. On examining their bodies, the wound given by the small man was found to be directed from below upwards, and that by the larger, from above downwards.—Foderé, vol. iii. p. 196.

† Valentini's Pandects, vol. i. p. 240. In the London Medical and Physical Journal, vol. xxxi. p. 467, an anonymous correspondent remarks, that in the account of the late trial of Major Gordon for the murder of a private soldier, by holding in his hand a sword, on which the deceased fell, it is stated that Messrs. Snowden and Blake gave medical evidence, and they deposed that from the appearance of the wound, they would take upon themselves to declare, that it must have been inflicted by the body falling upon the sword, and not occasioned by a thrust of the weapon. The writer solicits information as to the mode of discriminating between these.

him with his knife, in consequence of some maltreatment which he had received: that the miller renewed the attack, and, in attempting to pursue him, made a false step and had fallen on the weapon. A single external wound, which led downward to two wounds of the left ventricle of the heart, separated from each other by an interval of two lines, shewed that the accused had employed the same method to destroy his victim as that used by butchers in Germany to kill cattle; that is, after having driven the knife into the heart, they withdraw it some distance and replunge it, so as to make a second internal wound. Thus, the direction of the wound, compared with the respective statures of the two adversaries (the butcher being much smaller than the miller), proved that the blow had been inflicted obliquely from above downwards, viz: while the miller was sitting at his door, and not by a fall after getting on his feet, in which case the wound must have taken an opposite direction."*

Stephen Videto was, in July 1825, tried at the court of oyer and terminer for Franklin county (New York), for the murder of Mrs. Fanny Mosely.

It appeared that Mrs. Mosely had been married to a worthless individual in Canada. Shortly after her union, he brought her from her parents, under pretence of visiting his, to a tavern at the town of French Mills, and there deserted her, taking with him all her property. In this destitute situation, she applied herself with assiduity to the tailoring business, and finally accumulated some hundred dollars, with which she purchased a small farm.

In March 1824, she went to reside at the house of the prisoner's father. The family then consisted of his father and mother, a brother and sister, the prisoner and the deceased. The house consisted of two ground rooms, one called the kitchen, in which the old people slept, and the bed room, at the west side of the house. In this last there was one window at the west side, and another at the north end, a little east of the centre. At the north-east corner of the room stood the bed of the prisoner, with whom the brother slept, and at the north-west corner, that of the deceased, with whom the sister was a bed-fellow. The heads of both beds were to the north, and there was a space of about one yard between them, in which a screen or curtain was usually hung. It was also shewn, that the bed of the deceased was more than one foot lower than the bottom of the window.

In January 1825, the prisoner asserted that he had seen armed Indians about the house in the night-time, and he supposed that they harboured hostile designs against him. Under this pretence (for no other person had seen them), he borrowed a pistol and two guns, and provided himself with ammunition.

On the 1st of February, the brother and sister were both absent from home, and, of course, the prisoner and deceased were left alone. The prisoner asserted that he was watching during the night, from the apprehension of an attack, and sat up in bed, with his gun lying across

* Foderé, vol. iii. p. 196. I am indebted to Dr. Beatty for this reference, which escaped me in the previous edition.

his lap. While thus employed, a gun was suddenly thrust through the north window and discharged at Mrs. Mosely, who was then asleep. He immediately fired his gun out of the same window, but saw no one.

Such was his account. It was found on examination, that the ball entered the back of the deceased near the spine, a little above the left hip, and passed out near the left breast, nearer to the head than it entered. She died of the wound in two hours. The window, consisting of fifteen lights, had six broken in the lower sash. *The broken sash and almost all the fragments of glass were on the outside of the house.* The ball was found in the covering over the deceased. Mrs. Mosely mentioned before her death, that she lay in bed with her head to the north, her face to the west, and her body bent forward considerably.

On dissection, the lowest rib was found cut square off, at an inch or an inch and a half from the spine. There was, therefore, no glancing. The lower lobe of the left lung and the heart were perforated by the ball and shot.

The examining physicians placed the body in the position above described, on the bed, and then placed persons on the outside of the house, to ascertain whether a ball from a gun would reach her as stated by the prisoner. It was found that she must have lain in a most unnatural posture, in order to be reached,—namely, that of a person vomiting. Her account was very different.

It also appeared on the trial, that the prisoner had purchased arsenic, and probably given it to the deceased, whose health had for some time previous been in a declining state.

Videto was found guilty and executed, asserting, however, his innocence to the last.

The solution of this case remains to be given. It is the usual sequence of seduction and murder. On the dissection of the body, the murdered female was found to be pregnant. This fact was known to the district attorney, but from a regard to the feelings of the relatives of the murdered person, it was not brought in testimony. Videto confessed that he was the seducer, to Judge (now Chancellor) Walworth, before whom he was tried, a few days after his conviction.*

Not only the course of the wound is thus to be noticed, but some attention should be paid to the known comparative strength of the parties. In a recent case in England, a feeble old man, aged upwards of seventy years, was accused, on the testimony of a very suspicious witness, of having killed an individual aged twenty-four, by two or three blows on the head with a common stick. On dissection, the skull was found *broken into thirty-five pieces.* I do not know the result of the accusation; but several experiments were performed on the dead body, distinctly proving that, even with a loaded stick, such extensive injury could not be effected after nine or ten blows.†

We must also recollect, that cases like the following may occur. In 1808, during a quarrel among some drovers at an inn in France,

* For a perusal of this trial and the additional facts mentioned, I am indebted to the kindness of Chancellor Walworth.

† Midland Medical and Surgical Reporter, vol. ii. p. 358.

one was wounded with a knife on the face, hand, and upper part of the thorax near the right clavicle. When the riot ended, the injuries were examined, and found to be superficial and slight. They were washed, and an hour afterwards, the wounded individual departed for his home. He was, however, found dead the next morning, bathed in blood. Dissection was made, and the left lung and pulmonary artery were found cut. The surgeons deposed that this was the cause of death, and that it must have been inflicted after the superficial wound on the thorax, which was not bloody, but surrounded by ecchymosis. Such proved to be the fact; on his way home, he had been robbed and murdered.*

Again, an intoxicated individual was severely beaten, but was able to walk a mile and a half, to call on his physician, Dr. Davat. He did not speak, but continued in one position; allowed his comrades to tell the circumstances; and when they left, followed them, without staggering or receiving any assistance. This was at six in the evening; after which, he continued with them until nine, when he fell, and became comatose, and continued so in spite of medical assistance, until one o'clock P. M. the time of his death.

The body was examined in forty-eight hours after. There was no ecchymosis, scratch, or contusion on the surface of the body. Although, however, the scalp appeared perfectly natural, yet on cutting into it, the cellular tissue was seen infiltrated with black blood, and two large fractures of the parietal bone were discovered; blood was also collected between it and the dura mater. The viscera were healthy, but there was a longitudinal laceration of the diaphragm, two inches and a half in extent; and the herniated portion of the stomach was also ruptured, and had discharged its contents into the thorax. Small clots of blood accompanied the effused aliments.

The question immediately arose, whether the deceased had sustained all these lesions when he was seen by Dr. Davat in the evening, one hour after the injury. As to the fractures of the skull, there could be no doubt but that they were the consequence of blows; but could the diaphragm be thus ruptured, and the patient survive nineteen hours? Was it not rather owing to a fall without violence; or, as Dr. Davat supposes, occurring either immediately previous to death, or possibly directly after it? At all events, so far as experience extends, we may doubt whether such rupture of the diaphragm and stomach are compatible with life beyond a very brief period.

On the trial, the accused had the benefit of these doubts; and, although found guilty, was only sentenced to seven years' imprisonment.†

When a person is found dead at the foot of a precipice, or appears to have fallen from any height, we should naturally expect that fractures, irregular wounds, and contusions, would be present.

Madmen and suicides, it must be remembered, often inflict the most painful and extraordinary wounds on themselves. In suspected

* Chaussier, Recueil, p. 139.

† Edinburgh Medical and Surgical Journal, vol. xliii. p. 499, from the Archives Générales. Medico-Chirurgical Review, vol. xxvi. p. 529.

cases, we should ascertain the previous history of the deceased, his state of mind, and worldly situation. The countenance should also be noticed. In suicides, it is usually haggard, the eyes are sunk, and this physiognomy continues while a spark of vitality remains in the body. Those, on the contrary, who are the victims of assassination, have a degree of paleness and fear imprinted on their visage.*

These directions, though they may appear minute, are, notwithstanding, important, in consequence of the difficulty of the subject, and the fact that there is scarcely any description of wound which may not be inflicted by an individual on himself. Some, however, may be excepted, as when a person has been wounded by a small and sharp-pointed instrument in the spinal marrow, and generally, indeed, all wounds from behind.

Fire-arms are frequently used as an instrument of death, and here some inference may be drawn from the nature of the wound. If the ball has passed through the body, it is probable that the murderer was near, or that the individual inflicted it on himself. We cannot, however, rest much on this fact, since a great deal will depend on the strength of the charge and the resistance offered by the parts of the body. The direction is of more importance. "It may be taken for granted," says Dr. Smith, "that if the weapon has been introduced into the deceased's mouth and there discharged, it has not been done by another." Conceding this, it must also be recollected, that a suicide *may* inflict a wound on himself from behind. A man at Paris, after some years of insanity, shut himself in his chamber, from which was shortly heard the discharge of a pistol. On entering the room, he was found barely alive, with a wound behind the right mastoid apophysis, and the occipital bone fractured and broken. He survived two hours, and on dissection, the ball was found lodged in the cerebellum. It was evident that the pistol had been fired with the right hand placed behind the head, and probably the head was inclined to the left.†

An examination of the entrance and exit wound is also important, in enabling us to determine the direction. "That made on entering is smaller, and has its edges inverted and depressed, while the latter is much larger, with ragged, everted, and uneven edges—a circumstance depending upon the direction in which the force is applied to the skin, as well as upon the diminished velocity of the ball. When flat bones are perforated by balls, the same difference in the size and appearance of the two openings is to be observed. A trial, in which the defence rested upon the difference between the wounds, took place a few years ago in Kent, and is recorded by Dr. Gordon Smith. An officer in the preventive service was indicted for the murder of a man who was shot in the night, under circumstances of a suspicious nature as to his pursuit at the time. There was no doubt that he was in company with a party of smugglers, and came by his death accidentally. He was retreating before the prisoner, who tripped, and in the fall his gun went off. It seems that, on the other hand, several shots were fired by the

* Foderé, vol. iii. pp. 181–188.

† Case by Dr. Dance, Orfila's Leçons, 2d edition, vol. ii. p. 543.

smugglers on their retreat, and that the deceased was killed by one of them. This appeared from the testimony of a navy surgeon who examined the body. He found the wound in the upper part of the groin much smaller than that in the lower part of the buttock, which was twice or three times the size of the former, and was ragged and uneven. Fragments of the bone were likewise felt at the hinder opening, but none in the cavity of the pelvis. From these appearances he gave his opinion that the ball had entered in front, and had come from his own party."*

In a French medical journal there is stated the following case, as occurring a few years since.

An old man was fired at from a deep ditch on the road-side during a thick fog, and killed on the spot. A near relative, who was successor to his property, and whose menaces and conduct for some time previous were of an alarming nature, was suspected of the murder and arrested. It was proved that a few minutes before the murder was committed he was seen very near the fatal spot with a fowling-piece in his hand. On inspection by the surgeons it was found that death had been occasioned by two balls, one of which cut the aorta across, and the other passed through the ileum. The hole in the ileum was perfectly circular, and, when accurately measured, was found to be eight lines in diameter. The calibre of the prisoner's fowling-piece (the only arms in his possession) was found to be only six and a half lines in diameter. This circumstance at once set the prisoner at liberty.

Some time after this, however, an old officer committed suicide by means of a cavalry-pistol. The ball perforated the parietal bone, traversed the brain, &c. The hole where it entered was perfectly circular, and, when accurately measured, was found, not only greatly to exceed the calibre of the pistol, but, in fact, to admit, without much force, the barrel of the pistol itself.†

We have recently been favoured with some remarks by Baron Dupuytren on this subject. He observes, that when the gun has been discharged close to the wounded part, the opening by which the ball enters is smaller than that by which it makes its exit; but, if at a dis-

* Cyclopædia of Practical Medicine, art. *Persons dead from wounds*, by Dr. Beatty, vol. iv. p. 561.

Another instance is given in the English state trials. Richard Annesley was tried for the murder of Thomas Eglestone, a poacher. The prisoner was in company with the gamekeeper, and he asserted that his gun had gone off accidentally in attempting to secure the deceased. It appeared from the evidence of the surgeon, that the direction of the wound was upwards, and, consequently, the fowling-piece had not been levelled from the shoulder. The jury brought in a verdict of chance-medley.—Paris, vol. ii. p. 126.

In a duel fought at Paris in 1827, with pistols, the person killed was much taller than his antagonist, yet the mortal wound was obliquely downwards. Suspicion was excited and an investigation made by Breschet, Denis, and Pressat. The ball was found to have struck the clavicle obliquely, and, in consequence of its resistance, to have thus deviated. They added in their report, that they had witnessed many analogous cases. — Briand, 2d edition, p. 298.

† Medico-Chirurgical Review, vol. v. p. 504, from the Gazette de Santé of January 1824.

tance, so that the ball is nearly spent, then the reverse will be observed. The canal made in the former case will be conical. The hole made by a ball in clothes is always smaller than that in the skin.* It is hardly necessary to remind the young surgeon that balls frequently take remarkably circuitous routes.†

The following observations of the late Professor Staughton will also throw considerable light on this subject. After stating that Dr. Hennen is the first who noticed that balls will course along *concave* as well as *convex* surfaces, as, for instance, between the pleura costalis and the lungs, he proceeds to point out the striking difference between the effects of a *musket* and a *rifle* ball. "The motion of a musket-ball, independently of its projectile course on its own axis, is at right angles with its direction. Hence, when a musket-ball strikes the flesh, the hole made is smaller, to all appearance, than the ball itself. The barrel of the American rifle, on the other hand, is grooved, not in a longitudinal direction, as the French and German rifles, but in a spiral manner. The ball is forced down so tightly, that, as it passes out, it is under the necessity of following the course of the spiral groove. This imparts to it a motion on its own axis, corresponding with the direction of its course. Besides, the whole ball follows a spiral direction, forming in its progress a hollow cylinder, if I may be permitted the expression. Hence the *ragged hole*, which our hunters know so well, is always much larger than the ball. Hence the rifle-ball, at full momentum, does not, like the musket-ball, remove a cylinder of muscle and bone, but, by its rotary motion, tears the flesh and shatters the bone. Hence, too, unless the ball is nearly spent, it never glances."‡

Collateral circumstances will also throw some light on cases of this nature. Two have lately happened, the one in England, and the other in France, where the wadding was examined, and discovered to have been torn from paper found in the possession of the murderer.§ Again, a man was found shot, and his own pistol lay near him, from which circumstance (and no person having been seen to enter or leave the house of the deceased) it was concluded that he had destroyed himself, but, on examining the ball by which he had been killed, it was found too large ever to have entered that pistol; in consequence of which discovery, suspicion fell upon the real murderers.‖ Authors have also mentioned the discoloration of the fingers from the combustion of the powder in the pan, as a mark of suicide; but a crafty assassin might also have recourse to it.¶

* London Medical Quarterly Review, vol. iii. p. 133. Medico-Chirurgical Review, vol. xxv. p. 291.

† The most singular instance is that mentioned by Dr. Hennen; the ball struck the breast and lodged in the scrotum, the man standing erect in the ranks. Sometimes the tortuous course of the ball may be traced by a dusky line, but even this is not always present. The inference is obvious, in cases of wounds, not to pronounce an injury fatal until we are sure that the ball has penetrated.—Dr. A. T. Thomson, London Medical and Surgical Journal, vol. vii. p. 325.

‡ Western Journal of Medical and Physical Sciences, vol. iv. p. 380.

§ Smith, p. 280. ‖ Ibid.

¶ Such of my chemical readers as are curious on the subject, I will refer to the Annales D'Hygiène, vol. xi. p. 458, where an account is given of Mr. Boutigny's experiments to determine the period which may have elapsed after the discharge of

Again, it is a common remark, says Orfila, that the presence of two or more mortal wounds in various parts of the body, is a decisive proof of homicide, on the presumption that an individual, having allready inflicted one on himself, has not the strength to produce the second. Although correct as a general rule, it must be taken with exceptions, and particularly so if the first wound be not of a nature to produce instant death. A determined suicide may, in the few moments of existence, repeat the blows on himself. The following instance is given by our author, on the authority of Dr. Vingtrinier of Rouen. Mr. G. was found dead in his chamber, with two pistols, one near his body, and the other on the bed, at the distance of six paces. An inquest proved that the first pistol was fired when he was on the bed; that it had broken two ribs and wounded the lung. In spite of this severe injury, Mr. G. had gone into a neighbouring room, obtained the other pistol, and discharged it through his head. This produced instant death.*

The narrative of a few cases will form a proper commentary on the above remarks. I commence with one that was undoubtedly accidental.

On the 8th of February, 1792, S. D. aged about thirty years, and of a robust constitution, became intoxicated at an inn near Morges in Switzerland, and in a room heated very warm by a German stove. At eleven o'clock at night, he left this place, quite drunk, in order to return home, which was at the distance of half a league. The weather was cold, and the ground covered with snow. The next morning this man was found dead at the side of a ditch, within a small distance from his dwelling. A report soon circulated that he had been assassinated, and a medical man, who saw the body, asserted the certainty of it. The supposed murderer was already pointed out, when Dr. Desgranges, who then resided at Morges, was ordered to inspect the body.

No traces of injury were found, nor, indeed, any contusions, until, in turning the head from the left to the right side, an oblique wound, about three quarters of an inch externally, was discovered, situated below the under jaw, and nearly at the top of the larynx. On introducing the little finger into this aperture, its size internally was found greater than its external appearance indicated. Its depth was about one inch, and extended to the œsophagus and top of the trachea. The clothes of the deceased were stained with blood, as was also the snow on which he lay.

As the wound which presented itself did not resemble any inflicted by ordinary instruments, Dr. Desgranges was led to the opinion, that the injury was caused by a kind of auger, which the deceased had taken with him from the tavern, and which he had held under his arm with the handle backwards. This was found lying at the side of the man, covered with clotted blood. The truth of the conjecture was confirmed by opening the wound, and putting the auger into it, when

a piece of fire-arms. There is a translation of the same, by Mr. Fisher, from the Journal de Chimie Médicale, in the Philadelphia Journal of Pharmacy, vol. vi. p. 207. See, also, Baltimore Medical and Surgical Journal, vol. i. p. 501.

* Orfila's Leçons, 1st edition, vol. i. p. 717.

it was found to apply completely. On further dissection, it was ascertained that the left carotid had been wounded, and that hence the immediate cause of death had been the hæmorrhage from it. These facts seemed to decide the question as to its being an accident, and it was also supposed, that, in endeavouring to remove the auger on which he had fallen, he had moved it round, and thus made the internal wound larger than the external.*

In 1813, some excitement was caused in England on account of the sudden death of Sellis, a servant of the Duke of Cumberland, and the simultaneous injury received by his royal highness. Sir Everard Home published a declaration on this subject, which seems to indicate that Sellis committed suicide, after attempting the life of the duke. "I visited the duke," says Sir Everard, "upon his being wounded, and found my way from the great hall to his apartment, by the traces of blood which were left on the passages and staircase. I found him on the bed still bleeding—his shirt deluged with blood, and the coloured drapery above the pillows sprinkled with blood from a wounded artery, which puts on an appearance that cannot be mistaken by those who have seen it. This could not have happened, had not the head been lying on the pillow when it was wounded. The night-riband, which was wadded, the cap, scalp, and skull, were obliquely divided, so that the pulsations of the arteries of the brain could be distinguished. While dressing these wounds, a report came that Sellis was dead. I went to his apartment—found the body lying on its side on the bed, without his coat and neckcloth—the throat cut so effectually, that he could not have survived a minute or two. The length and direction of the wound was such as left no doubt of its being given by his own hand; *any struggle would have made it irregular.* He had not even changed his position; his hands lay as they do in a person who has fainted—they had no marks of violence upon them; his coat hung upon a chair, out of the reach of blood from the bed; the sleeve, from the wrist to the shoulder, was sprinkled with *blood quite dry, evidently from a wounded artery,* and from such kind of sprinkling, the arm of the assassin of the Duke of Cumberland could not escape."†

Arthur, earl of Essex, was committed to the Tower on the 10th of July, 1683. This was during the reign of Charles II. and at the time when his brother James, duke of York, was supposed to have great influence in the government. On the 13th (the same day that Lord William Russell was tried and capitally condemned) the earl was found dead in his chamber, with his throat cut. A coroner's jury was summoned, but before they were empannelled, the earl's body was taken out of the closet where it lay, and stripped of its clothes. These were carried away, and the closet washed: and when one of the jury insisted upon seeing his clothes, the coroner was sent for into

* Foderé, vol. iii. p. 190. The case was communicated by Dr. Desgranges. Renard (p. 109) remarks that the lungs of those who die from wounds are seldom found gorged.

† Edinburgh Annual Register, vol. vi. part 2d. p. 19. Smith, p. 284. Paris, vol. iii. p. 33. London Atlas Newspaper of June 24, 1832.

another room, and upon his return, told the jury *it was my lord's body, and not his clothes, they were to sit upon.* Before the jury, two surgeons, Sherwood and Andrews, deposed as to the wound. Sherwood stated, that the aspera arteria (the trachea) and the gullet, with the jugular arteries, were all divided. Andrews said, that the throat was cut from one jugular to the other, and through the windpipe and gullet into the vertebræ of the neck, both jugular veins being divided. The verdict of the coroner's jury was in the following words:—"That, with a razor, the Earl of Essex gave himself one mortal wound, cut from one jugular to the other, and by the aspera arteria and the windpipe to the vertebres of the neck, both the jugulars being thoroughly divided; and of this he died."

One Laurence Braddon shortly after formed the opinion that the Earl of Essex had been murdered, and (as he afterwards stated) conceived it to have been accomplished by individuals who were allowed to pass by the earl's keepers. These murderers he supposed, were set on by the Duke of York, afterward James II. He was tried for a misdemeanour in suborning witnesses to prove this, and was found guilty, and fined £2000. After the revolution, in 1690, he published a pamphlet entitled "*The Earl of Essex's innocency and honour vindicated,*" which contains some additional particulars.

The closet was about three feet two inches wide, and there was no blood higher than the floor. The instrument itself was a French razor, four and a quarter inches in its blade, and no spill or tongue at the end. Hence it must have been held by the blade, and it would seem difficult to inflict so large a wound with it. A surgeon is stated to have suggested to the coroner's jury, *that the notches in the razor were made by my lord against his neck bone.* Lord Essex was right-handed, and the razor lay on the left side. Two witnesses swore that the neck of his cravat was cut in three pieces, and there were five cuts on his right hand.

Bishop Burnet is of opinion that the earl committed suicide. He observes, that "when the body was brought home to his own house, and the wound was examined by his own surgeon, he said to me, it was impossible that the wound could be as it was, if given by any hand but his own. For except he had cast his head back and stretched up his neck all he could, *the aspera arteria must have been cut.*" Both the jugulars and gullet, he adds, were cut just above the aspera arteria.

The reader will notice the discrepancy between this account and the statement given under oath by the surgeons before the coroner's jury.

This subject was also agitated for some time before a committee of the House of Lords, and several physicians and surgeons who were examined by them, declared "that they would not positively say that it was impossible for my lord to cut his throat through each jugular vein, the aspera arteria, and gullet, to the very neck bone, and even behind each jugular vein on each side of the neck (as some judicious surgeons who had viewed the throat had reported it to be cut), but this they would be very positive in, that they never saw any man's throat so cut which was cut by himself. And they did then further declare, that they did believe,

that when any man had cut through one of his jugular veins, and the gullet and windpipe, and to the very neck-bone, nature would thereby be so much weakened by the great effusion of blood and animal spirit, that the *felo de se* would not have strength sufficient to cut through and behind the other jugular, as my lord's throat, by surgeons who saw it, was said to be cut."

No report was, however, made by this committee. Lord Delamere resolved to draw it up himself, but before he had completed it, parliament was prorogued, and afterwards dissolved; and, consequently, all further proceedings were stopped.

Modern historians have generally concurred with Bishop Burnet, in deeming this a case of suicide. They dwell much on the earl being subject to fits of deep melancholy, and being accustomed to maintain the lawfulness of suicide. Such is Mr. Hume's opinion, while Mr. Hallam (in his Constitutional History) founds his belief on his unwillingness to think that Charles and James would have caused so detestable a murder to be committed on one towards whom they had never shewn any hostility, and in whose death they could have no interest. And yet, in subsequent pages of his work, he informs us, that James (for Charles was never accused of any agency, direct or indirect, in the transaction) approved of Jeffries' cruelties, and that he assisted at the tortures in Scotland.*

No one at all acquainted with this subject will deny its intricacy. Chaussier, in commenting on the question whether the wounds are caused by suicide or homicide, quotes two cases from Ambrose Paré. One was of an Englishman, who was robbed and wounded with a dagger, and left for dead at Vincennes. He was found in his shirt, with the trachea and œsophagus completely divided. Paré brought the trachea together, and dressed the parts so that the patient could articulate. He named his murderers, who were taken and executed, and died some three days after.

In another case, a maniac inflicted a precisely similar wound on himself in the night, besides stabbing himself in various places. He was found thus in the morning, and his servant was arrested on suspicion. He, also, was so far recovered as to be able to confess that he had done it himself.

Now here were two cases of wounds precisely alike; yet one was

* The authorities from which I have drawn the above narrative are,—

The Trial of L. Braddon, in Hargrave's State Trials, vol. iii. p. 855.

The Earl of Essex's innocency and honour vindicated, by L. Braddon, ibid. vol. iii. pp. 899–934.

The Republic of Letters for August 1735.

"Some passages sent by a person of honour to the author of the Republic," &c.

Burnet, vol. ii. pp. 212–234; and Smith, pp. 282–283.

There is also another pamphlet by Braddon (published in 1725), reprinted in Howell's State Trials, vol. ix. p. 1229.

Hallam's Constitutional History of England, American edition, vol. ii. p. 617; vol. iii. pp. 92, 435.

Braddon, in his last pamphlet, says: "Queen Anne, upon her first coming to the throne, struck me out of the civil list, because, as her majesty then said, I had thrown blood in her father's face." But, if innocent, why was not the parliamentary investigation completed.

suicidal, and the other not. The collateral circumstances hence became very important; the one in a public, exposed place; the other in his bed, with his night-clothes uninjured, and in a disturbed state of mind.*

I proceed now to give some cases of homicide; and the first that I shall relate is taken from the notes of Sir John Maynard, an eminent English lawyer, and is stated by him to have occurred in the fourth year of Charles I. It happened in Hertfordshire.

Jane Norkott was found dead in her bed—her throat cut, and the knife sticking in the floor. Two females and a man slept in the adjoining room, and they deposed, that the night before, she went to bed with her child, her husband being absent, and that no person after that came into the house. The coroner's jury gave a verdict of *felo de se*. But, a suspicion being excited against these individuals, the jury, whose verdict was not yet drawn up in form, desired that she might be taken up; and, accordingly, *thirty days* after her death, she was taken up, and the jury charged them with the murder. They were tried at the Hertford assizes, and acquitted, but so much against evidence, that Judge Harvey let fall his opinion, that it were better an appeal were brought, than so foul a murder should escape unpunished; and, accordingly, an appeal was brought by the child against *his father, grandmother, aunt, and her husband Okeman.*

The evidence adduced was, "that she lay in a composed manner in her bed; the bedclothes not at all disturbed, and her child by her in bed. Her throat was cut from ear to ear, and her neck broken. There was no blood in the bed, saving a tincture of blood on the bolster whereon her head lay, but no substance of blood at all. From the bed's head, there was a stream of blood on the floor, which ran along until it ponded in the bendings of the floor. It was a very great quantity, and there was also another stream of blood on the floor at the bed's foot, which ponded also on the floor to a very great quantity, but no continuance or communication of blood of either of these two places from one to the other, neither upon the bed—so that she bled in two several places; and it was deposed, that on turning up the mat of the bed, there were clots of congealed blood in the straw of the mat underneath. The bloody knife was found in the morning sticking in the floor, a good distance from the bed; but the point of the knife, as it stuck, was towards the bed, and the haft from the bed. Lastly, there was the print of a thumb and four fingers of a left hand.

* Chaussier, p. 473. Two cases of suicide from cutting the throat with a razor, are given in the Annales d'Hygiène, vol. iv. pp. 408, 414. In the first, related by Marc, the individual passed from his bedroom to the window of another adjoining, and there committed the act. There was no suspicious circumstances present; the wound was from left to right; but an aged physician, called in immediately after, had, in his agitation, stepped into the blood, and thus made footsteps to and from the bed of the deceased. This, with those who afterwards came, and were ignorant of the cause, produced suspicion.

In the other instance, by Devergié, the individual inflicted no less than three wounds before he could destroy himself, and they were two inches in depth, three inches and three lines in breadth, and exactly one foot in circumference. The narrative is accompanied with a plate, and our author justly observes that, were not the circumstances known, its infliction might, with great probability, have been ascribed to violence.

" *Sir Nicholas Hyde*, chief justice. 'How can you know the print of a right hand from that of the left, in such a case?' *Witness.* 'My lord, it is hard to describe; but if it please the honourable judge to put his left hand upon your left hand, you cannot possibly place your right hand in the same posture;' which being done, and appearing so, the defendants had time to make their defence, but gave no evidence to any purpose."

The jury brought in all guilty except Okeman, and they were executed, but made no confession.*

Whether these were the guilty persons or not, it is certainly proved most incontestably that the female was murdered.

In several cases of late years, medical witnesses have been successful in detecting, not only murder, but also its manner, by an examination of the dead body, even when in a state of putrefaction or decay. I have already noticed some of these in a previous section, and will now refer to a few others.

A man named Beaugouin was murdered, cut in two, and his remains thrown into the Loire. The upper part was found at some distance and interred. On being taken up, fifteen days after, Dr. Ouvrad found that the cartilages between the third and fourth lumbar vertebræ had been cut. The lower portion exhibited several wounds of the abdomen. Dr. Ouvrad came to the conclusion, that either an anatomist, or a person conversant in such disarticulations, had committed the act. There was, however, no doubt of this being murder, and he, therefore,

* Hargrave's State Trials, vol. x. appendix, No. 2. p. 29. The above, however, are not the only remarkable circumstances in this case. " Because the evidence," says Sir John Maynard, " was so strange, I took an exact and particular notice, and it was as follows:—An ancient and grave person, *minister to the parish where the fact was committed*, being sworn to give evidence, according to custom, deposed, 'That the body being taken up out of the grave, thirty days after the party's death, and lying on the grass; and the four defendants being present, were required each of them to touch the dead body. Okeman's wife fell upon her knees, and prayed God to shew tokens of her innocency. The appellant did touch the dead body, whereupon the brow of the dead, which before was of a livid and carrion colour (in terminis, *the verbal expression of the witness*), began to have a dew or gentle sweat arise on it, which increased by degrees, till the sweat ran down in drops on the face; the brow turned to a lively and fresh colour; and the deceased opened one of her eyes, and shut it again, and this opening the eye was done three several times. She likewise thrust out the ring or marriage-finger three times, and pulled it in again, and the finger dropped blood from it on the grass.' *Sir Nicholas Hyde*, chief justice, seeming to doubt the evidence, asked the witness, 'Who saw this besides you?' *Witness.* 'I cannot swear what others saw; but, my lord (said he), I do believe the whole company saw it, and if it had been thought a doubt, proof would have been made of it, and many would have attested with me.' Then the witness, observing some admiration in the auditors, spake further, 'My lord, I am minister of the parish, and have long known all the parties, but never had occasion of displeasure against any of them, nor had to do with them, or they with me; but as I was minister, the thing was wonderful to me: but I have no interest in the matter, but as called upon to testify the truth, and this I have done.' [This witness was a very reverend person, as I guessed, of about seventy years of age. His testimony was delivered gravely and temperately, to the great admiration of the auditory.] Whereupon, applying himself to the chief justice, he said, 'My lord, my brother, here present, is minister of the next parish adjacent, and I am sure saw all done that I have affirmed.' Therefore that person was also sworn to give evidence, and did depose in every point—'the sweating of the brow—the change of the colour—thrice

supposed that a butcher was the criminal. Such proved to be the fact. Within a short time, the murderer was taken and executed.*

In 1814, an individual named Augustus Dautun was murdered in Paris. His body, cut into four or five parts, was found at various places in the Seine; the head had contusions on it, and there were wounds in the chest. The various portions were carried to the Morgue, and a model in plaster was taken of the bust. Through these means the body was finally recognised. Dupuytren was the principal examiner, and his reports are well characterised by Marc as models. The most striking circumstances by which the identity of the body was ascertained, were the existence of a wart on the upper lip and an examination of the bones of the thigh, by which they proved that the individual had been lame.

The wound in the chest was found to have penetrated to the heart; it was larger within than at the surface, and, indeed, a second wound was discovered in the aorta, two inches higher than the other. From these circumstances, they supposed that a second blow had been given with the dagger before withdrawing it, and merely by altering its direction.

A brother, Charles Dautun, was ascertained to be the murderer. He implicated Girouard, a companion in debauchery, as an accomplice, but this was denied, and Girouard escaped, apparently from the want of decisive testimony. Dautun was found guilty and executed.

On the trial, Dupuytren was asked if any marks on the dead body could indicate whether the murdered person had been attacked by one or more persons. He replied by begging the court not to give to his conjectures more weight than they deserved. All he could say was merely probabilities; but it appeared to him that a plurality of persons had been engaged in the murder, and for the following reasons: when a man is struck, his first act is to present his hands as a defence against

opening the eye—the thrice motion of the finger, and drawing it in again.' Only the first witness added, that he himself dipped his finger in the blood which came from the dead body, to examine it, and he swore he believed it was blood. I conferred afterwards with Sir Edward Powell, barrister-at-law, and others, who all concurred in the observation; and for myself, if I were upon oath, can depose that these depositions (especially the first witness) are truly reported in substance."—Ibid. p. 29.

In the trial of Standsfield for the murder of his father, a similar charge was brought. It is stated, that when the son was assisting in lifting the body of his father into the coffin, it bled afresh, and defiled all his hand. The opposite lawyers observe, that "this is but a superstitious observation, without any ground either in law or reason. Carpzovius says he has seen a body bleed in the presence of one not guilty, and not bleed when the guilty were present." They assign, as a cause of the bleeding, that the surgeons had made an incision about the neck, and the motion of the body, in removing it, caused the fresh hæmorrhage from that part.—Hargrave, vol. iv. p. 283.

This bleeding of a dead body, the cause of which I have already explained, was noticed even by the New England pilgrims.—See Thatcher's Indian Biography, vol. i. p. 158.

On this subject, see Metzger, p. 328; and Valentini Novellæ, App. 3. *De stillicidio sanguinis in hominis violenter occisi cadavere conspicui, an sit sufficiens præsentis homicidæ indicium?*

* Orfila's Exhumations, vol. ii. p. 336. Several additional cases are related, where fractures were found on the dead body.

the blow. Now in this case there was not the slightest mark of injury on them. The same person that inflicted all these wounds could not at the same time have held them. Again, the wounds on the head must have preceded those on the chest. These were mortal, the thorax containing four pounds of blood. While the hands were held, might not the head have been interposed to prevent the wounds in the chest?*

In a case of homicide by cutting the throat, the facts adduced to prove it were, the inability to find a cutting instrument near the body, the number of cuts on and about the neck, some very deep, and some along the chin. The posterior part of the head was also wounded. And, even admitting that the deceased himself could inflict all these wounds, it involved the absurdity of his being obliged to shift hands—some could alone be made by the right and the others by the left hand. From the presence of wounds of the hand, it is probable that there was some struggle.†

The remains of an individual named Ramus were, in 1832, found either in the Seine or in drains. They were collected as usual at the Morgue, and examined. It was ascertained that the body had been cut into four parts. Beyond this, however, it did not bear any marks of severe injury. A few superficial wounds only appeared on the face and eyelid. The skin and muscles were much retracted at the various sections, and particularly at the top of the thigh; the blood-vessels were completely empty; the heart was collapsed, and so light in colour that it seemed to have been washed. The lungs were empty, except of a little serosity and air.

Now, from the absence of wounds, it was evident that Ramus had not been in a condition to offer much resistance; and, accordingly, on proceeding to analyse the contents of the stomach, the presence of prussic acid was unequivocally established. I shall hereafter detail the experiments. It was, therefore, a probable supposition, that while labouring under its effects, the head had been cut off. That this was done during life seemed evident from the bloodless state of the vessels. The division of the other parts must have been made at the same time, or immediately after death.‡

I will only add a case of murder by fire-arms.

C. D., residing in the same house with his sister-in-law, suddenly disappeared. After a course of judicial researches, his body was found

* Causes Célèbres du xix. Siècle, vol. i. p. 400. Annales d'Hygiène, vol. i. p. 464. Zerah Colburn, in the Memoirs of his Life, states that he was in Paris, and saw Dautun led to execution. He mentions the mode of his detection, which I do not find in either of the above reports. "In the teeth of the dead body, tightly compressed, was a piece of human flesh, apparently torn out in the dying struggle. After some time, Dautun was gambling at the Palais Royal, and, becoming angry, threw a glass at the waiter. It was shivered into pieces, and a fragment was carried into Dautun's wrist, under the cuff of his coat. The spectators wished to examine the injury, but he obstinately refused. At last, suspecting something mysterious, they pushed up the sleeve by force, and there beheld a scar, recently healed, as if made by the tearing out of flesh. The landlord had been at the Morgue and seen the plaster model; he, therefore, delivered him to the legal authorities as probably the murderer."

† Annales d'Hygiène, vol. viii. p. 371.

‡ Ibid. vol. ix. p. 338. Lancet, N. S. vol. xii. p. 243.

buried in a cemetery, wrapped in ten folds of linen, and with his clothes on, covered with blood. In his left side were two round holes, distant about five inches from each other. The medical examiners reported that one of these penetrated from side to side, so as to take off a part of the right breast, and, on pursuing the dissection, the ball was found to have entered at the last true rib of the left side, to have passed the stomach, of which it wounded the upper part, and to have pierced the duodenum with a wound five inches long, and finally to have passed out at the first false rib of the left side. Corresponding holes were found in the clothes and shirt, and they, therefore, gave it as their opinion, that these wounds had been inflicted by fire-arms, and were the cause of death. On this, the sister-in-law of the deceased was arrested, as the clandestine burial, together with the wrapping up of the body, led to doubts concerning her innocence.

Mr. Pelletan and another surgeon, whose name is not mentioned, were consulted on the case. They agreed that no doubt could exist as to the cause of the death being a wound from a fusee; but they at the same time affirmed, that the deceased might have inflicted it, either voluntarily or involuntarily, on himself, and that another person could not have done it without being in an ambuscade, with his knee on the ground, and the deceased walking. From these circumstances, they were of opinion that the sister-in-law was not the murderer, if murder had been committed.

On this decision, we may remark, with Foderé, that it seems difficult that a wound inflicted in this manner, and nearly in a horizontal line, could have been caused by suicide; while, again, the sister-in-law, though not the actual murderer, might, notwithstanding, have been an accessory. She was, however, acquitted.*

In connexion with this subject of this section, it is sometimes of great importance to ascertain whether spots found on offensive weapons, clothing, or articles of furniture, are those of BLOOD. Modern chemistry has attempted to solve the problem.

The earliest experimenter was, I believe, Lassaigne. He observed that ordinary rust could be distinguished from that produced by blood, on iron or steel instruments, by dissolving the latter in distilled water. The salts and a portion of the colouring matter are taken up, while the rust is precipitated. Heat or the acids coagulate the solution, and by evaporating and calcining in a platina spoon, chloride of sodium, subcarbonate of soda, and phosphate of lime, are obtained.†

Chevallier recommended the use of muriatic and sulphuric acids, and potash, as reagents. By the two former iron rust is altogether dissolved; but they only partially dissolve the other. The insoluble parts give all the products of animal substances. Potash dissolves both; but the liquid of the iron rust is colourless, while the other is brown.‡

Orfila, with his characteristic industry, also examined the subject. Among the tests proposed by him is exposure to a heat of from 77°

* Pelletan, vol. i. p. 306. Foderé, vol. iii. p. 199.
† Anderson's Journal, vol. ii. p. 466, from Revue Médical.
‡ Journal de Chimie Médicale.

to 86° Fahr. If the spot on arms be of blood, it will come off in scales; but there will be no alteration if it be rust. Water dissolves the blood, but not the rust. The colouring matter may also be treated by heat and the acids, as above directed; and he adds that it is different from all other known colouring matters, since it is not changed by ammonia; chlorine also turns it green, and a large quantity decolours it altogether; but on adding infusion of galls, there is a dark red precipitate. Strong nitric acid also destroys the colour of the stain caused by blood.

When the stain is on clothing, this should be dipped in distilled water until the fluid is charged with it. The same experiments are then applicable.*

These experiments, however desirable in their results, did not receive universal consent. Raspail, another French chemist, announced that all the indications thus obtained from true blood might be procured from a mixture of whites of eggs and infusion of madder.†

Barruel, in his experiments on the colouring matter of the blood, found that on treating it with strong sulphuric acid, an odour peculiar to the animal from which it was obtained was distinctly perceivable. It is only necessary, he says, to put a few drops of blood into a cup, and add the acid to the amount of one-third or one-half of the other, and the odour will be evolved. This he styles the *aromatic principle* of the blood. In the male it has the odour of perspiration; in the female, the same, but much weaker. In the horse, the odour of its perspiration or of horse-dung. So also with the ox, sheep, dog, and even birds. This test, then, he deemed conclusive, and applicable to all doubtful cases.‡

Other chemists, however, do not appear to have the same acuteness of smell as Barruel; and we may well doubt, with Wedekind, whether it would be safe to ground grave charges on a sense so variable, and where the certain detection of it is on many accounts very difficult.§

F. *Of persons found dead from noxious inhalations.*

A vast proportion of the gases, discovered by modern chemists, are irrespirable. Few of them, however, are spontaneously generated, and their noxious power must of necessity be extremely circumscribed. We

* North American Medical and Surgical Journal, vol. v. p. 458. Edinburgh Medical and Surgical Journal, vol. xxix. p. 216. Orfila Leçons, 2d edition, vol. ii. p. 564.

† Brande's Journal, N.S. vol. iii. p. 497.

‡ Annales d'Hygiène, vol. i. p. 267. In two cases referred to him by the magistrate, he successfully pursued this examination, and pronounced one to be the blood of a sheep. See Annales, vol. i. p. 548; vol. x. p. 160.

§ Numerous papers on this subject are contained in the Annales d'Hygiène. Vol. ii. p. 217, the objections of Raspail, with a reply by Leuret; vol. ii. p. 221, Morin's experiments on the blood of fish; ibid. p. 479, Courbe, he confirms the experiments of Barruel, but objects to their application in legal medicine; vol. xi. p. 205, Baron de Wedekind (from Henke's Annals), he repeated the experiments with similar results, but remarks as stated in the text; vol. i. 443, Chevallier; vol. v. 467, Denis; vol. ix. 226, Lecanu, he found a great uniformity of results in experimenting on the blood of man and of fish. An extract from Raspail, pointing out his objections, may also be found in Medico-Chirurgical Review, vol. xxv. p. 371. See, also, Bulletin des Sciences Médicales, vol. xiii. p. 126; vol. xiv. p. 106.

shall notice such as have proved destructive to life, under the head of poisons. But there are some which may be produced under ordinary circumstances, or are occasionally the results and accompaniments of peculiar situations and occupations, and of these the most remarkable are corbonic acid gas and sulphuretted hydrogen gas. It must, however, be understood, that in many instances where they prove deleterious, other poisonous substances may co-operate in causing the result. This fact, in conjunction with the comparative frequency of injury from them, fully justifies a notice in this place.

1. Carbonic Acid Gas may be generated in various ways:—1. when a number of persons have remained during a long time in an apartment, or any other place where the air is not renewed. They mutually vitiate the air, and produce, by the process of respiration, the poison in question. The most striking and melancholy instance of this occurred at Calcutta, in 1756. When that place surrendered to Shujah Dowla, he thrust one hundred and forty-six Englishmen into the *black hole*, at Fort William, a place only eighteen feet by fourteen, and having only two apertures through which air could be admitted. They remained here from eight in the evening until the next morning, when only twenty were alive. A somewhat similar instance happened in London, in 1742. Twenty persons were forced into a part of St. Martin's round-house, called the *hole*, during the night, and, in consequence, several died.* Individuals in a state of suffocation from this cause are seized with an unsupportable thirst. A copious perspiration is present, and great pain in the chest, difficult respiration, and intense fever, follow. They lose their strength, and fall into a deep lethargy, to which death soon succeeds, if aid be not speedily given.† 2. The fumes of burning charcoal consist principally of this substance and carbonic oxide. This is unfortunately a frequent cause of death. Persons, on going to bed, leave pans of it burning in their apartments, and in the morning are found lifeless.‡ 3. Carbonic acid gas is contained in the exhalations from lime-kilns,§ and cellars or places where wine,

* Smith, p. 206. "A parcel of drunken constables took it into their heads to put the laws in execution against *disorderly* persons, and so took up every woman they met, till they had collected five or six and twenty, all of whom they thrust into St. Martin's round-house, where they kept them all night with doors and windows closed. The poor creatures who could not stir or breathe, screamed as long as they had any breath left, begging at least for water: one poor wretch said she was worth eighteen pence, and would gladly give it for a draught of water; but in vain! So well did they keep them there, that in the morning four were found stifled to death, two died soon after, and a dozen more are in a shocking way."—Horace Walpole's Letters to Sir Horace Mann, vol. i. p. 169. The keeper of the round-house was tried, but acquitted of wilful murder.

† Orfila's Directions, p. 170.

‡ A large number of cases of this description is quoted by Dr. Dobson, in an essay contained in Percival, vol. i. p. 328. See, also, Philosophical Transactions, vol. lii. p. 454.

§ "June 19, 1813. This morning two lads were found senseless on a brick-kiln in St. George's Fields. The eldest was recovered by medical assistance, but the other was lifeless. It is supposed that they had resorted to the kiln for the sake of warmth, and, having fallen asleep, were suffocated by its fumes."—Edinburgh Annual Register, vol. vi. part 2, p. 64.

beer, or other liquors, are in a state of fermentation. Hence the danger of sleeping near the former, and the necessity of ventilating the latter. 4. This gas is frequently produced in wells, marshes, and mines. In the latter, however, a different substance is also generated, called the *fire-damp*, or carburetted hydrogen gas, which is no less deadly. But the frequency of fatal accidents to persons descending wells is to be ascribed to carbonic acid. 5. In some rare instances, the effluvia of plants, which evolve carbonic acid and nitrogen during the night, have proved fatal. Dr. Paris refers to a case of this kind, where the gardener, watching for the safety of a pinery, was found dead in the morning in the green-house.* 6. Lastly, I may mention, if not already enumerated, that the smoke from burning wood or anthracite coal may prove deleterious, in a great degree, from the same cause.†

It seems to be now generally acknowledged, that the action of carbonic acid gas is narcotic. The experiments of Collard de Martigny are very interesting on this point. Animals are rapidly killed in an atmosphere of it, and, even when diluted with common air, they died in two or three minutes. Yet when a lighted candle was afterwards introduced under the bell glass used for the experiments, it burnt lively. This circumstance will explain why accidents have sometimes happened to persons descending into wells, after ascertaining that combustion could be supported.

In an experiment on himself, the body was enclosed in an atmosphere of this gas, with due precautions for the maintenance of breathing,

* Paris and Fonblanque, vol. ii. p. 49.

† Edinburgh Medical and Surgical Journal, vol. xxxii. p. 345. Case by Mr. Watson, of the workmen at the Wanlockhead mines, from the wood of a flue taking fire. Some of the symptoms are referable to the effects of sulphurous acid gas, which see under Poisons. Lancet, N.S. vol. v. p. 154. Case by Dr. Schenck, of two persons dead from the smoke of a forge. Edinburgh Medico-Chirurgical Transactions, vol. iii. p. 543. Dr. John Gairdner on the deleterious effects of the smoke of coal, as illustrated in the cases of six individuals subjected to its influence. A coal fire had been kept up during the night, and the smoke produced by it had passed down another chimney into the bed-room, the door of which was, however, open. They awoke with dizziness — a reluctance to rise — stupefaction of mind, and a desire to return to sleep. When thoroughly roused, headach succeeded, with vomiting or sickness at the stomach. They gradually recovered by the next day. Christison, p. 692. Annales d'Hygiène, vol. xiii. p. 442. A recent case by Devergie of one individual dead and several dangerously ill from the gas issuing from a smouldering beam that was heated by the flues of a kitchen chimney. The individuals attacked were in an upper room ; on removing the boards and giving access to the air, the beam took fire.

The common council of New York, not long since, were seriously affected by the gas proceeding from burning anthracite.

I will add to these the following curious case. On the 12th of May, 1650, some forgemen at Leipsic were drinking in a chamber, where a child, twelve years old, was asleep. They amused themselves with passing a half-extinguished candle under its nose. The child awoke, but again fell asleep, and they continued this course for half an hour. It was shortly after seized with convulsons, or epileptic fits, and died in three days. The parents complained of this to the magistrates, who consulted the Faculty of Medicine. They answered that the fumes of a candle were identical with the vapours from charcoal and lime, and would produce the same deleterious effects.—Valentini's Pandects, vol. i. p. 195.

and the symptoms were those usually observed from breathing it. Animals treated in this way died after some time.*

Sir Humphrey Davy attempted to breathe the pure gas, but found it impossible; the glottis was closed from the irritation produced. D'Arcet, visiting the place at Montpensier, in France, where carbonic acid gas issues from the ground, as at the Grotto del Cano in Italy, attempted to ascertain its effects, but they were so sudden that, having moved towards it on his hands, he instantly fell flat, and would have expired, had he not been drawn back by his guide.†

The earlier symptoms, so far as they can be ascertained, are a sense of weight; uneasiness or pain in the head; ringing in the ears; giddiness; a great disposition to sleep; a rapid loss of strength, so as to be unable to continue upright; great difficulty of breathing; the senses no longer exercise their functions; and there is a partial or total loss of sensibility.

In advanced stages, the breathing is occasionally stertorous, and froth issues from the mouth. Coma is perfectly established, interrupted briefly, in some instances, by delirium, and in others by slight convulsions; but the last are generally wanting.

If they are discovered after the gas has had its full operations, their bodies present the following appearances: the head, face, and neck, are swollen; the eyes are propelled from their sockets, but preserve their brilliancy often for two or three hours after death; the tongue is protruded, swollen, and inclined to one side of the mouth; the jaws are firmly closed; the face is livid; the lips are of a dark blue colour; the abdomen is inflated; the body preserves its warmth for a length of time, and sometimes, indeed, is warmer than natural; while the limbs remain flexible for some hours.‡

These appearances are not, however, invariable. The countenance is sometimes pale, and generally bears few marks of suffering. In the cases of Dr. Schenck, already quoted, there was an extreme tranquillity of features, and the face was pale, no great flexibility of the limbs, and no unusual tendency to putrefaction.

On dissection, the blood-vessels, and particularly those of the head and lungs, are found filled with blood, and it is principally accumulated in the right side of the heart, and in the veins leading to it. The blood itself is black, and so fluid that it is discharged readily from the smallest incision. Effusions of serum, tinged with blood, are found, particularly in the ventricles of the brain, and in the bronchiæ, while

* Edinburgh Medical and Surgical Journal, vol. xxix. p. 215. His experiments are also given in full in American Medical Recorder, vol. xiii. p. 296.

† Journal Royal Institution, vol. ii. p. 201.

‡ Struve, p. 52. Belloc, p. 184.

Dr. King in Edinburgh Medical and Surgical Journal, vol. vii. p. 180. History of three cases. Here the fingers and toes were curved, and the nostrils dilated.

Cyclopædia of Practical Medicine, art. *Asphyxia*, by Dr. Roget.

London Medical Repository, vol. xxvii. p. 468.

London Medical Gazette, vol. xv. p. 601. This is a remarkable case of suicide in Paris. The external appearances correspond exactly with those given above; but it is probable, from the signs of sickness of the stomach, and the presence of urinary and fæcal discharges, that there must have been some suffering.

the muscles are so soft as to be torn by the slightest exertion. The epiglottis is said to be raised; and, in some instances, sooty matter has been found in the nostrils and trachea.*

As a variation from the ordinary appearances, it may be mentioned, that Renard, in three cases, found the right side of the heart empty.

Although the causes which produce death in these cases are often evident, yet dissection should never be omitted in any suspected case. It may aid us materially. The loss of irritability in the muscles is also strikingly greater from this cause of death, than is ever seen in cases from drowning, hanging, &c., and it is, therefore, worthy of particular attention.† We should notice whether any marks of injuries are present, which may excite doubt. The place, the circumstances under which the body is found, the noxious material that has been inhaled, all deserve investigation, and may lead to the truth.

2. Sulphuretted Hydrogen Gas. This is the principal noxious substance exhaled from privies and common sewers, and it has proved destructive to many.

Chaussier appears to have been among the first to notice its rapidly fatal effects, whether inhaled or injected into the cellular tissue or rectum. According to the experiments of Thenard and Dupuytren, the gas, even when mixed with a large quantity of atmospheric air, is a very powerful poison. A proportion of 1-300th was sufficient to kill a bird in very little time. 1-800th produced death in a dog; and a horse was killed in an atmosphere containing 1-250th part of it. Nysten and Broughton have verified these results, either by a repetition of the experiments, or by injecting it into the veins.‡

"When the exposure has lasted but a short time, the sufferer experiences a general uneasiness, accompanied with nausea and sickness; his respiration becomes irregular; but not difficult, and his pulse

* Portal, in Medical Commentaries, vol. iii. p. 254. Belloc, p. 184. Dr. Babington's case of exposure to the vapour of burning charcoal, in Medico-Chirurgical Transactions, vol. i. p. 93. Orfila's Toxicology, vol. ii. p. 347. Larrey, vol. ii. p. 128.

Dr. Bright's Dissections, in Medico-Chirurgical Review, vol. xx. p. 4, of two sailors suffocated on board of a vessel. I presume these are the same mentioned in the Lancet, N. S., vol. i. p. 553, as occurring at Guy's Hospital. The vessels of the dura mater were filled with blood, and the sinuses gorged with it in a fluid state. The heart and its vessels were in a similar state, and the mucous lining of the bronchiæ beautifully injected.—Christison, p. 712. He refers to a case by Mertzdorff, where, in addition to the usual appearances, there was a general diffusion of blood between the arachnoid and pia mater. Alfred S. Taylor, Lecturer on Medical Jurisprudence, London, on the phenomena of suffocation from carbonic acid, copied in the American Journal of Medical Sciences, vol. i. p. 219.

† Orfila remarks, that if the body of a person suffocated by a non-respirable gas, or by strangulation, be cold or stiff, we may be certain that more than twelve hours have elapsed since death.

‡ Coxe's Medical Museum, vol. iii. App. p. 29, Exp's of Dupuytren. Christison, pp. 693, 698. Brande's Journal, N. S., vol vii. p. 16.

Sulphuretted hydrogen does not appear to be deleterious to man in an equal ratio. It has been found by accurate observation, that the workmen employed in the common sewers of Paris work without inconvenience in an atmosphere containing one part of sulphuretted hydrogen in 100 of atmospheric air, and that they constantly breathe from 25 to 90 thousandths of this gas. Air found on analysis to contain 3 per cent of sulphuretted hydrogen, had been breathed for several minutes by the person collecting it.—Annales d'Hygiène, vol. ii. p. 144.

much agitated; the skin is cold; general convulsions, almost tetanic, take place; and the muscles of the chest and face are particularly affected." The abdomen is often tumid, and recovery is preceded by vomiting up a bloody froth. Severe colic pains also are common.

"In cases where an individual has been long exposed to the action of this gas, all power of motion and sensation is lost; a frothy saliva, tinged with blood, flows from the mouth; the lips and face are livid; the eyes are shut, and void of all brilliancy, the pupil fixed and dilated; the pulse is small and frequent; and the respiration short and difficult, and apparently convulsive; the action of the heart becomes disordered and violent; and the extremities are in a state of relaxation. To this succeeds an agitation more or less excessive, the muscles are attacked by alternate spasms and convulsions, and the body is curved backwards, while the individual appears to suffer from acute pain."*

Delirium occasionally occurs; and in one instance, mentioned by Dupuytren, the eyes were open and red. This, however, has been ascribed to the presence of hydrosulphuret of ammonia, which is frequently found with sulphuretted hydrogen in sewers.†

In one case where death followed, and dissection was performed forty hours after death, the head and trunk were already putrid, the skin bluish, and elevated by gas. The blood contained in the various cavities was black and fluid. The brain was greenish and tender. The bronchiæ were of a red colour, and the posterior part of the lungs were gorged with black blood, but that organ was generally crepitous. The stomach presented traces of recent irritation, and the intestinal canal was greenish. The liver, of a greenish-black colour, was in a state of congestion. All the viscera exhaled the smell of putrid fish, and several of the persons present at the dissection were subsequently affected with lassitude and stupor, sleeplessness and violent colic.‡ Experiments on animals have presented similar results.§

G. *Of persons found hung.*

I need hardly apprise the medical reader, that there is an intimate resemblance between the principal physiological phenomena observed in persons *hung, strangled, and smothered.* I shall, therefore, in this section, consider these in detail, and hereafter confine myself to what may be deemed peculiar to the other kinds of death.

We understand by the term *hanging*, the suspension of a person by a cord or some other ligature around the neck. The rapidity of death from it evidently depends much on the manner in which the cord is adjusted, the texture and strength of the intervertebral ligaments, the

* These quotations are from Orfila's Directions, p. 167. They are derived from Halle's Recherches, Paris, 1785. See also a case by Dr. Howard. Boston Medical and Surgical Journal, vol. ii. p. 401.

† In the Dictionnaire des Sciences Médicales, vol. xliii. p. 305, art. *Plomb des Fosses*, the occurrence of ophthalmia and coryza is expressly ascribed to the hydrosulphuret.

‡ New England Journal, vol. viii. p. 279. Account of three cases extracted from the Nouveau Journal de Médecine for April 1818.

§ Orfila's Toxicology, vol. ii. p. 374.

fulness of the blood-vessels, and the strength of their coats. All these circumstances, with that of the weight of the body, and the height and suddenness of the fall, will render a shorter or longer space of time necessary to destroy life.*

The manner in which death occurs in these cases is far from being perfectly understood. Sufficient, however, is known to authorise us in asserting, that there is considerable variety.

The first to be mentioned is apoplexy, produced by pressure on the large blood-vessels that go to the head. Though this has been occasionally doubted, yet we have proof sufficient, both in the external appearances and on dissection, to warrant us in saying that this does happen. The compression prevents the return of the blood by the veins, and although it cannot obstruct the circulation by the intervertebrals, yet its effect naturally is, to cause an extreme congestion of the vascular system of the head, and of the brain particularly. It would not seem, however, in cases of recovery, to be attended with an ordinary consequence, viz. paralysis. Foderé has collected some curious cases in illustration of this. Thus, Wepfer saw both a man and woman who survived hanging. The latter recollected nothing; and the former stated, that on the application of the cord, he felt no pain, but sunk, as it were, into a profound sleep. Morgagni, also, mentions that an individual who had recovered under similar circumstances informed him that the first sensation was flashes of light before his eyes, and that he then sunk into the same sleep. Our author also quotes a case on the authority of Lord Chancellor Bacon. A gentleman took a fancy to ascertain whether those who were hung experienced any pain, and actually performed the experiment on himself. He immediately lost all consciousness, and the event would have been tragic, had not a friend entered in time to cut him down.†

In fatal cases, as we shall presently shew, the brain exhibits all the ordinary appearances of apoplexy.

Another immediate cause of death, and about which there is hardly any dispute, issuffocation, or exclusion of air from the lungs. The following experiment by Dr. Munro, sen., of Edinburgh, strikingly

* Dr. Plott, in his History of Staffordshire, quotes a patent roll of the 48th year of Henry III., in which it is stated that Inetta Balsham, having been convicted of harbouring thieves, was sentenced to be hung, and, accordingly, was hung, but remained alive from nine until the next morning. A free pardon was, therefore, granted her. Dr. Plott suggests that her life was probably preserved on account of the larynx being turned to bone, "as it happened in the case of a Swiss, as I was told by the Rev. Obadiah Walker, master of University College, who was attempted to be hanged no less than thirteen times, yet lived, notwithstanding, by the benefit of his windpipe, that, after his death, was found to have turned to a bone."—Professional Anecdotes, London, 1825, vol. iii. p. 180.

"Governor Wall was long in dying, in consequence of which, a particular examination of his throat took place, and it was found to have been owing to an ossified portion of the trachea resisting a portion of the rope."—Dr. A. T. Thomson's Lectures, London Medical and Surgical Journal, vol. vii. p. 418.

† Foderé, vol. iii. p. 134. He, however, mentions that there were individuals living at Marseilles, who, during the French Revolution, were hung, and their lives saved in the night-time, and who, for a long time, were affected with a ringing of the ears and deafness.

illustrates the correctness of this opinion. "A dog was suspended by the neck with a cord, an opening having been previously made in the trachea below the place where the cord was applied, so that air could pass into the lungs as freely as in ordinary respiration. After hanging in this state for three quarters of an hour, during which time the circulation and breathing went on as usual, he was taken down, and appeared not to have suffered materially from the operation. The cord was then shifted from above to below the opening made in the trachea, so as totally to prevent the ingress of air into the lungs, and the animal, being again suspended, was, in a few minutes, completely dead."*

In connexion with this, or possibly with both these causes of death, the injury produced by compression of the nerves of the neck must not be overlooked. That it aids in producing the fatal termination can hardly be doubted, after recurring to the experiment of Mr. Brodie. He "passed a ligature under the trachea of a guinea-pig, and tied it tight on the back of the neck with a knot; the animal was uneasy, but, nevertheless, breathed and moved about. At the end of fifteen minutes the ligature was removed; on the following morning, however, it was found dead." †

After considering apoplexy and suffocation as two of the immediate causes of death, it is the opinion of some of the latest writers on the subject, that, in many instances, they unite in producing the fatal termination.‡

To these a third is to be added, consisting, in addition to the compression, in a laceration of the trachea or larynx, or a luxation or fracture of the cervical vertebræ, from a rupture of the ligaments of the neck. The celebrated Louis inquired of several executioners, how they saved the lives of some criminals, while others were irrecoverably dead? It was answered, that in the latter case, they caused a laceration of the trachea and a luxation of the first cervical vertebræ from the second, by placing the knot of the cord under the neck, and then giving a rotary motion to the body at the moment when the ladder was taken from under its feet.§ This luxation chiefly occurs in heavy persons, or where they may have fallen from a height upon the end of the rope, or where attempts have been made to hasten death by increasing the weight of the body. And the rapidity of the result is well illustrated by accidents where the vertebræ are injured.

The above statement evidently explains the great diversity in the phenomena, observed of late years, on the bodies of those who die from hanging. This subject, indeed, has attracted peculiar attention, and all variations from received accounts have been carefully noticed.

* From Curry, quoted by Dr. Roget. Art. *Asphyxia*, in Cyclopædia of Practical Medicine.

† Paris, vol. ii. p. 44.

‡ I refer particularly to two very valuable dissertations in the Annales d'Hygiène, and both translated from Henke's Zeitschrift. One by Professor Remer of Breslau, entitled, Materials for a medico-legal examination of death by strangulation, vol. iv. p. 166, and the other by Dr. Fleichmann of Erlangen, On the various kinds of death in strangulation, vol. viii. p. 412. I shall have frequent occasion to refer to these.

§ Foderé, vol. iii. p. 141. Dorsey's Surgery, vol. i. p. 207.

I will commence by mentioning such as have been most generally deemed signs of strangulation. The mark of the cord is evident around the neck, forming a livid, depressed circle; the face, chest, shoulders, and occasionally the arms and hands, are swollen and livid; the countenance is distorted: the eyes open, red, or protruded; the tongue is sometimes wounded by the convulsive motions of the jaws, and thrust out of the mouth; the fingers are bent, and the hands nearly closed. De Haen, from his observations, added, that a bloody mucus often issues from the mouth and nose.* In some instances, an ecchymosis is distinctly seen on the shoulders, and extending upon the breast.

Of late years, there have been added to the external signs, the semi-erect condition of the penis, and the emission of semen. The fæces and urine are also sometimes expelled at the moment of death. It is further stated, that in females executed a bloody discharge from the uterine organs has been noticed.

How variable all or most of these are, remains to be stated; and unless we can explain this diversity in connexion with the various causes of death, the subject must remain extremely intricate.

The mark of the cord around the neck has generally been deemed a common occurrence in death by strangulation, and hence its presence was greatly relied upon. It was known, indeed, and is so stated by De Haen and Foderé, to have been sometimes wanting. This, however, was thought to be a very rare occurrence, was not much discussed, and was explained, when noticed, from the suddenness of death in these instances. The following case, that occurred to Esquirol, succeeded in attracting marked attention to its presence or absence. An insane female at the Salpétrière was seen to hang herself on a tree in the garden. An attendant immediately hastened to her, and cut down the body, but all attempts to restore life proved fruitless. The features were composed and natural, the skin not discoloured nor ecchymosed. There was a double mark on the neck, as the rope had been twisted twice round it: but there was only a simple depression, without any change of colour. In three hours after, there was no change; in seven hours, the mark of the rope had a light brown tinge, but without any ecchymosis. None, indeed, occurred; and, on dissection, the cellular tissue beneath was found dry and compressed, so as to form a *brilliant white band a line and a half in breadth.*†

Since the publication of this case, the absence of ecchymosis has been noticed by other observers. Dr. Klein, a German, in fifteen cases of suicide by hanging, could find none on the neck.‡

Dr. Remer, however, was enabled to examine no less than 102 medico-legal reports of persons dead by hanging, and all occurring in Silesia. Of these, eighty-nine presented a distinct and well-marked ecchymosis; in one, the skin was shrunk, and resembled parchment; in two others, the skin was excoriated; in one, putrefaction had ad-

* De Haen, vol. iv. p. 338.

† Edinburgh Medical and Surgical Journal, vol. xix. p. 487.

‡ Annales D'Hygiène, vol. iv. p. 168. Orfila, Leçons, 2d edition, p. 363, &c. mentions many other cases. See, also, a very recent case of suicide, communicated by Dr. Albin Gras.—Annales D'Hygiène, vol. xiii. p. 208.

vanced too far to permit an examination; and in nine, it is expressly stated that the bruised condition was wanting. He also adds, that the ecchymosis was not confined to those who were suspended from some height, but equally occurred in such whose knees or feet were in contact with the ground.

After recognising these facts, he next inquires whether a satisfactory explanation can be given, why this mark is present on the neck in some cases and not in others? It has been suggested that its absence may be owing to the comparative softness of the article used for hanging. But even a handkerchief and a cravat cannot, in the ordinary sense, be deemed such, since they are twisted and folded, so as to become hard, or at least take that character, by the pressure of the body. In four cases where handkerchiefs were used, there was ecchymosis; in two others there was none.

We come, then, with a greater probability of a solution, to the respective causes of death. Persons may die so soon from apoplexy that no time is left for the cord to act on the living neck, for it must be kept in mind, that *ecchymosis only happens when a sufficient interval has elapsed previous to death for the cord to produce its effect.** In connexion with the consideration of this mode of death, and to explain more fully its occasional extreme suddenness, Dr. Remer conjectures that the pressure on the nerves, in conjunction with the congestion, may produce a state identical with a *palsy of the brain.* Out of thirteen cases, in which the absence of ecchymosis is particularly noticed, Dr. Remer found that in one the examination was so imperfect as not to permit any deduction; one exhibited, on dissection, the marks of death by suffocation; and the remaining eleven those of apoplexy, either simple or complicated, with suffocation.†

The deductions drawn by him from this investigation are the following: 1. The presence of ecchymosis on the neck is to be deemed a proof of death by hanging. 2. As it occasionally is wanting, its absence cannot be considered a positive proof of the contrary supposition; but, 3. When it is thus wanting, death has probably been suddenly caused by apoplexy.

But in connexion with this we must also observe, that the ecchymosed part, or, in other words, the position of the cord, is not uniformly the same in every individual. Out of forty-seven, in whom the diversity was reported, it was found in thirty-seven between the larynx and

* It is due to the editors of the Edinburgh Medical and Surgical Journal, to state that they indicated, some years since, the important distinction now developed by the investigations of Remer. In proof of this, I offer the following extract. After stating that the period during which the rope has been left around the neck is insufficient of itself to explain the presence or absence of ecchymosis, they remark, "We believe the true cause may be shewn to be rather the *more or less complete exclusion of air.* When the exclusion is complete and sudden, the body will present no unusual appearances, but when it is incomplete and gradual, so that the person lives for some time in a state of agony, the signs of venous turgescence are every where remarkable."—Vol. xix. p. 621.

† Dr. Fleichmaan is altogether opposed to the idea of a cerebral palsy, and prefers ascribing death in part to compression on the large nerves, which induces paralysis of the lungs and heart.

the chin; in seven, on the larynx (one of these, indeed, had this organ torn); and in two, below it.* Dr. Fleichmann, apparently without being acquainted with the investigations of Dr. Remer, notices a similar diversity, and he endeavours to explain the various kinds of death in connexion with it. When the cord, he observes, is so placed around the neck as to compress, in preference, its large vessels, and particularly the venous ones, and at the same time prevent the passage of the blood below the constriction, apoplexy will follow. When, on the contrary, the cord is placed between the larynx and os hyoides, pressure operates powerfully on the respiratory passages, without so strikingly affecting the blood-vessels. Here death ensues from suffocation. The mixed state, or death from a combination of suffocation and apoplexy, probably ensues when the cord is placed below the larynx. Its direction must necessarily then be horizontal, and it will interrupt the passage of the air as well as compress the blood-vessels.†

I am far from presenting these views of Drs. Remer and Fleichmann as perfectly sound or well established. They require confirmation, but they also deserve every attention, as being among the most valuable approaches to a clear understanding of the subject.‡

In every case, whether ecchymosis be present or absent, there should be a dissection of the neck. Supposing it to be found, let it not be confounded with the lividity observed on the dead. By noticing the extent and the place of the extravasation (in front as well as on the declining part) all mistake may be avoided.

The next most important external sign is the *condition of the genital organs*. That the urine, fæces, and occasionally the semen, are expelled at the moment of strangulation, appears to have been known for some time. It is mentioned by Drs. Gordon Smith, and Male. Other observers have subsequently noticed it. M. Guyon, surgeon-major at Martinique, was present at the execution of several negroes. Being habited in white dresses, any circumstance of this description could more readily be seen, and he observed erection of the penis in several at the moment of strangulation, and immediately thereafter, several urinated freely. One hour after the execution, he found the penis in a state of semi-erection, and its canal filled with semen.§ Of Dr. Remer's cases, twenty-two were females, and eighty males. Of the latter, forty-five were not examined. In twenty nothing was found; and in fifteen there was either an ejaculation of semen or a sanguineous congestion of the genitals. Other cases will be quoted below.‖

* Remer.

† Deslandes has suggested the possible case of the cord slipping upwards at the moment of suspension, till it is stopped by the upper jaw, and thus closing completely the orifice of the larynx. Here life would be instantaneously extinct, and almost without a struggle.—Orfila Leçons, 2d edition, vol. ii. p. 359.

‡ Out of six cases related by Dr. Fleichmann, ecchymosis around the neck was present in two. In the remaining four it was absent, but the mark of the cord was of a yellow colour, hard and rough, resembling, I presume, parchment, as in the instances already cited. In one instance, noticed by Amusat, there was a circular depression, three lines in breadth, indicating the pressure of the cord, and the skin of this was dried, thin, and as if burned.

§ Anderson's Journal, vol. i. p. 151.

‖ Emission of semen and erection were found in Amusat's case; vesiculæ

On the other hand, Dr. Klein did not observe it in his fifteen cases. It is, therefore, evident, that although its presence is a presumptive proof that death has been caused by strangulation, yet its absence must not infer the contrary; besides, it has occurred from other modes of violent death. Although Dr. Klein did not observe it in any of his cases of death by hanging, yet in a suicide who mortally wounded himself by blowing out his brains, after surviving twenty-four hours, the penis was found in a state of erection. In another case, at Breslau, where a fire-arm had torn the descending aorta and its accompanying vessels, there were decisive proofs of the emission of semen.*

Nor does this phenomenon seem to be confined to the male sex. In a female who suspended herself with a handkerchief, besides a marked ecchymosis of the neck, the genital organs were seen red, the labia swollen, and the mouth of the uterus a little open.† Dr. Otto seems also to have noticed some bloody discharges, but the particulars of this case I have not been able to obtain.‡ Mr. Charles Cooke mentions two cases of executed females, in whom he was informed there were present bloody discharges; and he himself noticed them in three insane women, who hung themselves. In one of these, urine and fæces were also evacuated; and it is an interesting circumstance, that two of them had passed the usual period of child-bearing.§

As to the remaining external signs, I must content myself with a brief commentary.

The condition of the tongue, its protrusion, its swollen state, and its wounding by the teeth, must evidently vary with the position of the cord. It is, therefore, not to be always found. Dr. Gordon Smith, indeed, remarks, that it is only produced when the rope presses upon the cricoid cartilage. Should it press above the thyroid gland, the tongue will be pushed back, owing to the compression of os hyoides.‖ Something may also be ascribed to the manner of death, whether easy or convulsed. In the latter its unnatural position is most common.

It is evident that the extent of the ecchymosis on the parts adjacent to the neck must depend somewhat on the height from which the body is projected; and, accordingly, we more commonly find these extensive on such as have been executed. Dr. Houston of Dublin, in four cases of this description, found "the cervical vertebræ uninjured, and also the spinal marrow and the brain; yet in both, the sterno-mastoid muscle on the right side (the opposite to that on which the knot of the rope was applied) was ecchymosed, contused, and broken; that of the left was only slightly bruised. The os hyoides and thyroid cartilage were completely severed from each other. The other hyoid muscles were so bruised and lacerated that only some stretched shreds of them

seminales empty.—North American Medical and Surgical Journal, vol. vii. p. 205. By Orfila, in a suicide aged 62 years.—Leçons, 2d edition, vol. ii. p. 376. In one case of Fleichmann.—Annales, vol. viii. p. 420. In Irons, executed at London in 1828.—Lancet, N. S. vol. ii. p. 124.

* Remer, Annales, vol. iv. p. 175. † Ibid. p. 177.

‡ Medico-Chirurgical Review, vol. xxv. p. 213.

§ Lancet, N. S. vol. viii. p. 751. See also, on this subject, ibid. vol. viii. p. 808; vol. ix. pp. 49, 98, 161, 661.

‖ Smith, p. 217. Belloc, p. 170.

remained to hold the parts together. The thyro-hyoid membrane was also torn across: and the epiglottis, pulled from its root at the back of the thyroid cartilage, had passed up with the os hyoides and tongue into the back of the mouth. The skin alone remained unbroken, and interposed between the rope and the cavity of the pharynx. This was the only region of the neck which gave evidence of much injury; the great vessels and nerves all escaped unhurt."*

The variety in the *colour of the countenance* must have some connexion with the immediate mode of death. Whenever there is an imperfect interruption of respiration, so that the struggle is prolonged, we find the cheeks, lips, and eyes, particularly swollen. The admission of even a small portion of air into the lungs permits the heart to continue its gradually impeded circulation, while at the same time the pressure of the rope obstructs the return of blood and accumulates it in the face.†

Its paleness is, however, no positive proof that death has not occurred from hanging. We find, in many cases of apoplexy, an absence of similar congestion.‡

The presence of bloody mucus, or froth issuing from the mouth or nose, is not by any means constant. In some instances, as in that of the Duke of Bourbon, it is seen, while in many executed it is wanting.§

As to the appearances on dissection, they must, of course, vary with the cause of death, and they will be more or less distinct according as it is least complicated.

In those dead from apoplexy, the brain will be gorged with blood, its vessels distended, and sometimes there will be extravasation, while the right as well as left ventricle of the heart will contain blood.

When an individual expires from suffocation, cerebral congestion will be wanting, but the lungs will be engorged, and filled with air. The left side of the heart will be empty, while the right and its vessels contain more or less of fluid blood.

Of the cases examined by Remer, nine appeared to have died from apoplexy, six from suffocation, nineteen were too imperfectly dissected to permit a classification, and the remaining sixty-eight appeared to

* Quoted by Dr. Beatty. There is a similar case in Lancet, N. S. vol. ii. p. 124.

† Roget: art. *Asphyxia*, in Cyclopædia of Practical Medicine. Dr. Fleichmann supposes that the livid colour of the face only occurs when apoplexy operates slowly. Sometimes one side is more livid than the other, and Dr. Kellie ascribes this to the position of the cord. The executioner generally adjusts it on one side of the neck, and, by the weight of the body, it slips upwards on that side towards the mastoid process behind the ear, and there is, consequently, a space corresponding to the rising of the noose which is not embraced by the cord, and where the veins are subjected to little pressure. Here, of course, there will be less lividity.

‡ Dr. Dunbar of Virginia, in stating some galvanic experiments on an executed criminal, mentions that the neck was found dislocated, the first and second vertebræ being separated so far from each other as to admit the end of the little finger. The face, however, was natural.—Baltimore Medical and Surgical Journal, vol. i. p. 245.

§ I copy the following from a newspaper, and cannot, therefore, vouch for its authenticity. It, however, teaches a useful lesson. A man in one of the eastern states was convicted of murdering his wife by strangulation: a physician deposed that in all such cases the tongue protruded, and there was foaming at the mouth; on this a respite was given, until another medical man, present at a recent execution, testified that neither of these had occurred in the latter instance.

have sunk from the mixed effects of both, as already explained. In some, the marks of both are completely developed, while in others, one seems to predominate. Thus, we find the blood accumulated in the brain, and occasionally even extravasated, while the lungs also are gorged, and the right ventricle filled and the left empty. Here impeded respiration has interrupted the return of blood to the heart, and its congestion on the brain continues until the last pulsation, and it is this last pulsation which empties the left side of the heart.

Again, there may be an incomplete apoplexy, or, in other words, only a certain degree of congestion, with complete suffocation. Dr. Remer, however, noticed but one of this description. Of the next variety he mentions thirteen cases, and this is complete apoplexy with incomplete suffocation. The lungs contain air and blood, but the head dies first, and its effects extend downwards. Here the death is so rapid that the blood continues fluid.*

Besides the appearances described in the preceding pages, there are some others occasionally observed, which deserve a brief notice.

In the case of Dr. Amusat, already referred to, and which was suicide by suspension, at the point corresponding to the stricture around the neck, the middle and internal coats of the carotid were found ruptured, precisely as when a ligature has been applied to it. Devergié, supposing, and correctly, that this, if constant, would be a valuable proof of suspension during life, made several dissections to ascertain whether it was always present; but out of thirteen he only noticed it in one. It was accompanied with a bloody infiltration into the cellular coat of the artery, but without ecchymosis in any of the

* As the appearances noticed in the text may appear somewhat arbitrary in their division and their peculiarities, I have subjoined such cases as I have been enabled to collect, for the purpose of comparison. In Guyon's (already referred to), the blood-vessels of the head contained but little more than usual; those of the lungs were gorged; the right auricle, also, empty; the cervical vertebræ, uninjured. In Mary Caen, executed at London in 1826, the rope had caught between the thyroid and cricoid cartilages, and separated them; death occurred instantly: appearances natural; no congestion in the external veins of the head, and those of the dura mater but slightly distended; some effusion in the ventricles, and the blood altogether fluid.—Lancet, vol. ix. p. 688. In Amusat's case, suicide by suspension, and where the most remarkable circumstance noticed was that the epiglottis was thrown back, and as it were turned on itself; congestion is not mentioned, but a serous effusion; the bronchiæ were gorged; the lungs, also, and the right auricle contained only a small quantity of fluid blood mixed with air.—North American Medical and Surgical Journal, vol. vii. p. 205. In Esther Hubner, executed at London in 1829, there was congestion of the vessels of the dura mater, and bloody serum oozing from some of the torn vessels of the bone itself; the longitudinal sinus was almost empty, but the other sinuses were full; the veins of the plexus choroides were full, but the arteries empty; the substance of the brain exhibited numerous bloody spots; considerable effusion between the araichnoid and pia mater, and in the ventricles.—Dr. Bright, Medico-Chirurgical Review, vol. xx. p. 3. A case of suicidal suspension at the Salpétrière, in December 1834: the individual, a female, hung an hour and a half; the face pale; the furrow which was in front of the os hyoides, was yellowish like parchment; *the skin strongly adhering to the sub-cutaneous tissue*, but no ecchymosis; the substance of the cerebrum injected, and the brain firm; very little blood in the lungs, and more of it in the left cavities of the heart than in the right. —By Dr. Gras, Boston Medical Magazine, vol. iii. p. 617, from London Medical Gazette.

adjacent parts. The cord consisted of two packthreads knotted together, and the neck was compressed circularly.

Dr. Devergié requested Dr. Lenoir, of the Salpétrière, to suspend dead bodies with the finest possible materials, and he accordingly did so in twelve cases,—but, although they were in several cases hung as soon as possible after death, and the legs pulled with some force, no lesion of the arteries could be discovered.*

In a case of suicidal suspension, along with the usual cerebral congestions, Dr. Prus found the upper and middle lobes of the right lung affected with vesicular emphysema; and, at one part, the air had escaped from some ruptured cells under the pulmonary tissue, and formed three bladders of air, each nearly an inch across.†

Flaccidity of these organs has, on the other hand, also been observed. In two cases of Dr. Fleichmann, this was seen very strikingly; and I observe it also noticed by Dr. Rhinelander, in his account of the dissection of Le Blanc, executed in New Jersey, in 1833. The face was livid; the mark of the rope was below the cartilages of the larynx, and very deep; the superficial veins were greatly distended with dark fluid blood, while the carotids and internal jugulars were empty; the lungs were in a state of collapse, and the right auricle and ventricle were empty.

Dr. Fleichmann explains this occasional collapse by supposing that death occurs at the moment of making a powerful expiration.‡

The same variety that occurred between the condition of the internal and external vessels of the head in Dr. Rhinelander's case was much insisted upon by the late Dr. Kellie, of Leith. In his elaborate paper on congestions of the brain,§ he even doubts whether the apoplectic state occurs in these cases, and mentions three examinations of persons executed, where the veins external to the cranium were fully distended, while but little change was seen internally.

He mentions, also, that Dr. Monro has repeatedly observed a peculiar softness in the brain of persons executed.

In every suspected case, two questions may present themselves for solution by the medical witness.

1. *Was the individual suspended before or after death*, or, in other words, has he been previously killed in some other way, and then placed in this situation to avoid suspicion?

The materials for a proper answer to this are to be drawn from a careful examination of the facts stated in this section. It is useless to conceal that the marks are far from uniform, that great diversity exists between them, originating unquestionably from (which has been too

* Annales d'Hygiène, vol. ii. p. 196.

† Medico-Chirurgical Review, vol. xxii. p. 516. In all cases of persons hung, it is important to remember that the engorgement, if present, will be greatest at the depending part, at their base and diaphragmatic face, according to Renard. This, however, should be noticed very early, since, if the blood continue fluid, a very short continuance of the body in the horizontal posture will induce the usual appearance.

‡ Dr. John Davy states, that in his experiments on animals, strangled by a ligature on the trachea, but a very small quantity of air was found in the lungs.—Edinburgh Medico-Chirurgical Transactions, vol. iii. p. 444.

§ Ibid, vol. i. p. 131.

much over-looked,) the various ways in which death may be caused. We find, however, that in a majority of cases certain signs are quite constant, and if one or more of these be absent, we should ascertain, if possible, whether this is not owing to some peculiarity as already laid down.

An ecchymosis along the mark of the cord is allowed, even by those who question its frequency, to be a very decided proof of suspension during life; but if it be absent, unless collateral circumstances aid us in our investigation, the difficulty of solution will be increased. I make this remark, because Orfila unequivocally states, that in twelve experiments on the dead body, some immediately after death, others after six, eight, or eighteen, hours, the depression made by the cord, and the skin under it, as well as the subcutaneous cellular tissue, presented precisely the same appearances as they do from suspension before death.*

We cannot, however, do wrong in particularly examining the form and situation of the mark around the neck, and pursuing its dissection carefully. If it is at the bottom of the neck, unless the position of the body favour this, there is a probability of strangulation, since, if suspended, the cord would slip to the upper part of the neck. It may happen that a person has been strangled and then suspended. In this case, we should expect to find two distinct circles on the neck, each characterised by its peculiarities.

The congestion of the venous system, the excited state of the seminal organs, and the livid condition of the countenance, &c., all are favourable to the idea of the presence of life, but we must not forget that other modes of violent death may produce them. Let the probability of these last be satisfactorily disproved, and the proof gains weight.†

The presence or absence of luxation, or fracture of the vertebræ, is not to be greatly relied upon, as it may have been produced by force subsequently applied, such as pulling at the feet. The inference, if any, is, however, in favour of its being caused during life, if accompanied with the usual marks of lesion.‡

Wounds, effused blood, and marks of violence, are to be judged of according to the rules already laid down.

One or two cases will serve to illustrate the present point.

A female aged 50, at Mantes (in 1683), was found suspended from a beam in a barn. The face was not discoloured, no froth issued from

* Leçons, 2d edition, vol. ii. p. 381. Marc, however, doubts whether this state can be exactly produced on the dead body.—Annales d'Hygiène, vol. v. p. 178.

Orfila is so positive on this subject, that he considers the presence of ecchymosis very uncommon, and imagines that the brown colour of the furrow has often been mistaken for it.

† An opportunity is also offered in cases that may hereafter occur, of verifying the opinions of the German writers that I have quoted. If the signs, both external and internal, correspond with the apparent cause of death, and the position of the cord, the inference must be strong in favour of the presence of life.

‡ Orfila, Leçons, 2d edition, vol. ii. p. 388. It is proper to state that this author doubts whether, in the present state of our knoweldge, we can go *beyond probability* in answering this question of suspension before or after death. If so, moral circumstances deserve a more careful investigation than ever.

the mouth or nose, the tongue was natural, there was no change of colour around the shoulders, nor was the neck marked by the cord. It was determined to examine the body minutely, and a short investigation discovered a small wound, directly under the right breast, which, on being pursued, was found to have penetrated though the heart, and produced an effusion of blood in the thorax. It was evident that she had been thus murdered.*

In 1811, a female in France aged sixty, large and fat, was found suspended by a handkerchief from a tree in the garden. The height of the branch from which she hung was eight feet seven inches, and its distance from the trunk three feet six inches. The tree did not give off branches until at six feet from the ground.

Near the tree was a common ladder seven feet long, and on applying it for the purpose of mounting, it was found impracticable to reach the point of suspension. The bark was lightly rubbed above, but below was untouched and covered with moss. The heels of the body were two feet six inches from the ground.

The head bent a little forward, and the hands were half closed. The face was pale, and not tumefied. The eyelids natural and partly open, the eyes sunken and dull, the lips dry and not swollen, the jaws closed, and the tongue approaching them. There was no froth in the mouth or nose.

On the neck, where the handkerchief had been, there was a semicircular depression of a little more than an inch in breadth, extending upwards. The colour of this was a light violet. On the lower part of the neck, near the left clavicle, was a slight excoriation. The other external parts were natural.

On dissection, a tumour was found in the occipital region, and when this was cut into, a fracture of the bone was seen, two inches long, accompanied with extravasation of blood. The lungs were soft, slightly engorged on their posterior part, and the right cavities of the heart were filled with fluid black blood.

The neck presented no ecchymosis or engorgement in the tissue under the parts where the handkerchief had been placed. The tissue under the excoriation just below, was, however, ecchymosed.

The medical testimony in this case was, that death had not resulted from suicide, nor, indeed, from hanging; but that the injuries stated preceded the suspension.†

2. The second question is, *whether the individual has hung himself, or has been hung by others?*

The presumption in all cases of suspension is favourable to the idea of suicide, since hanging is a difficult mode of perpetrating murder, unless the strength of the parties be greatly disproportionate, or the assailants be numerous and powerful. And, accordingly, we find that in a vast majority of cases it is an act of suicide. It must, however, be understood, that there are instances in which a decision is very difficult, as the marks left either from homicide or suicide may be precisely similar.

* Devaux, quoted by Foderé, vol. iii. p. 153.

† Chaussier, Recueil, p. 376.

We should first ascertain whether suspension took place before or after death; and, next, the immediate cause of death as before stated. The instrument of death, that is, the cord, should be compared with the furrow that it has made, so as to ascertain whether the diameter of the neck be much diminished by it. All the circumstances which indicate strangulation are so far against the idea of suicide.*

The presence of luxation or fracture of the vertebræ is an indication of homicide, and for the reason that we most frequently meet with them in persons executed, and then, as I have already stated, often in consequence of some additional force applied by the hangman.† But it may also happen, as suggested by Belloc, when a suicide precipitates himself from some height, or even when the body is heavy and has descended with some force against the cord. These are, however, exceptions, and their existence may be ascertained by proper examination. A case of this description occurred to Dr. Ansiaux, of Liege, in the person of a female who hung herself from a beam in the barn. She had mounted by a chair. On dissection, the intervertebral ligaments between the first and second vertebræ were found ruptured.‡

Wounds and marks of violence on the body are generally to be deemed proofs of homicide. But there may be suicides who injure themselves previous to suspension. De Haen records the case of a person who, while hanging, inflicted several wounds on his face. These, however, we should not consider as the cause of death. A still more remarkable case is mentioned by Ballard, of a young ecclesiastic, who cut his throat partially, and then hung himself in the vestments of his office, which he had arranged for this purpose.§ Dr. Male has also suggested that wounds may possibly be accidental, as when a person, by swinging himself with violence, breaks the rope and wounds himself by falling upon some article of furniture. The following case occurred to him: "An apprentice-boy, in my neighbourhood, working alone in an attic, tied one end of a rope loosely round his neck, whilst his master was from home, probably without any intention of destroying himself, and twisted the other round the projecting part of the top of the door, the planks of which were irregular and somewhat divided; a small stool, on which he stood, slipped from under him, when he fell forwards, striking his temple against the corner of a box,

* Foderé observes, that in suicide that portion of the cord which surrounds the neck is relatively longer than in homicide, where the constriction will be more violent. The skin will also in this case be more drawn up towards the chin.—Vol. iii. p. 159. Mahon remarks, that in assassination, the neck is sometimes so compressed, that the diameter of the circle described by the cord is not more than two or two and a half inches. He saw a female who had been hung, in whom the integuments alone resisted the cord; the vertebræ, muscles, and larynx, were separated, and the diameter of the circle was about two inches.—Vol. iii. p. 49. It is, however, doubted, and I think justly, by Male (p. 235), whether this should be considered a conclusive proof of homicide. Much of the tightness of the noose must depend on its situation.

† Also by leaping on the shoulders, as is practised at the Cape of Good Hope, or pulling the legs.—Edinburgh Medical and Surgical Journal, vol. xxxix. p. 397.

‡ Belloc, p. 173. Orfila, Leçons, 2d edit. vol. ii. p. 381. Remer is strongly in favour of luxation being considered a proof of murder. Orfila is at best doubtful, and rather disinclined to rely much on it.

§ Ballard, p. 409.

which cut him to the bone. He lay along the floor, his head and shoulders only elevated a few inches above it. The cord not being tied had nearly run its whole length, and then caught within the planks of the door, in which state he died. The wound was magnified by popular rumour into many, and vengeance was denounced against the innocent master, who was accused of having first killed, and then suspended the boy. On examination, the mark of the cord was found to extend from ear to ear, the vessels of the brain were turgid, the thyroid cartilage broken, the nails blue and the hands firmly closed. From this and other important circumstantial evidence, the coroner's jury were convinced that the charge was unfounded."*

The situation of surrounding objects, the state of the dress, the place and posture of the body, the appearance of the hands and nails, whether they bear any mark of resistance, all deserve attention.

George Hebner, a tailor, was found hanging to the top of a bedstead, in the garret of a house of ill fame, in Dean street, London, kept by a widow, Hughes. His hands were tied behind his back, and his handkerchief drawn over his face. The rope around his neck was fastened by what is termed a sailor's knot. These circumstances indicated homicide, and they led to the detection of a sailor, Ludman, who, with Mrs. Hughes, was found guilty and executed.†

The state of mind of the deceased, his previous history and situation in life, all may aid us in forming an opinion, and particularly so, if a predisposition to insanity is found to exist. We should not rely much on the cast of countenance. Although every thing on it indicative of fright or horror is so far in favour of violence, yet we must remember that the suicide, at the moment of the mortal pang, may experience similar feelings.

A curious case of an attempt at homicide, by hanging, occurred in 1827, in the Scottish Courts. Marion Brown, a woman aged 69, twisted a small rope three times round the neck of her husband, older than herself, while he was asleep, and fastened it to a beam in the room in such a manner, that when the neighbours entered, he was found lying on the floor with the head raised about a foot from it. He was quite insensible, his face livid, and it was some minutes before he could be roused. He deposed that *he was not aware of any thing that passed during the attempt to hang him.* The prisoner was proved to have been intoxicated, and was only sentenced to imprisonment.‡

"If the person be not elevated from the ground or floor at all, while the cord is not so tight about the neck as to strangle in this posture, and no other cause of death can be discovered, there can hardly be a possibility of doubt as to self-murder. A few years ago, a man aged 75, destroyed himself at Castle Cary, by fixing a cord round his neck, while sitting on the bed-side, leaning forward till his purpose was accomplished. His wife, who had for years been bed-ridden, and, therefore, not likely to have been fast asleep, was in the room during the transaction, and knew nothing of what was going on."§

* Male, p. 182. † Paris, vol. iii. p. 44. ‡ Syme's Justiciary Reports, p. 152.
§ Smith, p. 278. For similar cases, see page 570.

Among the multiplicity of cases that have come before legal tribunals, I will only select four for consideration.

A young man, eighteen years of age, and named Bartholomew Pourpre, was found dead and hanging to a tree at seven o'clock in the evening of the 12th of August, 1736. A surgeon, who examined the body, certified that he had been strangled. His father had married a second wife who was on very ill terms with the young man, and had produced frequent quarrels and threats of murder between them. Suspicion was, therefore, excited, but its probability was destroyed by the idea, that a father would not murder his son, and also from the circumstance that he was fifty-two years old, and his son eighteen, and in full health and vigour. On this reasoning the father was acquitted, and the son was deemed to have hung himself.

An order having, however, been made to prepare a statement of the suicide, and the cause being carried up to the parliament of Aix, the attorney-general discovered such facts in the statement of the surgeon, as led him to believe that Pourpre had not destroyed himself. It was mentioned not only by him, but by other witnesses, that the mark of the cord, instead of being at the upper part of the neck, was at its lower part, just above the shoulders; and, secondly, that the teeth were knocked in and bloody. On dissecting the integuments no alteration or ecchymosis was found on the upper part of the neck, but under the skin, just above the clavicles, there was a circular and deep-seated ecchymosis, the muscles were livid, and the trachea was red, with some rupture of its fibrous fascia. The parliament, from these facts, decided that the father had strangled him, and had put his foot on the mouth of his son, either to prevent his cries, or to hurry on the strangulation. The suspension, they declared, was subsequent to his death. Whether the father was guilty or not, we must at least say, with Foderé, that two facts are well established in this case: 1. That the son had been strangled before being hung; and 2. That the strangling had been done, not by himself, but by others.*

Marc Antoine Calas was the son of John Calas, a merchant of Toulouse, aged seventy years, of great probity, and a Protestant. This son was twenty-eight years of age, of a robust habit, but melancholy turn of mind. He was a student of law, and, becoming irritated at the difficulties he experienced (in consequence of not being a Catholic) concerning his license, he resolved to hang himself. This he executed by fastening the cord to a billet of wood placed on the folding-doors which led from his father's shop to his store-room. Two hours after he was found lifeless. The parents, unfortunately, removed the cord from the body, and never exhibited it to shew in what manner his death was accomplished. No examination was made—the people, stimulated by religious prejudice, carried the body to the town-house, where it was the next day examined by two medical men, who, without viewing the cord, or the place where the death had been consummated, declared that he had been strangled. On the strength of this, the father was condemned by the parliament of Toulouse, in 1761, to be broken

* Foderé, vol. iii. p. 152, cited from Louis. Chaussier, p. 439.

on the wheel. He expired with protestations to heaven of his innocence.

Reflection, however, returned when it was too late. It was recollected that the son had been of a melancholy turn of mind—that no noise had been heard in the house while the deed was doing—that his clothes were not in the least ruffled—that a single mark only was found from the cord, and which indicated suspension by suicide; and, in addition to these, that the dress proper for the dead was found lying on the counter. Voltaire espoused the cause of the injured family, and attracted the eyes of all Europe to this judicial murder. The cause was carried up to the council of state, who on the 19th of May, 1765, reversed the decree of parliament, and vindicated the memory of John Calas.*

The Duke of Bourbon (otherwise called the Prince of Condé), the father of the unfortunate Duke d'Enghien, was residing at the Château de St. Leu, in the seventy-fifth year of his age. On the evening of the 26th of August, 1830, although much depressed with the result of the "Events of the Three Days," he entertained a party and went to bed at midnight, leaving directions that he should be called at 8 A. M. The key of the door of his apartment was, according to custom, in the hands of Sieur Le Comte, who locked it, but the duke himself closed the inner bolts. At the appointed time the signal was made, but no answer being returned, it led to alarm, and, finally, to breaking open the door. On entering the room and opening the shutters, the duke was found dead, hanging from a curtain rod attached to the top of the window. A chair was displaced on opening the shutters. The height of the rod from the floor was six and a half feet, and attached to it were two white linen pocket-handkerchiefs tied together. The noose formed by them suspended him. The tongue projected out of the mouth; the visage was pale; froth issued from the mouth and nose; the arms hung by his side, and were stiff; the fingers, closed; the toes of his feet touched the floor, the left heel being elevated three inches, and the right, one and a half, the knees were half bent. His night-dress appeared natural and undisturbed, and the bed was as if a person had lain in it.

On further examination, no ecchymosis was seen around the neck, but a distinct depression, most marked on the left side, where the knot of the handkerchief had been situated; blood also flowed from the urethra.

These were the facts elicited in the inquests made by the physicians first summoned, and all within a few hours after death.

The circumstances, however, of this case, and the high rank of the individual, rendered a more extensive inquiry necessary; and, accordingly, a commission, consisting of Drs. Marc, Marjolin, and Pasquier, was appointed, and they acted on the 28th. The additional facts reported by them I will now state:

The face continued pale, and the back and the depending parts of the body were livid, as is usual in corpses; the depression made by

* Foderé, vol. iii. p. 167, from the Causes Célèbres. See also Grimm's Historical and Literary Memoirs (from 1753 to 1769), vol. ii. pp. 41, 117, and 166.

the handkerchief is between the os hyoides and the upper third of the thyroid cartilage, passing upwards and backwards, and terminating at the mastoid process. The skin under it is dry, hard like parchment, and of a yellow colour. There was a very slight excoriation, three lines in diameter, just below the furrow; also a slight ecchymosis about an inch helow the posterior part of the elbow, and one or two excoriations on the front of the legs. All these last are ascribed to contact with the chair and wainscoting while in the act of stepping off.

On dissection, no ecchymosis was found in the parts under the furrow, but they were hardened and thickened; the external jugulars contained but little blood, the internal ones very full of fluid black blood; the carotid had a little serous blood; there was no contusion or lesion on the external integuments of the head; the dura mater adhered and its vessels were engorged; there was some serum in the ventricles, and the substance of the brain was soft. All the other parts of the head were healthy. The cartilages of the larynx were sound; the tongue, swollen and livid; the mucous membrane of the bronchiæ injected and red, and a bloody froth in all their divisions; the lungs, crepitant, dark coloured, and filled with blood, while both sides of the heart were equally empty; semi-erection and an emission of semen.

Dr. Marc, from whose account I have taken the above facts, proceeds to consider the case under the two questions which I have previously noticed.

That the *hanging occurred during life* is, in his opinion, established by the absence of any other lesion that will account for death; by the condition of the tongue, of the genital organs, of the blood-vessels; by the fluidity of the blood, the state of the bronchiæ, and the lungs and heart. Even the appearance of the furrow is no evidence against it, since that is known to be present in many instances.

But, secondly, *was this a case of suicide or homicide?* From the state of parties, this became a debated question; and, indeed, some physicians, as Dubois and Gendrin, gave it as their opinion, that the duke might have been murdered. The position of the body, touching the floor with its toes; the ecchymosis just *below* the mark of the cord; the assertion, that, from a previous injury to his right hand, his fingers were injured, while, from a fracture of the collar-bone, the left arm was so weakened that he could not raise it above his head; the state of his mind on the evening of his death; all were urged in favour of the probability of violence. The excoriations on the arms and legs might be equally the act of the murderer dragging the body to the place of suspension.

To these presumptions, Marc replies, that if murdered, the mark of the noose would have been more parallel with the lower jaw. It is hardly possible that assassins would have given it that direction on which they could apply least force. They would also select a cord or a rope in preference to a cravat or handkerchief, as producing the desired object much sooner. Beside, the mark did *not extend around the whole neck.* All these are difficulties, even supposing the prince was asleep when strangled; but if awake, there must have been more

striking marks of resistance. That on the neck was evidently caused by the cord, and on the other parts by striking against the chair or window. They were oblong in form, and in each case on the front side. As to the state of the shoulder from fracture of the collar-bone, Dr. Marc remarks, that nothing was discovered to warrant this assertion. On the contrary, it was notorious the duke was an accomplished sportsman.

That the position of the body is not inconsistent with the idea of voluntary suspension is incontestibly proved by several cases, either seen by himself or derived from other observers. In one, a man was found suspended to a cross rope going between two beams, by means of a cotton handkerchief. This was in a barn; the feet were supported in a heap of grain, and the knees bent forward so much that they were but a few inches from the grain. In another, a prisoner was found hanging to the bar of a window, so low that he was nearly sitting on the ground, and he had previously tied his hands together. In a third case, a prisoner hung himself in his cell, which was arched, and so low, that in the highest part, a man could not stand erect: yet he hung himself from the grating of the roof, and was found almost sitting down, with his legs stretched out before, and his hips within a foot and a half of the ground. In the fourth, a girl of the town suspended herself from the supporter of the little shelf in the cell: it was so low, that she was obliged to stretch her legs and rest, with one on her heel and the other on her toes, in order to accomplish her purpose. Again, a female was found stretched at the foot of her bed, the body lying on the floor, and the head and shoulders supported by the cord attached to one of the posts of the bedstead.*

In these cases, the probability is that pressure on the blood-vessels produces very early a loss of sensation and nervous power; and the individual is deprived of ability to prevent, even if he were then desirous, the fatal catastrophe.

As to the moral circumstances attending this case, Dr. Marc dwells much on the apprehension excited in the duke by some remarks made at the evening party concerning the state of feeling in Paris against the exiled family. The fragments of a written paper were also collected in the hearth, in which he spoke of suicide. There is, however, a great contrariety of statement as to the deportment and state of mind of the deceased.

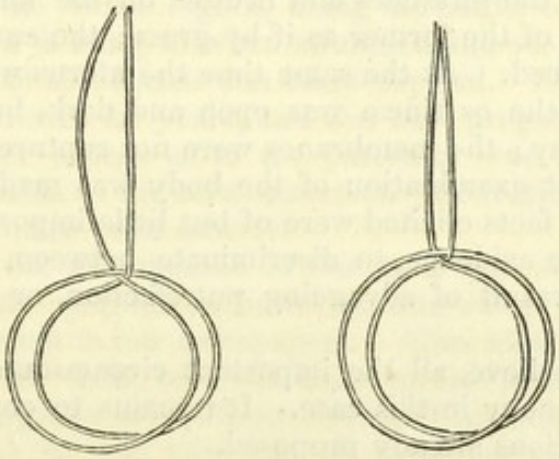
A third opinion has gained ground, and certainly seems to me not at all improbable, and that is, that the death by suspension was owing to accident. The duke was a veteran libertine; even at his advanced age he had his mistress (the Baroness de Feucher) living in the palace with him. It is a known practice with persons of this description, to cause themselves to be half hanged in order to arouse their dormant generative powers, and several have lost their lives from not being

* Besides these, which are only a portion of Marc's cases, others may be found in Annales D'Hygiène, vol. xi. p. 472. A boy in Connecticut, some years since, by way of curiosity, hung himself in a similar way.

taken down in time.* Is it not possible that this might have been the cause of death?†

Sarah M. Cornell, an operative (as the term now is) in one of the cotton-mills at Fall River, Rhode Island, left her home on the evening of the 20th of December, 1832, in good health and spirits, and on the morning of the 21st, was found dead, suspended to a stake. Her cloak was hooked together nearly its whole length, only one hook being loosened about the centre of the chest. Her calash was on ber head, and her hands gloved. Her shoes not on her feet, but stood about eighteen inches from the body, and there was a little mud on one of them. Her toes touched the ground, the heels being nearly perpendicular. The knees approached nearly to the ground, and the clothes were smoothed back as far as they would reach under her legs, The cord, which consisted of hemp, small in size, and taken twice round the neck, was attached to the stake about six inches from its top. Its length, from its fastening on the stake to the neck of the deceased, was short of six inches. Her calash was so far back on the right cheek, that the face rested against the stake, and in consequence was distinctly marked by the pressure.

The cord was described by a witness who had followed the seas, as a *clove hitch*—two loops, one passing under, and the other over. And he also added, that it must be drawn at both ends horizontally in order to tighten it. The knot was at the right side.



The countenance was pale; and, on dividing the cord, the strings of the calash were found under it. A deep horizontal indentation was found to extend exactly around the neck; and this was so marked that the neck below it measured eleven and a half inches, while at the mark, its circumference was only ten and a half. It passed round the neck

* Fatal cases are mentioned in the London Medical Gazette, vol. ix. p. 609; and Lancet, N.S. vol. ix. p. 49.

† The authorities consulted in this case are: Annales D'Hygiène, vol. v. p. 156. Medico-legal examination of the cause of the death of the Prince of Condé, by Marc.—London Med. Gazette, vol. ix. pp. 485, 608.—Albion newspaper of February 11, 1832. I have followed the narrative of Marc in this case, principally because it is the only one that I have been enabled to examine. The facts in favour of the idea of murder are, however, well enumerated in the article last referred to, in the New York Albion newspaper.

above the thyroid cartilage, an inch and a quarter below the tip of the ears on both sides. When the head was erect the mark was higher at the back of the neck than it was in front. The tongue protruded slightly. Several females, who prepared the body, on the same day that it was found, for burial, deposed that there were marks as of the print of fingers passing upwards on the abdomen; that there were bruises on the legs, but the worst one was on the back of the hip. There were scratches on the knees, with some dirt. One knee had the appearance of being stained with grass; and one witness (a female) indeed swears that she picked grass from it. The vagina was bloody, so that her linen was stained; the fæces evacuated and flattened. The right arm was raised upwards, quite stiff, under the cloak.

A coroner's jury was summoned. A physician who appeared before them inclined to the idea of suicide, particularly as he was aware of her pregnancy from previous consultation with him, and also by noticing the fulness of the abdomen. A verdict of suicide was accordingly brought in, and she was interred on the 22d, the same day on which her body had been found.

Suspicions, however, arising, the body was taken up again on the 24th, and a further examination made by medical men. The indentation on the neck looked like parchment, the stomach was healthy, the lungs gorged with black blood, the abdomen was livid and discoloured, but they do not speak of the marks of fingers. They observed, however, the scratches and bruises on the knees and legs, and the discoloration of the former as if by grass; the contusion above the hip was also noticed. At the same time the uterus was examined, and a fœtus found; the os tincæ was open and dark, but the rest of the uterus was healthy; the membranes were not ruptured.*

A subsequent examination of the body was made on the 26th of January, but the facts elicited were of but little importance, as it is impossible, from the evidence, to discriminate between those which may be deemed the result of advancing putrefaction, or of injury during life.

Such are, I believe, all the important circumstances that make up the medical testimony in this case. It remains to consider it in reference to the questions already proposed.

Was the female suspended while living? In answer to this, I would premise the remark, that death was evidently caused by strangulation, using that word now in its most extensive sense. The absence of any other injury sufficient to account for it, the mark of the cord, the condition of the lungs, the fæcal discharges, and the condition of the vagina, if we determine to explain that without the idea of an attempt at abortion, all unite to render this opinion probable, and indeed certain. But, in agreeing to this, we have only approached to the difficult part of the subject. The horizontal mark extending all around the neck, the deep indentation it had made, combined with the position of the body, and the peculiar character of the cord, all render it doubtful whether hang-

* The facts relative to the fœtus and its probable age I have noticed in a previous chapter. See p. 179.

ing was the immediate agent. Add to this, the marks of injury on various parts of the body, which, at all events, are not incompatible with the idea of previous violence. Professor Channing, whose able replies, during an examination of at least three hours, cannot be too much commended, in answer to the question, replied that he thought the mark might be horizontal, "if the body were nearly on the ground, and suspended from above, In such a case, the body falling forward, the mark of the cord on the back of the neck, or the side nearest the place from which the cord was suspended, would not be apparent at all. I knew (says he) an instance of suicide of this kind; there was very little oblique pressure in that case; the mark was directly across the windpipe, and but little appearance elsewhere."

In further support of the idea of hanging during life, the absence of *two* marks around the neck, the calmness of the countenance, the inability to discover any indications of struggling in the stack-yard, and the impossibility to strangle a person with a cord so near the ear, were urged.*

On the other hand, the state of the clothes, the shortness of the cord—just long enough to go round the neck and fasten to the stake, the probability that the pressure of the body on it would have altered the mark from its horizontal position to one tending upwards, were dwelt upon to establish the idea of murder. And, in connexion with this, the idea has been advanced, that the marks of violence, and particularly those on the female organs, being indicative of a struggle, she may have been in a fainting fit when strangled and suspended.

The character of this female was decidedly bad. She had indulged in habits of incontinence for years, and was now pregnant. So far her helpless and (if her charge as to the paternity was false) desperate condition is favourable to the idea of suicide. Seduction, however, and murder too often follow each other.†

I commenced the examination of this trial with strong prejudices against the accused—prejudices, however, founded on a perusal of the testimony as published in our newspapers. After a careful and deliberate review of all the facts, with reference to the present work, I will only say, in the language of Professor Walter Channing (in a communication with which he was kind enough to favour me), that "every point is surrounded with difficulty."

It is not by any means certain, from the *medical* testimony, and that alone I desire to consider, that Miss Cornell was murdered.

H. *Of persons found strangled.*

I have already, in the previous section, indicated the difference

* On this trial Dr. Channing testified that he had seen some fourteen cases of people hung, and in most of these the countenance was pale. Dr. Dunn, of Newport, confirmed this from the observation of four cases.

† I have examined the following pamphlets in stating this case: Report of the trial of E. K. Avery, for the murder of S. M. C., by Benjamin F. Hallet, Boston, 1833. A Report of the same, published by Marshall & Brown, Providence. Strictures on the case of E. K. Avery, by Aristides. Vindication of the result of the trial of E. K. Avery. A manuscript communication from Dr. Graves of Baltimore has aided me; and also an Analysis of the case in Boston Medical and Surgical Journal, vol. viii. p. 334.

between this species of murder and hanging, and, indeed, were it not for the sake of regularity, they might be considered together.

The following distinctions are, however, to be noticed.

In strangulation, strictly considered, the distinction consists in the murdered not being suspended. It is a more common, and probably, a more violent mode of murder than hanging, and we should, therefore, expect that the mark of the cord, ligature, or whatever may be used, would be more distinct.

The diversity that occurs in the external appearance is to be explained in a similar manner as those seen from hanging. The instrument of murder varies considerably, from a cord to the application of the hands. The simplest form is probably the bow-string, as practised by the Turks. Here the ligature is applied round the neck, and drawn so tight as to interrupt at once the alternate entrance and exit of air by the windpipe.* But in ordinary cases, death is not so rapidly produced. There is more or less of struggling; and I apprehend that in by far the greater number of cases, suffusion and distortion of the face will be seen, depending, however, on the length of the conflict.

The mark of the ligature will, generally, form a *horizontal* discoloured circle round the neck and towards the lower part. The dislocation of the vertebræ is not to be expected, though there may be fractures of their processes, and, in all probability, injury to the cartilages of the larynx.†

The appearances on dissection will not vary materially from those stated in the previous section, except that in cases of manual strangulation, they will not be so distinct, since the imperfect closure of the windpipe has allowed respiration and circulation to go on for a longer time.‡

The same questions are to be considered here as in the former section. *Was the deceased actually strangled, or was the rope fastened around his neck after he was dead?* There are instances on record, where injuries have been inflicted on bodies strangled, to avert suspicion of the true manner in which they were killed.

I commence with one, which, even at the distance of a century and a half, is still a vexed case. It acquired an importance from its connexion with the distracted state of England on religious subjects, in the reign of Charles II., and the supposed murder was attributed to the agency of the Catholics. I discard this idea altogether. The Popish Plot was engendered in fraud, and no credence can with justice be given to any of its perjured inventors. I will state the case simply as it comes down to us, from the narrative of eye-witnesses and the testimony of responsible observers.

Sir Edmundbury Godfrey, an eminent magistrate in London, was, on the 12th of October, 1677, found dead in a ditch, nearly a mile out of town. His sword was thrust through him, but there was no blood on his clothes or about him. His shoes were clean. His money in his pocket. His neck, which was open, without any thing on it, had a mark all round, an inch broad. It was also dislocated. The breast was marked with bruises.

* Edinburgh Medical and Surgical Journal, vol. xxxix. p. 396.

† Smith, p. 224.

‡ Beatty, ut antea, p. 333.

This is the statement of Bishop Burnet, who went to see the body.

Subsequently, several individuals were tried in the Court of King's Bench, for publishing letters importing that *Sir E. Godfrey had murdered himself.* Though a case of libel, they endeavoured to defend themselves by calling witnesses to prove the truth of the fact, and this the chief justice (Pemberton) allowed to the fullest extent. The medical testimony is as follows:

Two wounds were found on the body, within an inch and a half of one another. One went no further than the bone, having struck on a rib, and the other through his back. When the sword was drawn out, blood followed. The neck was very flexible. The face was bloated, and the eyes bloodshot. The upper part of the breast was much discoloured. And Mr. Lazinby, a surgeon, deposed to the marks on the neck as being very distinct, with a swelling above and below them.

It is urged in opposition to these striking facts, that Sir E. Godfrey was of a melancholy temperament, and laboured under a great depression of spirits; that he probably destroyed himself under the operation of this feeling, and that the mark around the neck might be owing to the tightness of the collar.*

Philip Standsfield was tried and found guilty, in 1688, of the murder of his father, Sir James Standsfield, of New Milns, in Scotland. This atrocious parricide appears to have been a man of vicious and debauched habits, and on extremely ill terms with his parent. He cursed him, and repeatedly swore that he would take his life. The father was murdered by strangulation in his bed-chamber, at the dead of night, and the body was afterwards taken, and carried to some water hard by. In the morning it was discovered lying on the top of the water, which was only five feet deep, and not a running stream, and, although Philip was desired to delay the funeral, yet he caused it to be immediately interred. Suspicions were, however, excited, concerning the cause of death, and two surgeons were sent for from Edinburgh, by order of Sir John Dalrymple, the king's advocate, to examine the body. They (James Murehead and James Craufurd) had it dug up, and on inspection, found the following appearances, which I shall give in their own words. "Having, with all possible exactness, viewed the corpse, we observed the face a little swelled, and inclining to a dark reddish colour, some fulness of some capillarie veins in the pallat of the mouth towards the uvula, as also a large and conspicuous swelling, about three inches broad, of a dark red or blue colour, from one side of the larynx round backwards to the other side thereof; we observed the jugular veins on both sides the neck very

* Hargrave's State Trials, vol. ii. pp. 759–791; vol. iii. pp. 505–518. Burnet, vol. ii. p. 42. Smith, p. 225. Hallam's Constitutional History of England, American edition, vol. ii. p. 574. Edinburgh Review, vol. liii. p. 39. Compare with these Lingard's History of England. The reviewer in the Edinburgh Medical and Surgical Journal, vol. xxii. p. 191, observes that the proof of strangling in this case is quite inconclusive, and animadverts with perfect justice on my introduction of the testimony of Oates's gang. In the present narrative, I have omitted this altogether, but I am still inclined to consider the case as one of strangling. See Baltimore Medical and Surgical Journal, vol. i. p. 34.

large and distended, and full of blood; there was a large swelling under and betwixt the chin and cartilago scutiformis; there was also a little scratch below the left mandibula, which had rankled the cuticula, and made some little impression on the cutis. Having made incisions from the chin down about the larynx, and cross upon the swelling of the neck, we found a greater laxness and distance (as we think) than ordinary, betwixt the cartilago scutiformis and os hyoides; we found the tumour on the neck containing bruises, like dark or blackish blood; the jugular, when cut, bled considerably, especially that on the left side.

"Having opened his breast, we found the lungs distended to the filling up of their capacities, but free of water; his stomach, liver, &c., were all in good condition; we found no water within the corpse; the corpse had no smell at all; the breast, belly, privy parts, &c., were all well coloured; there was no swelling in his belly, nor any thing but ordinary to be seen on his head."

This report was submitted to the deaconry of surgeons at Edinburgh, and they state, "*that though it is not usual to declare more than matter of fact,*" yet they, in obedience to his lordship's commands and inquiry, whether these symptoms import drowning or strangling, reply, that they indicate external violence, and such as could not be caused by drowning simply. On that part of the report which details the appearances found on opening the breast and stomach, they observe, that *a body, when drowned, is generally found to have much water in it.* As this was not present in the deceased, as the lungs were distended, but free from water, and as the other circumstances mentioned in the report indicated violence, they decided that there were just grounds to think that he was not drowned.

The college of physicians were also consulted, and answered that there was sufficient reason to believe that Sir James had been strangled, and not drowned.

Spurway, a person present at the dissection, proved that when surgeon Murehead was moving the cap from the head, the eyes opened, and the eyelids were much swollen, and very red.

The defence set up was, that Sir James had drowned himself, and, in reply to the argument that no water was found in the body, it was urged, that when a man commits suicide in this way, he will keep his breath and thus prevent the ingress of the water. Various conjectures were also advanced in the pleadings to account for the swelling of the neck, but did not prove satisfactory, and the parricide was with great justice condemned and executed.*

I shall adduce another case, to shew the facility with which a person may be murdered in this manner. Dr. Clench, a physician in London, was called out of bed by two persons, on the night of the 4th of January, 1692, who desired him to visit a friend who was not well. He entered a hackney-coach with them, and drove about several streets in the city for an hour and a quarter. The two individuals then left the coach, and sent the driver on an errand. When the coachman

* Hargrave's State Trials, vol. iv. p. 283.

returned, he found Dr. Clench sitting on the bottom of the coach, against the front seat, with his head against the cushion. Thinking him in liquor, he shook him, but obtained no answer. He then called the watch, and they found him strangled by a handkerchief in which a coal had been placed, and then the coal applied directly over the windpipe.* The coachman had heard no noise while driving the carriage.†

It must, however, not be forgotten, that strangulation is sometimes effected by other means than a cord, ligature, or handkerchief. It may be performed by the hand; and in this instance, instead of a circle round the neck, the discoloration will be partial, the bruises will be of an indistinct form, or the positive marks of fingers may be traced.‡

In 1763, a man named Beddingfield was murdered in England, and the charge was laid against his wife and man servant. The medical testimony was very unsatisfactory, as no dissection had taken place; but it was proved that there were marks about the neck resembling those of fingers. A contradictory account was, however, given of the number; one surgeon said a thumb and *three fingers*, the other, a thumb and *four fingers*, while another evidence, who also saw the marks at the inquest, spoke of *two* only, "which looked as if the blood was set in the skin."

The defence was, that the deceased had fallen out of bed, in a fit of apoplexy, and was found lying on the floor on his face, with one hand round his neck.

I am far from thinking that this could have been mistaken, if a proper examination had been made. The discrepancies in the testimony, and the omission of dissection, might, however, have led to subsequent doubts, had not one of the condemned persons confessed that he had strangled Beddingfield, by seizing his throat with his left hand, while asleep, and that though the deceased struggled violently and made some noise, yet he soon accomplished his purpose.§

Sir John Dinely Goodere, in 1741, was forced by violence on board the Ruby ship of war, commanded by his brother, Capt. Goodere, and lying in the port of Bristol. In the night he was strangled by two assassins in the employ of his brother. One of them confessed, that the other fell on Sir John, as he lay in bed, took hold of his throat with his hand (his stock being on), and so strangled him with his stock. They then put a rope with a noose in it round his neck, and drew it tight, to insure the certainty of the murder. In accordance with this,

* "There are a caste of robbers in Upper India, who strangle their victims by means of a cummerhand (a long piece of cloth worn round the waist), in which a knot is cast, and thus, from the softness of the cloth, leaves little or no mark; they generally throw the body into a tank or well, and putridity in that country advances so rapidly, that in twenty-four, or at most forty-eight hours after death, nothing can be found by which the cause of death could be traced."—Dunlop.

† Hargrave's State Trials, vol iv. p. 495.

‡ These marks are occasionally very slight. A young officer was strangled in his bed by a soldier. The surgeon of the regiment could only find one small spot, which the murderer afterwards confessed he had produced by violent pressure with his thumb.—Metzger, p. 379.

§ Smith on Medical Evidence, p. 290. Paris, vol. iii. p. 30.

Mr. Dudgeon, the surgeon's mate of the Ruby, swore, that there were some marks on his neck, which looked like the scratching of nails, while blood came out of his nose and mouth.*

"On opening the bodies of those who are murdered by manual strangulation, the usual appearances of this kind of death may not seem so conclusive as in other cases, from the person making continued resistance, and the functions of respiration and circulation going on in some measure for a longer period than when they are interrupted at once, as in the instance of drowning or the effectual application of a cord."†

In the case of a woman who had been strangled *per manum* by two men, Littre found the tympanum of the left ear lacerated, and from it flowed about an ounce of blood; the vessels of the brain were unusually turgid; red blood was extravasated in the ventricles, and also on the base of the cranium; the lungs were greatly distended, and their membrane very vascular. Not more than an ounce of blood, however, was contained in the right ventricle of the heart, and it was fluid and frothy, like that of the lungs.‡

In a case of murder by manual strangulation, detected with great skill by Dr. Paris, patches of extravasated blood were seen on the throat, with abrasions, corresponding to the nails. On the chest, also, bruises were noticed. On dissection, the brain was found excessively turgid with blood, but all the other organs were healthy. The murderer, previous to execution, confessed that he had strangled his victim with a pocket-handkerchief, but, from the difficulty of completing it, he was compelled to press his knees upon the chest.§

John Nuttal was convicted of the murder of his pregnant mistress, at Lancaster (England), in 1817. She was found dead in a well; there were bruises on the forehead, chin, knees, and arms. On the neck there were marks of four nails, one under the right ear, and another under the left jaw, and they had penetrated very deep, and were very distinct; connected with the nail marks, were those of fingers. The brain exhibited an effusion of blood; the dura mater was turgid; the vessels of the pia mater were, in many places, ruptured. The lungs were shrunk or collapsed, and there was no water in them or the stomach. There was a great accumulation of blood in the heart.‖

As to the question, *Whether the strangulation is the effect of suicide, homicide, or accident?* it may be observed, that it would appear extremely difficult for a person to destroy himself in this way, since the hands lose their strength the moment compression begins. Cases, however, are so numerous, where the object has been completed, and where no reasonable doubt can exist as to the cause, that we cannot deny its possibility. All marks of violence are, however, of course, proofs of homicide; and the circular mark itself is *primâ facie* evidence, unless contradicted by sufficient testimony.

As illustrations of the remark just made, I may mention several

* Hargrave's State Trials, vol. vi. pp. 816, 831. It is insinuated that Captain Goodere was insane. See Croker's Boswell, vol. i. p. 332.

† Smith, p. 229.

‡ Foderé, vol. iii. p. 139.

§ Paris, vol. iii. p. 29.

‖ Remarkable Trials, vol. vi. p. 241.

well-authenticated cases. The following were communicated by Dr. Desgranges of Lyons, to Foderé, in 1811: A man was found in a hay-loft, strangled by a handkerchief, which had been tightened with a stick. The judicial tribunal consulted the Society of Medicine, whether this was a case of possible suicide. The Society replied, *that it was possible;* and Dr. Desgranges observes, that in a person who is firmly determined to destroy himself, it might be accomplished by producing several rapid revolutions of the stick, and in this way tightening the handkerchief effectually.

In another case, an old man in the hospital used the handle of a pot as the instrument for tightening the ligature. He was found lying on the bed, with his face turned to the mattrass; the chin was cut by the pieces of the pot; the head was dark-coloured, the face swelled, the lips thickened, and a sanguineous saliva issued from the mouth.*

In 1834, an insane female strangled herself at the Hotel Dieu, by tying a handkerchief round her neck from behind forwards, and taking a knot, and then returning it and making a second one. She was seen alive in her ward an hour previous, and was found inanimate, with her head hanging out of the bed. The eyes were much injected; the mark of the ligature was deep, ecchymosed, and partially excoriated. What adds to the interest of this case, is the fact that the right hand wanted four of its fingers. It is well asked, whether the presumption would not have been almost irresistible of murder, if this female had been thus found in a solitary place, instead of the open, frequented ward of a hospital? Dupuytren, in remarking on it, observes, that in these cases, strong proofs are often derived from the posture and features of the deceased.†

All who are acquainted with the eventful history of Buonaparte, —and who is not?—must recollect the sudden death of General Pichegru. This distinguished soldier was confined as a state prisoner in the Temple. On the 5th of April, 1804, he was as well as usual, and at ten o'clock in the evening the keeper locked the door of his prison and took the key. The general was heard to cough during the night, but at seven o'clock, when they came to light the fire, he was found dead on his bed. A commission was appointed to examine the body, among whom were several medical men. They found, twelve hours after death, a circular mark around his neck about two fingers wide, produced by a black silk cravat strongly knotted, and through which a small stick had been passed. This stick was used as a tourniquet to produce the strangulation. They also remarked that one end of the stick lay under the left cheek, where, by an irregular motion of the

* Foderé, vol. iii. p. 173.

"A navy surgeon, a friend of mine, related to me the case of a Malay, who, on board of a man-of-war in the East Indies, had made repeated attempts to commit suicide, and at last succeeded by the means alluded to in the text. He tied a handkerchief round his neck, and with a small stick twisted it several times, and then secured it behind his ear to prevent its untwisting. Jealousy was the cause assigned for the act."—Dunlop.

† Annales d'Hygiène, vol. x. p. 252. London Medical Gazette, vol. xii. p. 126. Similar cases are related in Annales, vol. viii. p. 429; London Medical Repository, vol. xxviii. p. 347.

body, it had caused a slight scratch. The face was ecchymosed, the jaws fixed, and the tongue held between the teeth. The body was swollen, the extremities cold, and the muscles of the hands and feet strongly contracted.

From these observations, and taking into view the position of the body, they were of opinion that General Pichegru had strangled himself.

The next day a medical dissection was ordered. The dura mater was injected and slightly adherent. The blood-vessels of the brain filled with blood. The other portions were healthy. So, also, were the viscera, except that the lungs were gorged and the stomach reddish. The œsophagus was healthy except at the mark of the handkerchief. The examiners repeated their opinion of its being a case of suicide.

Chaussier very justly condemns the palpable deficiencies in these reports. The appearance of the eyes is not noticed, nor the position and attitude of the body. We are not informed at what part of the neck the mark was, whether the inferior or the superior, or how deep, or of what colour.

As to the dissection, it is superficial, notices points which are of no importance, and slurs over the most important subject of inquiry, viz. the state of the neck.

I apprehend that no one can read this statement, and it contains all the medical facts we have on this historical case, without inclining to agree with Chaussier, that, although the medical witnesses might be justified in declaring it a case of strangulation, they had no grounds for pronouncing it suicide. Still this is within the range of possibility, if we credit the narratives already given.*

There is another class of cases that may be mistaken for either suicidal or homicidal strangulation, and these lead to grievous mistakes. I refer to instances of apoplexy, occurring in unusual positions of the

* Chaussier, p. 279. I subjoin the statement given by one who, if Pichegru was murdered, might, probably, have directed the commission of the crime. "He was lying (says Savary, duke of Rovigo, in his Memoirs) on his *right* side: he had put round his neck his own black silk cravat, which he had previously twisted like a small rope; this must have occupied him so long as to afford time for reflection, had he not been resolutely bent on self-destruction. He appeared to have tied the cravat, thus twisted, about his neck, and to have at first drawn it as tight as he could bear it; then to have taken a piece of wood of the length of a finger, which he had broken from a branch which yet lay in the room (part of a fagot, the relics of which were still in his fire-place); this he must have slipped between his neck and his cravat, on the right side, and turned round till the moment that reason forsook him. His head had fallen back on the pillow, and compressed the little bit of stick which had prevented the cravat from untwisting. In this situation, apoplexy could not fail to supervene. His hand was still under his head, and almost touched this little tourniquet."

"No human eye (says Sir Walter Scott) could see into the dark recesses of a state prison; but there were not wanting many who entertained a total disbelief of Pichegru's suicide."

The defective state of the reports, and the evident reluctance of the medical men to pursue the investigation, appears to me most mysterious, if this was a case of suicide. Under other circumstances, French medico-legal examiners rather err in the opposite extreme—in being too diffuse and minute. Buonaparte, however, when at St. Helena, steadily denied that Pichegru had been murdered. "The very uncommon mode of his death (he said) proved the contrary."

body, where a strong pressure is necessarily exerted on the neck, and phenomena of strangling, indeed, both external and internal, are more or less developed. Several well-ascertained cases of this description, where no doubt could exist as to the cause, are mentioned in the journals;* others, again, have been made the subject of legal investigation.

In a recent instance in France, two individuals were sent to the galleys for the supposed murder of an intoxicated person by strangling; nor was it until after a long revision of the case, and the production of the positive opinion of Foderé, Marc, and others, that the case presented not a single feature beyond that of ordinary apoplexy, that the sentence was reversed. The physicians who examined the body, and who deposed on the trial, gave a similar opinion; yet popular prejudice was sufficient to condemn the accused.† Without, however, going into the details of this, I prefer noticing a somewhat similar case that happened some years since in New York.

Frederick L. Teige, a man advanced in years, and who, a few weeks previous, had arrived in this country from Switzerland, was found dead in New York, on the morning of Saturday the 28th May, 1825. He lay in a gutter on his face, and underneath his face, which did not touch the earth, in consequence of the narrowness of the gutter, was a puddle of congealed blood, extending from ten to fourteen inches. On raising the body, fresh blood was observed on the nose and face, and, indeed, some dropped from the face while in the act of lifting him. The right hand lay upon his back, and the right foot was drawn up. The body lay at the foot of a declivity of about twelve feet, and the bank was composed of very loose sand. No marks of struggling, such as breaking away the sand, were noticed, and there was no sand on his back. His hat lay somewhat on the hillock, and there were marks of five or six steps on the bank, of one person.

The coroner stated that around the neck of the deceased, and between his vest and shirt, there was a loose green cord. The neckcloth was very tight, as also the shirt-collar—so tight, indeed, that the witness could scarcely introduce his finger between the neck and collar, and after unbuttoning it, he could not have buttoned it again. None of the clothes were torn, nor was the cravat out of place. On the neck, the marks of a thumb and three fingers were visible, but he could not say whether they were of the right hand or the left hand.

Dr. Graves, who examined the body in the first instance, stated that there was a slight wound on the left temple, and an abrasion of the skin on the top of the nose, while on the right side of the head, the skin was rubbed off to the extent of a dollar. The skin was also rubbed on the right and left side of the throat. On removing the skull-cap, a large quantity of serum was discovered.

Drs. Francis and Anderson, who subsequently made an examination, found the countenance very turgid, the eyes protruded, the tongue pressed firmly against the teeth, and on the neck a strong mark, distinctly visible, and nearly as low down as the collar of the shirt. The

* Annales D'Hygiène, vol. ii. pp. 440, 447. † Ibid. vol. vii. pp. 568, 615.

jugulars were distended and the neck swollen. The right side of the heart was engorged, and also the lungs. The larynx, in its internal surface, was discoloured, owing to the effusion of blood. No marks of injury appeared on the body.

It was proved on the trial, that the deceased was a stout, athletic man, of a large neck and full frame; that he had been for years in habits of gross intoxication; that he had been drunk every day of the week of his death, and extremely so on the Friday evening, at 10 o'clock, preceding the Saturday morning when he was found dead.

Two of his countrymen, who had come over with him in the same vessel, were charged with his murder, but the evidence against them was so slight, that the jury acquitted them without leaving their seats.*

The grand medico-legal question in this case evidently is, *whether death was caused by accident or design?* I incline to the former opinion: from the habits and make of the deceased, from the external appearance and position of the body; from the extreme tightness of the shirt-collar acting on this state and position of body; and from the absence of other marks of injury. Among the doubtful circumstances, however, are the mark of fingers on the neck; but it is possible that these may have been made by the deceased himself, in an effort to unbutton his collar. The appearances on dissection will, of course, apply to either supposition, while the blood was evidently discharged from the nose.

It is an interesting inquiry, whether proofs of strangulation can be found on the dead body some time after decease or interment. In the instance of a child of eighteen months, first strangled and afterwards thrown into the water, the body, examined ten days after death, was found far gone in putrefaction; but on the fore part of the neck, over the windpipe, was a softish furrow, with a hardened ridge both above and below.†

But the most remarkable instance is one that has recently been investigated in France. I copy the leading details from a London journal; but the whole case is given in the Annales d'Hygiène.

"In the year 1821, a widow lady of the name of Houet, residing in the city of Paris, disappeared; and certain persons, Bastien, Robert, and Robert's wife, who had taken the house, No. 81 Rue de Vaugirard,

* New York Medical and Physical Journal, vol. v. p. 432.

† Syme's Justiciary Reports, p. 266.

I add the following in this place, merely as a historical curiosity. "March 16, 1814. On opening a vault at St. Maryport church, Bristol, the workmen discovered, very deeply concealed, a coffin of great antiquity. It is generally supposed that the corpse it contained was the body of —— Yeoman, sheriff of Bristol, in 1643, when the city was surrendered to the parliamentary army by Prince Rupert. Mr. Yeoman was hanged in Wine-street, opposite his own house, by order of Fairfax, for his attachment to the royal cause. The body was in the highest state of preservation, handsomely accoutred in the costume of the day, with gloves similar to those which the sheriffs at present wear. *And there were considerable tumours visible in the neck, which inclined several medical gentlemen, who inspected the body, to be of opinion that they were occasioned by strangulation.*"—Edinburgh Annual Register, vol. vii.; Chronicle, p. 30.

were suspected of having made away with her. A judicial inquiry was pending ever since, in the Court of Assize; but the accused, for want of evidence, had been set at liberty. Not long ago, however, some information was obtained touching a body said to have been buried for about eleven years in a particular garden. An investigation was accordingly set on foot; and by the dint of patient and ably directed research, such satisfactory evidence was procured of the identity of the remains, and of the manner of the death, that the prisoners were convicted, and condemned to the galleys for life.

"The first part of the inquiry — the juridical examination — was conducted by M. Boys de Loury. After excavating different parts of the garden for about five hours, one of the workmen hit upon a hollow spot, in which there were bones. The greatest care was taken to uncover them with the least possible disturbance; they were evidently those of a human body, reduced almost to a perfect skeleton. A drawing was made of the parts *in situ*. The figure reposed on the left side; the head was bent forward on the neck; the vertebral column was curved; the right fore arm was raised, so that the bones of the hand nearly touched those of the face. The pelvis was turned obliquely upwards, resting on the left haunch. The thigh-bones were raised considerably, and the legs were crossed beneath them. The colour of the remains, generally, was between an ochre and a brown: and when the earthy matter was removed from some of the long bones, the uncovered parts were found to be of a deep red colour.

"The grave was four feet deep, funnel-shaped, measuring five feet and a half in length at its upper part, but at the botton, only two and a half; its greatest breadth was about two feet. Some lime-stone had been placed over the body, so as to form a sort of vault. Having made these general observations, the parts were next examined. The skull was small and lengthy in its shape; it seemed, by the way, from the position of the head, that the body had been thrown into the grave head foremost. The parietal bones were very yielding; the sutures were well knit; the teeth white, and had been used with care; three molars wanting, and one of the incisors carious. A small quantity of light-coloured or ruddy hair was found, having some gray mixed with it.

"The state of the neck was particularly striking; the third, fourth, fifth, and sixth cervicle vertebræ, as well as the right clavicle, were held together by a blackish mass, in the composition of which there could not be recognised any tissue. This mass was surrounded at its lower part by several twists of a cord, two lines in diameter; the cord was in a very decayed condition, and no knot could be found upon it; its direction was exactly horizontal.

Among the bones of the left hand was found a gold ring, of small diameter, carved in *facettes;* and several small well-formed finger-nails were also discovered. The pelvis, from its shape and proportions, could only be that of a woman. Some portion of cloth, probably part of a stocking, was found near the legs; but, upon exposure to the air, it rapidly crumbled to dust.

"Other reporters, MM. Orfila, Marc, Barruel, and Chevallier, were

afterwards added to M. Boys de Loury; and three or four elaborate documents were drawn up, of the first of which we give the result.

"From the preceding facts, we feel ourselves justified in concluding: 1. That these bones are those of a human skeleton. 2. That the skeleton is that of a female. 3. That this female had attained the age of from 60 to 70. 4. That her stature was about 4 feet 8 or 9 inches (nearly 5 feet English). 5. That the hair of the female, which was of a bright blond colour in youth, was mixed with gray at the time of her death. 6. That the hands were small. 7. That during life the bones had never suffered any injury. 8. That this woman died of strangulation, and that the act was, to all appearance, homicidal. 9. That the body must have lain for several years in the earth.

"The prisoners, who had been long suspected, were at length brought to trial (nearly twelve years after the murder), and have been condemned for the remainder of their lives to forced labour. They had a narrow escape of the guillotine; only for some mitigatory circumstances which induced the jury to recommend them to mercy, they would have been executed."*

J. *Of persons found smothered.*

Smothering is the covering of the mouth and nostrils in any way, so as to prevent the free ingress and egress of air. It happens most frequently with children, either as an accident or a crime—and in the former case, from *overlaying* them, as it is called. This occurs from a pillow, bolster, or bed-clothes, coming in contact with their face in such a manner that their struggles cannot remove it.

In a case of a child six months old, which died from being wrapped up too closely by the parents, who were taking it into the country to nurse, the integuments of the chest, arms, and head, were of a dark hue. The mouth was open and fingers bent. The veins of the heart gorged with blood. The left lung natural, but the right one bright red. The trachea and bronchiæ filled with a reddish froth. The brain

* Annales d'Hygiène, vol. xi. p. 117. London Medical Gazette.

NOTE. Just as I was expecting the proof-sheet of these pages, I received No. 1 of vol. ix. of the Western Journal of the Medical and Physical Sciences, which contains an interesting paper on *Manual Strangulation*, by Professor Gross. I extract from it the following case, and sundry experiments:

Mrs. Getter was strangled near Easton (Pennsylvania), on the night of the 27th of February, 1833, by her husband. She was strong and robust, with a short thick neck, and a broad expanded chest. The next day, an examination was made. The countenance was full and bloated; the lips tumid, and of a dark bluish tint; the tongue slightly livid, but did not project beyond the teeth; the mouth was filled with froth, and the vessels of its lining membrane greatly distended; the jaws nearly closed; the eyes prominent and half open, and turgid; the ears and temples of a dark colour, owing to engorgement of the veins. On the right side of the throat was an indentation, as if made by a thumb or finger nail; it extended into the true skin, and was about half an inch long, and the twelfth of an inch in width. There was also an abrasion of the upper part of the larynx.

On dissection, the veins of the neck bled very profusely; both carotids were empty. Beneath the muscles on the left side of the neck, towards the upper part of the larynx, was a slight extravasation of blood, corresponding to the external mark. The windpipe was filled with frothy matter, and its lining membrane thoroughly injected; the diaphragm was arched; the lungs of a deep black colour, and filled with dark venous blood mixed with froth; the auricles and ventricles of both sides

turgid, and its vessels in every part, even in the substance of the brain, filled, while three drachms of serum were found between the tentorium and cerebellum.*

Adults, in a state of intoxication or debility, may also be destroyed by getting into a posture which prevents the transit of air to the lungs, and then be unable to extricate themselves. Thus, Dr. Roget speaks of persons being buried completely under a mass of earth that has fallen upon them; and he mentions the following remarkable instance in which life was nearly lost from inattention to the requisites for respiration. "An athletic black, of pugilistic celebrity, had been selected, from the fine form of his chest, and well-marked expression of his muscles, as an academic model. It was wished to obtain a cast of his body, but this being attempted at one operation, and in one entire piece, as soon as the plaster began to set he felt on a sudden deprived of the power of respiration, and, to add to his misfortune, was cut off from the means of expressing his distress. His situation, however, was fortunately perceived just in time to save his life, by breaking his bonds and releasing him from the extreme peril in which they had placed him."†

In the previous edition I made the following remark. "Smothering will seldom be used as an instrument of homicide, since a moderate degree of resistance can generally prevent its effectual application." I am sorry to add that it has, notwithstanding, of late years, and with the use of aids to prevent all resistance, been made the means of murder. I refer to the case of the notorious Burke and Hare, who, in 1828, thus killed several persons at Edinburgh. From the testimony of accomplices, it appears that the deceased (Margery Campbell), while in a state of intoxication, was struck down to a sitting posture on the floor; that Burke threw himself on her, kept her down by the weight of his body, and, covering her mouth and nose with one

were filled with black blood, and the coronary vessels were much injected; the bladder was empty and contracted. All the other parts were healthy.

The brain was not examined. Regretting this omission, Dr. Gross was induced to perform some experiments on animals, for the purpose of ascertaining its state. Dogs and rabbits were the subjects, and they were strangled by the hand. In the former, the urine and fæces were discharged almost immediately after pressure was made. The external appearances corresponded to those observed in the human subject. The blood-vessels were in a similar state, but the lining membrane of the air-passages was white in two cases out of three. The lungs were not in every instance congested, but the heart was distended in each case. In the brain, the vessels of the dura or pia mater were injected; the cerebral substance was darker than usual; and in one instance, there was a slight extravasation of blood at the base of the brain, and an injected state of the membranes of the spinal column. In no case was there any blood in the ventricles of the brain, or any extraordinary congestion of its vessels.

Dr. Gross very properly cautions the medical examiner not to mistake the effects of apoplexy, hysteria, epilepsy, or intoxication, for those of manual strangulation. In each of the above diseases, persons suddenly seized with fatal symptoms may, in their agony, apply their hands to the throat, and thus produce marks on it. The nature of the case, however, will generally explain it, if a cautious inspection be made.

* London Medical and Physical Journal, December 1827. A case of inflammation of the lungs in a young infant, mistaken for criminal suffocation, is given in Annales d'Hygiène, vol. vii. p. 621.

† Cyclopædia of Practical Medicine, vol. i. p. 177.

hand, while he applied the other under her chin, held her thus for ten or twelve minutes, till she was dead. The body, examined two days after death, presented the following appearances: the joints flaccid; features composed, red, and rather more turgid than natural; lips dark; conjunctivæ of the eyes, even in the horizontal position of the body, much injected with blood; a little fluid blood on the left cheek, apparently from the nostrils; tongue not protruded; the scarf-skin under the chin much ruffled, and the surface of the true skin dry and brown when denuded, but without blood or surrounding ecchymosis; the integuments every where free from lividity, except on the face; no injury or effusion about the windpipe or cartilages, but the os hyoides and thyroid cartilages further apart than usual, in consequence of stretching their interposed ligament. The internal organs very healthy, and particularly the lungs. The right side of the heart and its veins filled with very fluid and black blood.

There were other injuries present, particularly in the spinal canal, but these had been inflicted after death, in consequence of forcibly doubling up the body to enclose it in a box. I have noticed them in a former page.

On the trial, Professor Christison testified, that, from the unequivocal marks of violence in the contusions; from the absence of any appearances of natural death; from her being seen alive and in good health a few hours before, and from the blood on the floor where the body lay, the probability of death from violence was strong; but he declined a more positive opinion. In his subsequent remarks on the case, he has well remarked, that there is a mistaken idea prevalent, that the signs of suffocation are very obvious and characteristic. "It ought to be distinctly understood by every medical man, that such appearances are very far from being always present." And the reason is manifest, since the mode of procuring death is such as to leave few or any indications, particularly if the murdered person has been previously rendered insensible by opium or alcohol. And in proportion to the rapidity with which death is induced, will be the absence of all external or internal signs. There is no opportunity, says Dr. Roget, for the accumulation of blood in the venous system. The body, accordingly, will present no discoloration of the skin, no turgescence of the veins, no engorgement of the pulmonary vessels.*

In death by smothering, then, circumstantial evidence must be the principal if not the only means of ascertaining whether the event has been produced by crime or by accident.

Dr. Gordon Smith adverts to a mode of suicide said to be practised by negroes, which is that of doubling the tongue and swallowing it down into the fauces so low as completely to choke the individual.† Dr. Horner of Philadelphia, however, besides questioning the possibility of doing this, denies ever having heard of it, although he has passed many years of his life among a negro population.‡

I find the following in the Rev. Dr. Walsh's Notices of Brazil,

* Edinburgh Medical and Surgical Journal, vol. xxxi. p. 236. Syme's Justiciary Reports, p. 371.

† Smith, p. 231. ‡ American Journal of Medical Sciences, vol. ii. p. 182.

confirmatory of the common opinion. "The wretched slave in Brazil often anticipates the result of chastisement, by inflicting death upon himself in an extraordinary manner. They have a method of burying their tongue in their throat, in such a way as to produce suffocation. A friend of mine was passing through the carioca, when a slave was tied up and flogged. After a few lashes he hung his head apparently lifeless, and when taken down he was actually dead, and his tongue found wedged in the œsophagus, so as completely to close the trachea."*

While on this point, I must not omit noticing a remarkable case mentioned by Dr. Wagner, as occurring in Austria in 1833.

"A criminal who had been shut up alone in a dark dungeon, when visited by his keeper not long after, was found lying dead on the floor. It was thought that he had a fit of apoplexy, and a vein was opened, but to no purpose. It was for the first time noticed that he had a foreign body in his mouth, and it proved to be a piece of woollen cloth two ells long and a quarter broad; a shawl, in fact, which the wretched man had thrust into his throat.†

I may add that in some suspicious cases, tumours pressing on the organs of respiration, or foreign bodies found in the trachea or œsophagus, have explained the accidental cause of death.‡

K. *Of persons found drowned.*

The observations that have been already made on the nature of asphyxia will obviate the necessity of again entering on it, except so far as the phenomena have strict reference to the present cause of death.

It is evident that the subject is an intricate one, and it is equally so that too little attention has been paid to the various modes in which death is produced. This will explain why, although a favourite inquiry with physiologists, its facts have been disputed and its characteristics doubted.

Dr. Desgranges of Lyons was, I believe, the person who first (in 1790) suggested that there were distinct modes of death operating in the drowned, and his division has received the sanction of Foderé and Marc.§ He was induced to make it from observing turgescence of the countenance in some cases, and its paleness in others.

One of the modes he denominates *asphyxia by suffocation*. This is probably the most common, and occurs when a person in full possession of his faculties is immersed. After ineffectual struggles, some water enters the trachea and bronchiæ, mixes with the air contained in them, and forms the frothy mucus so commonly perceived. It is probable, also, that from the convulsive action of the glottis and muscles

* Vol. ii. p. 197.

† Dr. Cummin, in London Medical Gazette, vol. xiii. p. 973.

‡ "The smothering which is probably most directly fatal, is that which takes place when, in great crowds, children and delicate persons are so crushed by multitudes of human beings, as in theatres, or in cases of alarms of fire, that no time is left to allow the chest to expand in those individuals who are trodden under foot."—Edinburgh Medical and Surgical Journal, vol. xxxix. p. 398.

§ Marc, p. 165. Foderé, vol. ii. p. 296. Edinburgh Medical and Surgical Journal, vol. xix. p. 620.

of the throat, some water is taken into the stomach. The contest cannot, however, continue long, the blood is determined to the head, and, as it is not decarbonised, its venous qualities operate on the brain. The lungs are unable to perform their functions, and the body falls insensible to the bottom of the water. It is in these cases that we should expect to see a lividness of the countenance, although this, as we shall see, is not invariable.*

Another mode of death is termed *nervous or syncopal asphyxia*, and it is well illustrated in a case related by Plater. A female convicted of infanticide was condemned to be drowned. She fainted on being immersed into the water, and remained there a quarter of an hour. On being drawn out, she recovered her senses.† Thus, fear, or coldness of the water, or a blow on the head in falling, or absolute intoxication, may suspend as it were the vital functions, and throw the nervous system into a state of inaction. Here, of course, there will be no struggle, and we can only expect to find the marks of simple asphyxia, such as paleness of the face and body, owing to a spasm of the cutaneous vessels; the presence of a little water, but no froth in the trachea, and the internal organs but little differing from their natural state.

Dr. Marc has added a third to these, which he styles *asphyxia from cerebral congestion*, and refers to it such cases as are marked by an apoplectic habit, or where persons fall into the water when in a state of intoxication, or with a full stomach.‡

In many instances, the first and last are, in his opinion, united, and suffocation and apoplexy, according to circumstances, act, reciprocally, either as the essential or aggravating cause of death.

After this outline of the probable modes of death, I need hardly state, that in legal medicine, the leading question, in every case, is, *Whether there are any marks that distinguish death by submersion, from death previous to submersion?* Or, in other words, Whether a person was thrown when alive, or after death, into the water?

I shall arrange my remarks on this in the following order: First, state the ancient doctrines; secondly, those most commonly received at the present day. It will then be necessary to comment on the different marks, and to shew how far their value is disputed, and to endeavour to fix a proper estimate on them. In connexion with this, I shall afterwards consider the effects of continued immersion on the dead body, and the changes produced by it. Some medico-legal cases will form a proper conclusion.

I. Ambrose Paré has stated, in a few words, the ancient opinions on this subject. He observes, that a surgeon will find the following appearances on the body of a person who has been thrown into the water while living: The stomach and intestinal canal are filled with water; a glairy mucus issues from the nose, and sometimes there is

* Roget, ut antea, p. 173.

† Marc, p. 165. This punishment was in compliance with the ancient provisions of the Caroline code. The criminal was put into a sack and sunk into the water.

‡ We may also add to this, drowning in marshes, or stagnant canals or streams, where deleterious gases are disengaged.

a bleeding from it; there is a frothy appearance about the mouth, and the extremities of the fingers will be found excoriated, as if, in dying, they had grasped the sand, or some other hard substance. On the contrary, those who have been thrown, when dead, into the water, will have no tumour in the stomach or abdomen, since all the passages to them were closed by the absence of inspiration; the nose and mouth will present none of the appearances mentioned above, nor will there be any excoriation of the fingers.*

These rules were considered orthodox until the commencement of the eighteenth century, and Deveaux reports several cases which were decided according to them.

II. I believe I shall be correct in stating, that the following marks, laid down by Dr. Marc, are recognised by the great body of modern physiologists as deserving of peculiar attention. The value attached to each is to be presently mentioned.

Signs that a person has been drowned while living.

As to the external appearance of the body:

1. The eyes are half open; the pupils much dilated; the skin is remarkable for its paleness, originating in a spasm of the cutaneous vessels; the tongue approaches to the under edges of the lips; and these, as well as the nostrils, are covered with a frothy mucus. Occasionally, when the paleness is wanting, the head will be bloated, the face red, and all the symptoms which denote a determination of blood to the brain will be present.

2. There is excoriation at the end of the fingers, and dirt or sand found under the nails.

As to the appearances on dissection:

3. A greater or less fulness of the blood-vessels of the brain, according to the violence and length of the struggle.

4. The right side of the heart, and its vessels, filled with blood; the left, either empty, or not containing more than half that in the other side.

5. The epiglottis, according to some, is found elevated.

6. The diaphragm depressed into the abdomen.

7. The blood in a permanently liquid state, and oozing from the body on the least touch of the scalpel.

8. A watery froth, which is sometimes bloody, found in the trachea and bronchiæ; to which is added, by late experimenters, the presence of a small quantity of water in the lungs.

9. Water is occasionally found in the stomach.

10. The fulness of the bladder, and the reddened state of the viscera.

On the other hand, the *signs that denote death previous to submersion* are:

1. The presence of lesions which could not be inflicted under water, such as the marks of ecchymosis, or of a cord around the neck; wounds from fire-arms, or the traces of poisons.

* Quoted by Foderé, vol. iii. p. 80.

2. The absence of the external characters mentioned above.

3. The absence of water or foreign substances in the trachea and stomach.

4. The lungs being in a state of collapse, and not gorged with blood; the abdomen flat, and the diaphragm in a state of natural tension.

5. The blood in a coagulable state.*

III. In proceeding to review the marks of death by submersion, I regret to state that many of them have singly been proved to be of little value. The variety to be expected in the *external appearance* has been already explained, and it is important to keep it in view when ascertaining the particular mode of death. I have mentioned in what cases paleness is most frequently seen, and when fulness and discoloration.

We must, however, recollect that a bloated, livid countenance is not uncommon from other causes of death. Fothergill suggested, as a characteristic in these instances, that the eyes are found half open, and the pupil much dilated; but this last may have been owing to the use of narcotics, and thus death may have preceded drowning. The same remark applies to the appearance of the eyes: spasmodic diseases, amongst others, will leave them in that state. Froth at the mouth, and protrusion of the tongue, accompany convulsions and epilepsy; while redness of the visage, and swelling of the head, are the most common signs of death from apoplexy.† It is important, however, to notice the situation of the tongue, as in many instances it is found protruded between the teeth;‡ and, although this occurs also with the strangled or hung, yet, when all suspicion of this is obviated, it may assist in forming the history of the case.

As to the paleness of the skin, Orfila is disposed, from his experiments, to ascribe this to prolonged immersion, rather than to the kind of death. He states, that in those who have lain long in the water, the integuments of the legs will become indigo-coloured, and then brownish, on exposure to the air, while the rest of the body is very white; but the moment it also reaches the air, it is successively changed to brown or green, beginning at the chest. Of course, a still longer continuance in the water will, with advancing putrefaction, cause abrasions of the skin, which must not be mistaken for the result of injuries.§

The excoriation at the ends of the fingers, and the presence of dirt or sand under the nails, were formerly much depended upon; and Ambrose Paré and Bohn, in particular, rely greatly on it, since it indicates, according to them, the last efforts of the *living* individual to save himself from death. Like the last, however, it is rather to be deemed a

* Marc, pp. 172–182. Orfila, as hereafter quoted. † Marc, p. 173.

‡ Devergié, Roget.

§ In quoting Orfila, I refer to his Leçons, 2d edition, vol. ii. p. 334. His essay on this subject originally appeared in the Archives Générales, and there is a good abstract in the London Medical Repository, vol. xxviii. p. 541.

So, also, when noticing Devergié, I quote from his paper on the signs of death before and after submersion. Annales D'Hygiéne, vol. ii. p. 430.

supplementary than a conclusive proof. A man may fall during a state of intoxication into the water, and never make an effort to save himself; or he may be in a state of syncope when drowned. No mark of exertion will then be found;* while, on the other hand, a dead body may, from being thrown from a high place, contract this appearance in rolling over. The depth of water in these instances should be noticed, since there may be an extinction of life before coming at the bottom.

We come next to the internal appearances.

A greater or less fulness of the blood-vessels of the head, together with the fulness of the right side of the heart and its vessels, has been much relied upon as a sign by several anatomists. Hopffenstock, a physician of Prague, in his dissection of the drowned, observed constantly a great accumulation of blood in the cerebral vessels, the jugular veins, the right auricle and ventricle, and pulmonary artery; while, on the contrary, the left side of the heart was completely empty.† Mahon, Kite, and Walter, have confirmed this by their investigations. Goodwyn, however, in his experiments, found the external surface of the brain darker than usual, but its vessels were not turgid. The right ventricle was filled with black blood, but the left, instead of being empty, was noticed by him as being about half filled with blood of the same colour.‡ Orfila concurs with this last. Devergié says, that the right side is but rarely distended with much blood, although he concedes that generally, but not always, there is more in the right than in the left side.§ Orfila also adds, that the right ventricle is of a blackish brown, while the left is a clear rose colour, and the right cavities retain contractility longer than those of the left.

As to the brain, it is not always gorged with blood. Certainly, in those who die from *syncopal asphyxia*, this mark will be far from being a striking one, while, on the contrary, should apoplexy have occurred previous to drowning, we might expect its presence.

According to Detharding, the *epiglottis* is pushed down in the drowned so as to close the larynx. The correctness of this is totally denied by Orfila.

The depression of the diaphragm into the abdomen, with the elevation of the chest, is considered by Hebenstreit as an essential character. It is wanting, according to him, in those who are drowned after death, and its occurrence is attempted to be explained on the idea, that the last act of breathing is inspiration. But, unfortunately for the value of this sign, Orfila informs us, that the result of more than fifty dissections of persons drowned, has been the opposite, and, consequently, proved that the last act is not inspiration. At all events, I apprehend that there is little or no variation in the situation of the diaphragm, whatever be the cause of violent death.

The fluidity of the blood was formerly greatly insisted on as an important proof of death by drowning, and it was asserted to have been

* Mahon, vol. iii. p. 3. † Foderé, vol. iii. p. 90. ‡ Inquiry, pp. 4, 5.

§ Devergié remarks the very striking difference between the two sides of the heart in persons suffocated by carbonic acid gas. There is nothing like this, he adds, in the drowned.

so seen, even in the vessels which enter the bones.* The value of this test, as a mark of the violent termination of life, has been already noticed. It occurs in many other kinds of violent death, and, in some instances, of natural disease. While, therefore, its diagnostic character is destroyed, although we must allow that it is most commonly found fluid in the drowned, yet even this is not invariable. Lafosse, long since, and Avisard, Orfila, and Devergié, recently, have, in a few cases, found coagulated blood in the auricles or ventricles of those drowned while living.

It is stated, as a remarkable fact, that in dogs drowned the blood is always coagulated.†

The next mark is, *the presence of a small quantity of water, very frothy, and sometimes coloured with blood, in the trachea and bronchiæ.* This has been a subject of great speculation among physiologists, and, formerly, the water thus found in the lungs and stomach was supposed to be the cause of death. Becker, a German physician, was the first to controvert this opinion. He published a work at the commencement of the eighteenth century, in which he denied that water was always present in these organs, and illustrated his position by several dissections of the human body, as well as by experiments on animals.‡ Some distinguished men, as Littre, Senac, and Petit, embraced his views, although, towards the end of the last century, many physiologists, as Hallar, De Haen, and Louis, inclined again to the ancient idea.§

I have already sufficiently explained the commonly received cause of its formation, and must now endeavour to present the results obtained by a host of experimenters.

Wepfer and Waldsmidt did not observe it in animals, which they drowned. Morgagni could not find it in Guinea pigs drowned by him. Portal did not observe it. Evers made a number of experiments at Gottingen, in 1753, on cats, and always found it, but could discover none in the bodies of two persons who were drowned when intoxicated.‖ Belloc remarks, that he has not found it in cases where persons were undoubtedly drowned while living.¶ And he explains this variety, by suggesting that the last act of the drowning person may be either expiration or inspiration. If the latter, a small quantity of water may reach the lungs, and, mixing with the air there, form the froth, but probably not in the former case. We shall presently see that this was an approach to what is, probably, the actual reason.

On the other hand, Louis drowned animals in coloured fluids, and found froth similarly coloured in the trachea and bronchiæ.** Roesler,

* Marc. p. 179. Thus (says he) if the pericranium be separated, and the blood taken up with a sponge, it will immediately reappear along the surface of the bone.

† Orfila.

‡ This work is published in the Novellæ of Valentini. "J. C. Beckeri Paradoxum-Medico-Legale, *de submersorum morte, sine pota aqua*, 1704," p. 299. See, also, a notice of this work in the Philosophical Transactions, vol. xxiv. p. 2512. Bohn of Leipsic published an essay in 1711, in which he advanced the same opinion. See Memoirs of Literature, vol. iv. p. 165.

§ De Haen's Ratio Medendi Continuata, p. 130, &c. Louis' Memoire sur Les Noyés.

‖ Foderé, vol. iii. pp. 93, 94. ¶ Belloc, p. 178. ** Kay, p. 242.

in forty-five experiments, found, in every case, a small quantity of frothy mucus at the bifurcation of the trachea. Marc, Mayer of Bonn, Dr. Williams of Liverpool, Devergié, and many others, have observed it almost universally.

In order to reconcile this discrepancy (and noticing the observation of Piorry, that froth would not occur in an animal, who, while drowning, was kept permanently below the surface of the water), Orfila was induced to perform experiments on animals, and found that in every case where the animal came to the surface to breathe, the watery froth was seen in the trachea and bronchiæ. But if these animals were left for some days in the fluid in which they perished, and then exposed to the air, some two or three days before dissection, no trace of froth could be seen. So, also, with persons found drowned. If the bodies had been in the water for a few hours only, it was present; but not so, if they had lain twelve or fifteen days, or beyond that period.*

The remarks of Devergié on this sign are so important and interesting, that a full abstract of them is proper.

He is of opinion that observers have not sufficiently insisted on its peculiar physical properties. It cannot form without motion, and is the product of an impulse communicated to the fluid and a gas in mutual contact.

The froth of the drowned is commonly of a white colour, and consists of numerous very small bubbles, constituting a lather rather than a froth, properly so called. It never adheres to the trachea by mucus, but is in immediate contact with that tube. All the bubbles that form it have a watery envelope, easily broken, and often, in opening the trachea, the greater part disappears like soap bubbles.

Its production is thus evidently the result of vitality, for it cannot be formed without this. It is also distinguished from similar appearances in the trachea and bronchiæ. In pneumonia, for example, the *mucus* secreted under the influence of bronchial irritation, is mixed up with the air in the efforts of coughing.

In both cases, whether from disease or drowning, the frothy matter will be formed more easily in the last bronchial ramifications than in the trachea, since the dimensions of the former, being much smaller, are sooner obstructed. And, accordingly, Devergié observes, that the existence of froth in the superior part of the trachea is a more certain sign of the life of the individual at the moment of submersion than when it is met in the extreme branches, but the part where it is preserved for the longest period is at the bifurcation of the trachea. From his experience it seems, that in winter it can be discovered in

* Orfila. He objects to the distinction formerly proposed by Foderé, viz.; that the froth in question will not appear in *syncopal asphyxia*, or *asphyxia from cerebral congestion*, but only in *asphyxia from suffocation*, on the ground, that, in many instances of the former, although death is sudden, yet some water must enter and thus produce it. Leçons, vol. ii. p. 344.

He also suggests, as a probable reason of its absence in some cases, that the body is drawn by the feet from the water, and left with the head depending, for some time before examination. The froth that has been formed may thus flow out with the water contained in these organs, and consequently cannot be found.

most cases during eight or ten days, but, after that, it completely disappears.

Having thus endeavoured to establish its character, and to explain its absence in some cases, it is necessary to add, that its presence is not by any means an essential cause of death.* It is also said to accompany other diseases and causes of death. Thus, De Haen mentions having seen it in the body of a person who was hung; and Marc confirms this by a case which he himself examined. In apoplexy, and particularly those cases which arise from an overloaded stomach, it is, according to Chaussier, quite common.† It is probable, however, that the application of the distinctions, indicated by Devergié, may aid in establishing the nature of the case.

Intimately connected with this, but which I prefer to consider separately, is the disputed point, whether *water is found in the lungs* of the drowned; and, if so, whether it may not have entered after death, thus destroying its value in any disputed case.

Roesler, in his experiments, found froth, but no water. Dr. Mayer of Bonn, on the contrary, in his experiments, performed under all possible circumstances, uniformly found it. "He arrived at the conclusion, that in every instance of death by drowning, provided death really arises from the mere obstruction of breathing by the water, and not from apoplexy, or some other affection occurring at the moment of immersion, water will be found in the lungs. He has made the trial with pure water—with water coloured by red-lead or cinnabar, and with a solution of prussiate of potash, which was sought for in the lungs, by the test of the muriate of iron; and, in every instance, whether the animal was allowed to rise to the surface or not, whether it was drowned in cold or in warm water, and whatever was the species of animal, he found water, not only in the windpipe and its great ramifications, but likewise in the minute bronchial tubes. Sometimes it was

* This is well established by the experiments of Dr. Goodwyn. He made an opening into the trachea of a cat, and through this introduced two ounces of water into the lungs. The animal had immediately a difficulty of breathing, and a feeble pulse. But these symptoms soon abated, and it lived several hours afterwards without much apparent inconvenience. After this he strangled it, and found two ounces and a half of water in the lungs.—Inquiry, p. 17. Professor Mayer confirmed this opinion by numerous experiments. Among other results he mentions, that "animals support a considerable quantity of liquid injected into the lungs, without experiencing mortal symptoms from them. Rabbits can support a dose of four ounces and a half in 24 hours. But these injections should be performed by an opening made into the trachea; for if we inject these fluids by the larynx, they excite the most severe symptoms of suffocation, and the animal soon sinks under it. The suspension of respiration during this irritation of the muscles of the larynx by the injection, is the only cause of death." Again, "the symptoms of suffocation which arise from injections, are not serious when we inject pure water, but they become so when we take thick fluids, for example, all which obstruct the aërial passages, or some chemical solutions, which, destroying the parenchyma of the lungs, prevent the oxydation of the blood, and produce extravasations of blood, and inflammation in the lobes of the lungs. The fluids and solutions injected into the lungs are absorbed, more or less quickly, according to their nature and degree of concentration. The absorption is, in general, very great, but less in young and newly born animals than in adults."—Edinburgh Medical and Surgical Journal, vol. xvii. p. 469.

† Chaussier, p. 45.

found in substance, but more commonly in the form of froth; and he attributes the non-discovery of water by some experimenters, to their always having expected to find it in substance."*

Piolett, a French military surgeon, drowned dogs, cats, and rabbits, in oil, and always found from two to four ounces of that fluid in the air-passages. And he explains the removal of fluid from the lungs in those who recover, on the principle of absorption.†

Dr. Edward Jenner Coxe of Philadelphia, from a number of well-conducted experiments, makes the following deductions: 1. When an animal is immersed in any fluid, and taken out previous to the last efforts of respiration, none of the fluid will have entered the lungs, while in the stomach will be found one or two ounces. 2. When water is found in the lungs of an animal, it is absolutely necessary that the animal be under water, when making its last efforts to breathe.‡

Orfila and Devergié each state, that, in many instances, they have seen more or less of water in the lungs.

Considering this, then, established by the concurrent testimony of competent experimenters, it remains to ascertain whether fluid will not enter the lungs after death. This is unequivocally asserted by Orfila and Piorry. Dogs killed by strangulation were immersed, and after a short time, water was found in their lungs, the quantity depending on the position of the body. If this was vertical, the fluid was seen even in the extreme bronchial ramifications. And this was distinctly proved with coloured fluids, such as ink, Prussian blue, &c. The experiments of Mr. Johnson of Torrington also justify such an opinion.§ Orfila subsequently repeated the experiment on the human dead body, with similar results.

From these facts he is, of course, not disposed to attach much value to it as a distinctive mark. The only circumstances that, according to him, render its presence a probable proof of submersion during life, are, 1. That the liquid found shall be identical with that in which the person has been drowned. Hence the presence of any foreign substances, as mud, weeds, gravel, &c. exactly resembling those in the water, is a strong corroborating fact.‖ 2. That the water has not been injected

* Edinburgh Medical and Surgical Journal, vol. xxvi. p. 216.

† London Medical Repository, vol. xxv. p. 375.

‡ North American Medical and Surgical Journal, vol. ii. p. 286.

Dr. Berger of Geneva found that the air remaining in the lungs of drowned persons had lost nearly all its oxygen.—Copland's Dictionary, p. 132.

§ Dr. Carson, in commenting on these last, advances the opinion, that the water enters the lungs by imbibition. While under water, the body sustains the weight of a column of fluid; but when removed, the abdomen and chest, being elastic parts, will gradually expand, and the lungs may thus imbibe the fluid that has filled the windpipe and its ramifications.—Lancet, vol. xii. p. 139.

‖ "Unfortunately," says our author, "it is very difficult to verify this. The presence of sand or gravel is very uncommon; so much so, that in fifty dissections, I have observed it but once."—Orfila's Leçons, 2d edition, vol. ii. p. 347.

The London Medical and Surgical Journal (vol. vii. p. 446.) mentions a recent German case. "An individual, subject to epileptic fits, was found dead in a rivulet, with his face downwards, and the head covered with water, which was not more than a foot deep, and which, therefore, did not cover more than half his body. On

after death. And, 3. That the body has not remained so long in the water in a vertical position, that, by its weight, it may have penetrated into the bronchiæ.

As to the presence of *water in the stomach*, we may remark that it is an accidental circumstance, and in no way connected, as was once supposed, with the cause of death. Goodwyn, Kite, Orfila, and others, have proved by their experiments, that a quantity may be swallowed during the struggles of a drowning person; but there are also cases on record where none was found.

Senac illustrated this subject, nearly a hundred years ago, by detailing the method then used in Paris for torturing criminals, and under which the subject occasionally died. The mouth being forcibly kept open with a wedge, and the nostrils closed, a great quantity of water was poured into the person's throat. Respiration was thus prevented, while the irritation of the trachea, in resisting the access of fluid, caused faintings, convulsions, violent agitation of the respiratory organs, rupture of the pulmonary vessels, spitting of blood, and death; but *very little water entered either into the lungs or the stomach* of these unfortunate persons. On dissection, however, the usual lesions observed in death from submersion were apparent.*

While, then, it is possible that water may be found in the stomachs of those who have been drowned, it becomes a question of some interest, whether it can enter after death. Experiments, so far as they have yet proceeded, are decidedly opposed to this. Goodwyn and Kite never found any in the *intestines* of animals; and Dr. Fine of Geneva has ascertained that it cannot be introduced into the stomachs of the dead, except by passing an elastic sound into the œsophagus. The sides of that canal, when in a state of inaction, appear to be in close contact.† These results are confirmed by Orfila and Marc. Dr. Edward Coxe also found that when an animal is killed, and then immersed for twelve

examination, sand and gravel, the largest of which last weighed a drachm, was found in the trachea, below its bifurcation into bronchiæ. Some of the sand, indeed, had entered the pulmonary vesicles. The whole quantity found weighed between three and four drachms. The size of one of the stones, which exceeded the capacity of the glottis, proves that it could not have entered the trachea by a mere mechanical descent after death, but renders it probable that it was swallowed in the last moments of agony."

* Smith, p. 210. It was formerly thought, that if no water was found in the stomach, or bronchiæ, death could not have been occasioned by drowning. See the subsequent notice of the trial of Spencer Cowper.

"The common people, who in all countries inherit the cast-off prejudices and opinions of their betters, are still of the same opinion; and, deeming water in the stomach and lungs the symptom most to be dreaded in cases of drowning, the first indication of cure, therefore, when such an accident occurs, must be to remove it as speedily as possible. Accordingly, when a man is found drowned, the first process adopted is to roll him about on a barrel to dislodge the fluid, which they look upon as the *origo mali*, from all its creeks and corners, and then to hang him up by the heels to empty it out; as if the human frame were as simple in its construction as a bucket. The Humane Society, some years ago, did a good deal of mischief by giving their sanction, in a pamphlet on the means of restoring suspended animation, to the antiquated processes of throwing tobacco-smoke up the rectum, &c."—Dunlop.

† Marc, p. 160.

or fourteen hours, the stomach will not contain any of the fluid.* Devergié remarks, that the quantity found is generally various, but he has noticed it from a pint to a quart; and he adds that it is a phenomenon indicating the presence of life when it occurred, since deglutition is necessary to produce it.

Orfila, therefore, deems this the most satisfactory proof we have, provided the water is identified with that out of which the corpse has been taken, and it be proved that it has not been swallowed during life or injected after death.

Among the occasional appearances to which some observers have been disposed to attach value, may be named that of the *bladder*. Piorry remarks, that in all sudden deaths, this viscus is empty, while he found it full in dogs which he drowned.† He adds, however, that this fulness disappeared as the body became rigid. Devergié found it to occur, in some instances, in the human body, and in others not.

The viscera and the intestinal canal are frequently seen high-coloured in the drowned. Dr. Carson, indeed, remarks, that the lungs particularly will sometimes bear almost the appearance of inflammation.

From this tedious but necessary review, it will be seen that no single proof taken separately is perfectly satisfactory, and that several must be united in order to arrive at a just conclusion. It is evident that the presence of froth in the ramifications of the bronchiæ, and of water in the stomach, are the two most diagnostic ones.‡

The immediate cause of death in drowning has long been the subject of discussion, but the received doctrine at present is, that the extinction of life is caused by the stoppage of respiration and the exclusion of atmospheric air from the lungs. Dr. Cullen seems to have been among the first who promulgated this, and it is has been fully sanctioned by subsequent experiments.§ Of these, I will only mention a striking one by Gauteron. He immersed a dog more than a quarter of an hour, without inflicting any injury, having previously inserted a long tube in the trachea, which was kept elevated during the experiment above the surface of the water.‖

As to the marks of violence which may be found on the bodies of the drowned, they are, with great propriety, divided by Foderé into three classes.

1. Those which are totally independent of any connexion with the

* Dr. Darwall, in a note, after quoting Dr. Coxe's experiments, shewing that ink was found in the lungs of a cat immersed after death, but not in the stomach, observes, that "it is clear that the principal dependence ought to be placed upon the presence of fluid in the stomach, and not in the lungs."

† London Medical Repository, vol. xxviii. p. 542.

‡ In a late dissection of a person drowned last winter in a pond in London, where the body remained immersed during half an hour, and the examination was made the next day, the lungs were of a deep livid hue, and crepitated very indistinctly. They were filled with a frothy, sanguineous fluid, and the bronchial tubes and air-cells contained a quantity of mucus and water. The face, neck, and chest, were of a dark livid hue. Several of the internal parts were in a state of vascular engorgement.—London Medical and Surgical Journal, vol. vi. p. 798.

§ See letter to Lord Cathcart, by Wm. Cullen, M.D. Edinburgh, 1784, p. 6.

‖ Paris, vol. iii. p. 29.

circumstance of drowning. Of this nature are the usual signs of poisoning; a regularly formed ecchymosis around the neck, indicative of strangling; or wounds inflicted by fire-arms, or cutting instruments. All these lesions have an essentially distinct character, which cannot be mistaken. And hence the evident importance of examining all bodies drawn from the water. It was by pursuing such an investigation, that Deveaux discovered, under the breast of a woman, a wound which had penetrated to her heart.

2. There are marks of violence which may have resulted either from accidents attending submersion, or from previous homicide; and these are unequal, irregular wounds, which do not penetrate far into the body—contusions, fractures, and luxations. In all such instances, ascertain, if possible, the height from which the person has fallen, and the resistance he may have encountered.* The rapidity of the current, and the sharpness of the banks, may also have caused wounds. The obstacles which might have been encountered should also be noticed. Dr. Fine remarks, that the rapidity of the Rhone, and the numerous mills erected on its banks, often produce most shocking wounds on the bodies of those who are driven against the stakes in the stream, or are drawn into the machinery.†

3. Lastly, there may be lesions received after death. These are to be determined by the rules laid down in the section on medico-legal dissection. The progress of putrefaction deserves particular attention in this case.

IV. The next point proposed for consideration was the effects of immersion on the dead body, and the changes produced by it.

There is but little difference between the specific gravity of the human body and that of water, though the former is somewhat the greater. Hence, a person, whether dead or alive, when thrown into the water, will sink, unless buoyed up by external aid; but after the process of putrefaction has occasioned the evolution of gaseous matter, the body becomes specifically lighter than the water, and it rises to the surface. It is on this principle that bodies committed to the deep have, generally, weights affixed to them.

It is, however, possible that a body may float at first, when its cavities have been previously filled with air. Thus, Dr. Male supposes, that in the case of a person strangled, and thrown into the water with

* "A few years ago, a man, who had leaped from each of the then three bridges into the Thames with impunity, undertook to repeat the exploit for a wager. Having jumped from London Bridge, he sunk, and was drowned. When the body was found, it appeared that he had gone down with the arms in the horizontal, instead of the perpendicular posture, in consequence of which both of them were dislocated by the fall upon the water."—Smith, p. 214.

In another case, a soldier, an excellent swimmer, plunged headlong into the Sambre. He was seen to struggle, but it was supposed to be in jest; but perceiving him to become motionless, he was dragged out. On recovering his senses, he was found to be perfectly paralysed from the neck downwards. Death followed in a few hours, and on dissection, the body of the fifth cervical vertebræ was found fractured transversely. Case by Dr. Reveillon. Archives Générales. Medico-Chirurgical Review, vol. xi. p. 240.

† Marc, p. 183.

the cord attached around the neck, the body might float at once, from the included air. It is also the opinion, that dead bodies will float sooner in deep than in shallow, and in fresh than in salt water.* In the disastrous accident of the Royal George, the bodies were observed to rise to the surface on or about the fifth day.†

It often becomes a subject of much importance to ascertain *how long the body has lain in the water*. Until recently, we have had but few facts to guide the medico-legal examiner, and his inferences could only be drawn from the general results of putrefaction.‡ It was, however, understood, that the body, after lying for some time under water, became partly converted into a fatty substance, termed *adipocire*, and which, in appearance, resembles spermaceti.§ Water, in any situation, will produce this, although running water has been found to do it more rapidly. The question, how long a time is necessary to cause this change to take place, has been made the subject of a very interesting legal inquiry.

"At the Lent assizes held at Warwick in the year 1805, the following cause came before the court. A gentleman named Meecham, who was insolvent, left his own house with the intention (as was presumed from his recent conduct and conversation) of destroying himself. Five weeks and four days after that period, his body was found floating down a river three miles from Birmingham, the place where he resided. The face was disfigured by putrefaction, and the hair separated from the scalp by the slightest pull; but the other parts of the body were firm and white, without any putrefactive appearance. The clothes were unaltered, but the linen was exceedingly rotten. On examining the body, it was found that the lower part of the abdomen and the glutei muscles were converted into adipocire.

"A commission of bankruptcy having been taken out against the deceased a few days after he left home, it became an important question to the interest of his family, to ascertain whether or not he was living at that period. From the changes which the body had sustained, it was presumed that he had drowned himself on the day he left home;

* Male, 2d edition, p. 186. The body of Prince Carraccioli, who was hung by order of Lord Nelson, was sunk in the sea, with double-headed shot weighing 250 lbs. tied to the legs. It floated on the surface in thirteen days.

† Paris, vol. ii. p. 41.

‡ Mr. John Shaw relates the case of two young men, drowned in the middle of winter, whose bodies were examined by him. Though in the water only for a very short time, the surface, in the course of twenty-four hours, became black and puffed, and on raising the skin, a quantity of very offensive gas escaped. He then removed a considerable portion of the skin, and it was found that those parts from under which the gas had passed out went much more slowly into the putrefactive state than the others. He supposes that the emphysema may have originated from the rupture of some air-vessel during the last agony. If generally found, this may, as he suggests, prove a good test of life previous to submersion.—London Medical and Physical Journal, vol. xlviii. p. 185.

§ See Dr. Gibbes' papers on Adipocire, in Philosophical Transactions, vol. lxxxiv. p. 169, vol. lxxxv. p. 239. "This appearance is often to be found in the macerating tub of a dissecting-room, where there is but little water, and that both stagnant and seldom changed; but the process of its formation requires a much longer time to effect than elsewhere."—Darwall.

and, to corroborate this presumption, the evidence of Dr. Gibbes of Bath was requested, who, from his experiments on this subject, was better acquainted with it than any other person. He stated on the trial, that he had procured a small quantity of this fatty substance, by immersing the muscular parts of animals in water for a month, and that it requires five or six weeks to make it in any large quantity. Upon this evidence, the jury were of opinion that the deceased was not alive at the time the commission was taken out, and the bankruptcy was accordingly superseded."*

The information to which I have alluded as explanatory of the progress of change in the bodies of the drowned, is derived from a memoir of Dr. Devergié, published in the second volume of the Annales d'Hygiène. It is unnecessary for me to analyse it, as that has already been done in an able manner by Dr. Beatty. I therefore copy from him.

"The observations of M. Devergié are entitled to much consideration, from the unrivalled opportunity afforded for their formation. He was authorised to carry on his investigations at the establishment called 'La Morgue,' in Paris, a building on the banks of the Seine, to which are transported all bodies found dead in the city and its environs, and where they are exposed during three days for the purpose of recognition by their friends. The number thus exhibited exceeds three hundred annually, and includes all manner of violent deaths. In case of the sudden disappearance of an individual, his friends repair to the Morgue, and leave with the porter an accurate description of his person, his clothes, and the period at which he was last seen; and when a body is brought in, it is carefully examined, and if it corresponds with any of the descriptions that have been left, notice to that effect is sent to the persons interested, who come and claim it. The number of persons recognised is very considerable; in the first six months of the year 1829, out of 148 bodies, 116 were claimed. Of this number 62 were drowned, of whom 45 were recognised. Being thus furnished with positive information as to the time of immersion and that of finding the body, Devergié was enabled to prosecute his inquiries with great accuracy. He found that in general no change takes place on the exterior before the fourth or fifth day, and the cadaverous rigidity frequently continues two, three, or even four days after immersion. This is probably owing to the coldness of the medium in which the body is placed. About the fourth or fifth day, the skin on the palms of the hands begins to whiten, and this change of colour takes place particularly on the ball of the thumb, and the fleshy eminence on the inner side of the

* Male, 2d edition, p. 192. Professor Amos' Lecture, in London Medical Gazette, vol. viii. p. 193. Dr. Harlan of Philadelphia placed a cranium for maceration in a barrel half filled with water and closely covered over. On examination, at six weeks after, he found it floating on the surface of the water, with one side above the surface, and on cutting into it, the whole substance down to the bone was converted into adipocire. On the contrary, that portion of the head and face which was immersed was found putrid and macerated.—North American Medical and Surgical Journal, vol. v. p. 471. I neglected to mention, in a previous page, that Dr. Bostock considers adipocire as the immediate production of the muscular fibre, and not, as some have thought, a mere residue of the fat after the destruction of the muscles.—Medico-Chirurgical Review, vol. xv. p. 534.

palm over the metacarpal bone of the little finger, together with the lateral surfaces of the fingers. The back of the hand does not partake of this colouring, and the rest of the body presents nothing particular. On the sixth or eighth day, the skin at the back of the hand begins to whiten, at the same time that the sole of the foot has acquired a similar tinge: the skin of the face is softened, and of a more faded white than the rest of the body. On the fifteenth day, the face is slightly swollen and red; a greenish spot begins to form on the skin over the middle of the sternum; the hands and feet, with the exception of the dorsum of the latter, are quite white, and the skin of the palm of the hand is wrinkled. The subcutaneous cellular tissue of the thorax is reddish, and the cortical substance of the brain takes on a green colour in the upper part of that organ. At one month, the face is reddish brown, the eyelids and lips are green and swollen, the neck is slightly green, and a spot of about six inches in diameter, brown in colour, and with a green areola, occupies the superior and middle part of the sternum. The scrotum and penis are enormously distended by gas, the latter being sometimes in a state of erection from that cause. The skin of the hands and feet is quite white and very much wrinkled, presenting the appearance of having been long enveloped in a poultice. The hair and nails are still very adherent. The lungs are emphysematous, and fill the cavity of the chest, overlapping the heart,—a condition different from that which these organs present at a more advanced period. At a month and a half, besides the appearances first mentioned, the neck and thorax are found very green, and the cuticle begins so detach itself round the base of the hand where it joins the wrist. At two months, the body is covered with slime, which penetrates through the clothes. The face is enormously swelled and of a brown colour, the lips are tumefied and separated so as to expose the teeth. The skin on the middle of the abdomen, as well as that of the arms, forearms, thighs, and legs, is still in a natural state. This is a most remarkable fact, and establishes a striking difference between the progress of putrefaction in water, and when the body is exposed to the atmosphere; in the latter case the abdomen being the first part to manifest any change. At this period the skin has become detached from the hands and feet, and, having the nails attached to it, forms as it were a glove. The skin and nails of the feet are longer in separating than those of the hand. The hair begins to fall off, and is easily removed by pulling. The veins are almost completely empty of blood, and commonly distended with gas. The inner surface of the arteries is red, and that of the trachea between the cartilages presents the same colour. If at the moment of death the right cavities of the heart were gorged with blood, the internal surface of the ventricle is of a jet black colour; and in contrary cases an analogous appearance is presented on the opposite side. Devergié considers this a most important diagnostic mark of death by asphyxia. At two months and a half, the green colour of the skin extends to the arms, forearms, and legs; the nails are completely detached from the hands and feet; some adipocire is formed on the cheeks, chin, breasts, arm-pits, and anterior part of the thighs; the abdomen is greatly swollen by putrefaction within: the muscles at this

period preserve their natural colour, and do not appear altered in texture. At three months and a half, there is observed destruction of the scalp, eyelids, and nose, to such an extent as to make it difficult to tell the age of the individual. The skin of the breast is generally of a greenish brown; the centre of the abdomen is of an opaline colour, and scattered with small ulcerations caused by the water. Larger corrosions are found in different parts of the body. The hands and feet are completely naked of skin. The lungs no longer fill the thorax, but leave between them and the pleura costalis a space filled with reddish serum. At four months and a half occurs complete destruction of the face and scalp, leaving the skull bare; the remains of the face, the neck, and anterior part of the thighs are entirely converted into adipocire; and small eminences, indicating the commencement of calcareous incrustation, are observed on the prominent parts. The brain presents traces of adipocire in its anterior part. Devergié has not classified the changes that take place at more advanced periods."*

The knowledge and application of these facts might have proved useful in the excitement which several years since agitated our state. The body of William Morgan, drowned some fifteen months previous in the Niagara river, was supposed to have been found. The hair dropped out from the slightest touch; the nails of the fingers and toes were loose; the body was swollen, and the arms of a chocolate colour. My former pupil and friend, Dr. John Cotes of Batavia, examined the body. The parts under the skin had not undergone decomposition; the stomach was in a perfect state, and there was nothing manifest, except the early indications of putrefaction. He deposed, before the coroner's jury, that this body has probably not lain in the water more than six or eight weeks. It was subsequently ascertained to be the body of another individual. Yet it is to be added, that there were some striking coincidences in physical marks between the murdered individual and the one now under examination.

V. Spencer Cowper, Esq. a member of the English bar, and three other individuals, were tried at the Hertford Assizes, in 1699, for the murder of Mrs. Sarah Stout. Mr. Cowper came to Hertford on Monday, the 13th of March, and shortly after visited Mrs. Stout, who lived with her mother, of the same name. He dined with them, and staid till four in the afternoon. When he went away, he promised to return and lodge there that night. Accordingly, at nine o'clock, he arrived, ate some supper, and then engaged in conversation with Mrs. Stout, the daughter. They were alone in the room, when she called a servant, and desired her to make a fire in his chamber, and to warm his bed. The direction was attended to, and in about a quarter of an hour the servant heard the door shut, as if some one was going out. She remained above about a quarter of an hour longer, and then came

* Cyclopædia of Practical Medicine, art. *Persons found dead.* Devergié, Annales, vol. ii. p. 160. Orfila has attacked Devergié very severely, in his Exhumations Juridiques, vol. ii. pp. 1–120. The main charge, however, is plagiarism, and a denial, in some cases, of the uniform occurrence of the changes indicated. The controversy has been continued in the Annales d'Hygiène, vol. v. p. 429; vol. vi. p. 209.

down into the room. Mr. Cowper and Mrs. Stout were both gone and the next morning she was found dead, and *floating* on the water Its depth was about five feet, and her body was about five or six inches under it, although some of her clothes were on its surface. Her eyes were open, and some little froth issued from her mouth and nostrils. The body was not tumefied, nor were any bruises observed. This was the testimony of the individuals who took the body out of the water.

Mr. Dimsdale, a surgeon, was sent for by the mother, to view the body. He found both sides of the neck swelled and black, and the skin between her breasts up towards the collar-bone, was also dark coloured. The left wrist was slightly bruised. There was, however, no circular mark around the neck. It is to be regretted that this investigation proceeded no further.

On the 28th of April, six weeks after the death of Mrs. Stout, her body was disinterred for the purpose of inspection. The medical witnesses stated, that they found the head and neck so much putrefied, that no opinion could be formed respecting their appearance. The stomach and intestines were, however, in a sound state, as were also the lungs. Neither of them was putrefied, and, on making incisions into them, no water could be discovered.

Drs. Coatsworth, Nailor, Burnet, and Woodhouse, with Mr. Babington, a surgeon, deposed that when a person is drowned, water will be taken into the stomach and lungs, and as none was found in this case, they were of opinion that she came to her death by some other means.

The above is an abstract of the testimony on the part of the crown. On the part of Mr. Cowper, it was first attempted to be shewn that the peculiar position of the body was owing to its lying sideways against some stakes in the river. These prevented its complete immersion under water, and a witness also mentioned, that in drawing the body out of the water, one of the arms rubbed against the stakes, and thus probably produced the injury observed on it.

Drs. Sloane, Garth, Morley, Wollaston, and Crell, together with William Cowper, the celebrated anatomist, appeared as witnesses for the prisoner. They were all asked concerning the circumstances of no water being found in the body, and whether this disproved the probability of drowning. Dr. Sloane considered it altogether an accidental appearance in the stomach, and not necessarily present in such cases. The others advanced similar opinions. As to the fluid in the lungs, the answers were not very definite; but it was insinuated by some, that the six weeks' burial might have dissipated whatever was taken in.*

During the trial, it was a subject of keen inquiry whether dead bodies float or sink when thrown into the water. Seamen were summoned to depose on this point, and they testified that weights were fastened in order to produce their descent. The explanation of Dr. Garth is, however, perfectly satisfactory on this point. It is the same

* Dr. Morley suggested, that if the female intended to destroy herself, she might, by keeping her breath, only take in a very small quantity of water.

which is mentioned in a former page. Weights are added to prevent the buoyancy when putrefaction commences. In answer to a question from the judge (Baron Hatsell), Dr. Garth remarked, that the body of a strangled person might possibly float on account of the included air. In this instance, however, there was no proof of such a cause of death.

Dr. Crell insisted much on the presence of the frothy mucus about the mouth and nostrils, as a proof that Mrs. Stout had been drowned.

The coroner's jury had returned a verdict of *non compos mentis*, and Mr. Cowper, on the trial, attempted to prove a previous melancholy state of mind. This, of course, was for the purpose of rendering it probable that suicide had been committed.

These were the leading medico-legal facts and opinions elicited on the trial, and the jury, after remaining out about half an hour, brought in a verdict of not guilty.*

A case resembling the above in several particulars, has happened in this state.

Levi Weeks was, on the 31st of March, 1800, put upon his trial, before the court of oyer and terminer at New York, for the murder of Gulielma Sands. The principal circumstances were as follow. The deceased and the prisoner lodged in the house of Mr. Ring, who was a distant relative of the former. She received attentions from the prisoner, and told Mrs. Ring that she was to be married to him on Sunday, the 22d of December, 1799. When the evening arrived, she dressed herself, and came down into the lower room, where the prisoner was. Shortly after she again went up stairs, whither Mrs. Ring followed her, saw her put on her hat and shawl, and take her muff in her hand. While in this state of preparation, Mrs. Ring came down stairs into the room, and found her husband and Levi sitting together. The latter instantly took his hat and went out into the entry, and the moment the door opened, Mrs. Ring heard a walking on the stairs, and directly a whispering at the door. She soon heard them walking along, and presently the front door opened, and the latch fell. The time she accurately fixed at about ten minutes after eight. Weeks returned to his lodgings at Ring's at ten o'clock. Gulielma's body was found in the Manhattan well on the 2d of January, 1800.

As to the circumstantial evidence, I will only add the following. It was proved by a witness, that Weeks had spent the evening with

* Hargrave's State Trials, vol. v. pp. 193–231. This case gave rise to several bitter pamphlets, in which the whole course of testimony was reviewed, and the characters of Mrs. Stout and Mr. Cowper were treated with little mercy. — See vol. viii. pp. 485–512. The opponent of Mr. Cowper accuses him or his accomplices, in broad terms, of having felled her with a blow under the ear, and then strangling her with his hand. Such an opinion is, however, hardly tenable, as Dimsdale and Camlin both stated, that the stagnation of blood which was present did not materially differ from what is usually observed in the drowned. (The foling additional facts I derive from the London Law Magazine, vol. x. Life of Lord Cowper. Spencer Cowper was the brother of Lord Chancellor Cowper, and in after life became a judge of the Court of Common Pleas. Mrs. Stout appears to have been in love with him, although a married man. Her mother procured an appeal of murder against him, but it was got rid of by connivance.)

him from half past eight until ten: and again it was testified, that it took fifteen minutes to walk from Ring's to the well.

The medico-legal testimony was of the following import: the body was carefully drawn up, so as not to touch either side of the well. Her hat, handkerchief, and shoes, were gone, and her clothes torn. On the right hand there was something like a bruise, and there were scratches of sand upon her skin, some of which was knocked off, and seemed to have been driven forward. The right foot was bare, and somewhat scratched on its upper part, as if she had been dragged on the ground. Her countenance was flushed, and her arms and neck very limber. Drs. Prince and Mackintosh examined the body before the coroner's jury, on the 3d January. It was ascertained that she was not pregnant. The scarf-skin of the face was scratched, as if with gravel, and there was a bruise on the knee. There was a livid spot on the breast, but none on the neck. In the body, a small quantity of water was discovered. Both these gentlemen deposed, that, in their opinion, all the appearances could be accounted for on the supposition of her having been drowned.

Dr. Hosack saw the body on the day it was interred. He was struck with the unusual redness of the countenance, and, upon looking at the neck, observed three or four dark-coloured spots, of an irregular shape, but not in an exact line. The largest were about an inch and a half, and the smallest about three-quarters of an inch. He was decidedly of opinion that these were marks of violence done to the neck, and did not conceive it possible that they could have been committed on one's own person. Other witnesses had also observed these spots on the neck.

Towards the conclusion of the trial, Dr. Hosack was again called, and asked whether there was any explanation by which the medical testimony, apparently so discordant, could be reconciled. He replied, that it might, in either of two ways. First, the spots were probably not so visible, when the body was first taken out of the water, as after it had been exposed to the air for some days. The gradual progress of putrefaction might have developed this appearance in the injured part. Secondly, when she was first taken out of the well, it was generally supposed that the neck and collar-bone were broken. As Dr. H. did not see her until the day of interment, it is possible that the frequent turning and bending of the head, and the repeated examinations of the neck, to ascertain the injury done to the collar-bone, might have produced the spots in question, and as the body had been dead for several days, a little violence might have produced a rupture of the cutaneous vessels, and a consequent effusion under the skin.

The prisoner was acquitted.*

I cannot avoid venturing a single remark on this case. The prisoner was doubtless innocent, but there are strong proofs to my mind, that the deceased suffered violence, previous to falling or being thrown into the well. The weather was undoubtedly cold (it was during the

* Report of the trial of Levi Weeks, &c. taken in short hand by the clerk of the court (Wm. Coleman, Esq.), 8vo. New York, 1800. Not long since, it was asserted in some of our newspapers, but I know not on what authority, that the actual murderer of Miss Sands had suffered death, for a similar crime, in another country.

holydays), and the progress of putrefaction during immersion must unquestionably have been very slow. The coroner's jury viewed the body on the day after it was drawn up. Dr. Hosack, and other witnesses, some time thereafter. Is it not probable, that exposure to the air developed these marks of injury, and do not these marks indicate manual strangulation previous to immersion?*

These is a second question belonging to this subject, which is no less intricate than the first. *Was the drowning the effect of suicide, accident, or homicide?* I can offer but few observations on it.

We should inquire particularly as to the situation in which the body is found—notice whether the stream is rapid or still water, and whether its banks are precipitous or sliding. Ascertain whether the individual has laboured under near-sightedness, vertigo, or symptoms of insanity. The bruises on the body should be examined, and a minute dissection be made. We should, however, recollect, that the person may have precipitated himself into the water, and struck against a stone or other hard substance, and the body may have thus been wounded.† In other cases, accidental circumstances may clear up the subject, as the marks of footsteps on the margin of the water, and substances found grasped in the hands of the deceased, that have evidently been seized while making resistance.‡

It is an opinion with some writers, that less water is found in the

* In the Causes Célèbres, par Mejan, vol. v. p. 127, a case is related, of an individual taken from the water, around whose body a bag containing several large stones was suspended. Distinct marks of compression were observed on the neck, and, on dissecting through the skin, blood was found effused in situations corresponding to the external ecchymosis. One of the cervical vertebræ was luxated. The accusation was, that he had been strangled previous to the immersion; while the defence set up rested on various proofs of previous insanity, and it was insinuated that the luxation might have originated from the fall into the well. The jury (November 19, 1808) acquitted the *persons accused*. A similar case, where an extensive and severe fracture of the cranium was found on the head of a female drawn from a well in a cellar, containing five feet of water, and being about the same to the surface, will be found in Annales D'Hygiène, vol. ix. p. 192. The sides of the well were smooth, and its aperture small.

I add the following curious extract from Hamilton's History of Medicine, as given in a review of that work, in the Lancet, N.S., vol. viii. p. 486.

"Among other instances of superior sagacity to which the Chinese pretend, one of the most singular, perhaps, is the method by which they affect to discover whether a man found dead by strangulation has been his own executioner, or has been strangled by others! whether, in case of a body being found in the water, death preceded or followed its immersion; and whether, in other cases, death has been the result of natural causes or of felonious violence. The body, being taken up in all suspicious cases, is carefully washed with vinegar, a large fire is next kindled in a pit dug expressly for the purpose, and measuring six feet in length, three in width, and as much in depth; the fire in this pit is progressively augmented, till the surrounding earth becomes intensely heated, when the fire is removed, a large quantity of a vinous liquor, fermented from rice and honey, is poured in, and the mouth of the pit covered with an osier hurdle, upon which the body is stretched out at full length. A cloth, supported in the form of an arch, is then thrown over both, in order to confine the vapour arising from the vinous liquor thrown into the heated pit, and direct its action to every part of the body. At the end of two hours, the cloth is removed, and the body minutely inspected, when, if any blows have been inflicted, their marks will appear distinctly upon the body."

† Male, p. 236.

‡ See the case of Mr. Taylor, already noticed at page 485.

lungs of suicides than in those who are drowned by accident, or wilfully; but this is evidently uncertain and unfounded.

In March 1806, a young woman at Little Sheffield, in Yorkshire, made away with herself, by breaking a hole in the ice upon a pond, and thrusting her head in, while the rest of the body remained out. This situation repelled the idea either of force or of accident.*

In 1776, a young man named Paulet, of a violent and gloomy temper, was found dead at the bottom of a well. Strong suspicion attached to two individuals. The medical reporters stated that they found sand under the nails of his hands, a circular mark on his ancle-bones, external contusions on the head, and particularly above the left superciliary ridge, and some cuts on the top of the scalp. On opening the thorax, the whole extent of the trachea down to the lungs was found filled with frothy mucus, and the stomach was half full of a whitish water. They considered these as marks of death by drowning. It was proved that the well was so surrounded by houses, that the slightest noise at it would have been immediately heard, and it was also constructed with sharp and heavy stones. The marks on the ancle-bones were alone of a doubtful nature; but, as Paulet had been melancholy, and refused sustenance for several days, and every other circumstance could be satisfactorily explained, the parliament of Toulouse liberated the accused, and agreed that suicide had been committed.†

One would imagine, says Dr. Smith, that if a person be taken out of the water tied hand and foot, there need be no hesitation about inferring that he had been forced into that situation; yet we have several cases of precisely that description, in which the presumption was clearly in favour of suicide.

In June 1816, the body of a gauging instrument-maker, who had been missing for some days from his home, was discovered floating down the Thames. On being taken out, his wrists were found tied together and made fast to his knees, which were in like manner secured to each other. He had been in a state of mental derangement for two years. The cord with which he had tied himself was recognised as one that had hung from the ceiling over his bed, and by which he used to raise himself up, as he had been confined to bed for some weeks. He was a good swimmer, and it was presumed he had taken the precaution to prevent himself from employing that power. The verdict in this case was, "found drowned."‡

In another instance, a man aged twenty-eight, with a wife and children, was reduced to great distress. On a certain day, he took an affectionate leave of his family, declaring that he would not return until he had obtained some employment, by which he should be able to procure them bread. The following day, his body was taken out of the New River, with his hands and legs tied. A card with his address was found in his pocket, and also three pence; when he left home, he had five pence, and it was supposed that he had purchased the cord with the deficient sum. The verdict in this case was, "insanity."§

* Smith, p. 275. † Foderé, vol iii. p. 127, from the Causes Célèbres.
‡ Smith, p. 276. § Paris, vol. iii. p. 42.

In 1817, says Foderé, I was called to see the body of a workman, large, strong, and in the flower of his age, who had been taken out of the Yll. His hands and fingers were tied together with silk riband, in numerous folds. The hands evidently could have been very easily disengaged. There were no marks of external injury, and no swelling around the ligatures. His dress was uninjured, and nothing was taken from him. On examination, there were no marks except those common to drowning. Our author gave it as his opinion that this was a case of suicide, and that he had probably tied the riband with his teeth.*

The above are examples where there may be doubt as to suicide or homicide. I will conclude with one, where the question was suicide or accident. It arose in the English court of exchequer in 1826.

An individual named Rainer had insured his life for £3000 in the Rock Life Insurance. Now, it is one of the provisos in a policy, that if the insured meets his death by suicide or duelling, the insurance shall be void. Mr. Rainer, the person insured, had been insane for some time. He resided at Highbury, and, on the 15th of March, between five and six o'clock, left his home without the knowledge of his family, and called at several places, exhibiting strong symptoms of agitation and excitement. He then took the road to Finchley, and, on reaching a pond on the premises of a farmer, was drowned. It is probable, from the state in which his shoes and stockings were found, that he had walked into the pond with his clothes on; that he had then returned, undressed himself, laid his clothes in a convenient place, and in such a manner as to indicate that he intended to dress himself after leaving the water.

It was urged, that if this was a case of suicide, he would have thrown himself into the water with his clothes on; and some medical witnesses were of opinion that he died from apoplexy, occasioned by immersion in cold water while under a high fever. The chief baron remarked to the jury, that this was a case in which there was a great want of facts, and that they could only decide on probabilities. The verdict was in favour of the executors.†

It is not necessary to state the laws of various countries against the crime of murder. Whatever may be the mode adopted to destroy life, it is universally visited with the highest punishment. In a recent English law, called Lord Lansdowne's act (9 Geo. IV. cap. 31), the *attempt to drown, suffocate, or strangle a person*, is declared a felony, and made punishable with death.

* Dictionnaire des Sciences Médicales, vol. xxiv. art. *Indices*. A similar case is related in the Annales D'Hygiène, vol. ix. p. 207. The body of the Sieur X. was taken from the Seine at Paris, having the feet, wrists, and neck, tied. None of the knots, however, were tight, and they left but a very slight impression on the skin. On dissection, the liver and heart were found to bear the marks of long-continued disease. The medical examiners (Marc, Guichard, &c.), from these circumstances, and the total absence of injury, gave the opinion that this was a case of suicide. They add, that in each case they were slip-knots, and apparently made by the individual to put it out of his power to help himself in the water.

† Garret and others, executors of Rainer, *v.* the Rock Insurance Company. I copy this case from the newspaper.

CHAPTER XV.

WOUNDS ON THE LIVING BODY.

1. Of wounds in general—division of them into slight, dangerous, and mortal—enumeration of each. Circumstances which may aggravate the danger of wounds. A. The age and constitution of the patient, and his maladies, either hereditary or accidental. Habits of intemperance. Supervention of diseases, and how they are to be estimated—erysipelas—tetanus. B. The passions of the patient—negligence or delay. C. Insalubrity of the atmosphere. D. Ignorance or negligence of the surgeon. 2. Nature and prognostics of wounds of particular parts. Wounds of the head—of the face—of the neck—of the thorax—of the abdomen—of the extremities. Wounds from fire-arms. Laws as to the time within which death from wounds is deemed murder. 3. Of mutilation. French laws against it—English—Coventry Act—Cases. American laws.

It has been already stated, but it is proper to repeat in this place, that the term WOUND, in legal medicine, comprehends all lesions of the body, and in this it differs from the meaning of the word when used in surgery. The latter only refers to a solution of continuity, while the former comprises not only these, but also every other kind of accident, such as bruises, contusions, fractures, dislocations, &c. &c. In this sense, then, the term is to be understood in our future remarks.*

The questions which arise in all cases of wounds that come under judicial investigation, are the following: How far has the person who caused the injury contributed to the death of the deceased, or to the lesion of one or other of the functions of the body? And, again, to what class is a certain wound to be referred? These are inquiries of great magnitude—and correct views, as well as stable principles, are needed, in order to answer them properly. Medical and surgical works are filled with instances of remarkable recoveries from the most dreadful wounds, and also with cases of death from apparently the slightest ones. If we take these as our guide, the consequence will be that nothing of a determinate nature can be agreed upon, and every physician, whenever he enters a court of justice, may, by the aid of a corresponding example, prove that a dangerous wound is not so, and

* Ballard and Marc, however, object to this, and recommend the word LESION, for the general term. *Lesion from some external cause.*—Dictionnaire des Sciences Médicales, art. *Blessures*. In Moriarty v. Brooks, Lord Lyndhurst, chief baron, said—"The definition of a wound, in criminal cases, is an injury to the person, by which the skin is broken. If the skin is broken and there was a bleeding, that is a wound."—6 Carrington and Payne's Reports, p. 684. This is the usual surgical definition; but a man may have a bone fractured from a blow, without any breaking of the skin.

that its fatality has been owing to ignorance or neglect. Such power is too extensive and too important to be granted to every medical witness, and whatever we take from his hands, and refer to sound principles and general rules, is a solid gain to the cause of truth and justice.

In further proceeding with my observations, I shall, in the first place, notice the subject of wounds in general, and afterwards examine the nature and prognostics of wounds of particular parts. The subject of mutilation, from its entering so much into our statute law, will form a third section.

1. *Of wounds in general.*

Wounds, from their nature, may be either *slight*, *dangerous*, or *mortal*. By a slight wound is meant one in which there are no parts injured that are important to carrying on life, or any of its functions, and whose uniform course is to heal quickly, and to leave no lesion or deformity. A dangerous one implies a wound which, without being mortal, is still not exempt from danger, and presents more or less difficulty in its cure. Lastly, mortal wounds comprehend those whose consequence and effect is death. In this sense, only, is a wound, in legal medicine, termed mortal. More minute divisions than these which I have named, may, however, be made, and, indeed, are, indispensable. Thus, a wound may be in itself mortal, or it may be mortal by accident. It may be in itself dangerous, or it may become so from some complication, or from not having been properly treated. Even slight wounds may become dangerous from neglect, from a debilitated or diseased state of the system, or from mal-treatment,—such as endeavouring to excite suppuration, when the aim ought to be to promote adhesion. In such cases the blame should be laid where it properly belongs.

Circumstances, as well as accident, have a considerable effect on wounds. Bohn suggests several instances of this nature, in which their mortality is prevented by particular phenomena. Thus, a small portion of the omentum, or the fat of the intestine, may so place itself in the mouth of a wounded blood-vessel in the abdomen, as to prevent a hæmorrhage, while, if not thus obstructed, it would be mortal.* Again, it has been repeatedly observed by surgeons, that there may be such an adhesion of the pleura to the lungs, as that the blood or pus from the latter will flow outwardly when they have been injured by a penetrating wound. The same author remarks, that it has never been demonstrated, and, indeed, in the nature of things it never can be proved, that a wound from which there is a recovery is precisely similar to one which has proved fatal, although, externally, they may be similar in every respect. In the one case, there can be no dissection to prove its nature, and, in the other, there may have been many peculiar circumstances not attendant on the former.† This observation is

* Bohn, p. 31. He mentions a dissection in which the right iliac artery was found wounded, and life had been prolonged for thirteen days, evidently from this cause.

† Ibid, p. 27. "Dubium an vulnus sanatum exacte idem cum non sanato fuerit."

in itself a sufficient answer to the argument already referred to, of proving the possibility of recovery from dangerous wounds by a reference to similar instances.

The subject may be further illustrated by examples. A man, says Bohn, receives a wound in the bottom of his stomach; a severe hiccup, faintings, and retchings, come on, while the half-digested food that he has taken passes out through the aperture. This individual is, however, cured in a month's time, whilst another, whose wound is accompanied with similar symptoms, except that he does not hiccup, and which in itself is a favourable symptom, dies in three days. Shall we say that the latter was not mortally wounded, because the former escaped? Dissection will teach us the incorrectness of this deduction; and that, in the instance of mortality, the wound has been rather lateral than deep, and has touched the left gastric artery, in consequence of which there has been a profuse hæmorrhage into the abdominal cavity. Again, an individual receives a violent blow on the head, which causes a depression of the cranium, and is accompanied with a considerable hæmorrhage from the head and ear, and a loss of sense and motion. After a day or two the depressed piece of bone is raised; he recovers his senses; the hæmorrhage ceases; and, at the end of some weeks, the patient recovers. Another is injured in precisely the same manner, is treated similarly, and, notwithstanding, dies at the end of seven days, without ever recovering from the state of coma; and, on dissection, extravasated blood is found in the ventricles of the brain.*

These instances are sufficient to prove how little dependence is to be placed on analogy, and they also illustrate the importance of fixed rules concerning the mortality of wounds, founded exclusively on anatomical and physiological data.

A strict definition of life is not necessary at this time; and it is sufficient to state, that it depends on the union and reciprocal influence of the functions which compose it, and, particularly, of the circulating, nervous, and respiratory systems. Lesions of the chylopoetic system come next in order, as the body cannot survive without nourishment, and the danger to life will, of course, be in proportion to the extent of the injury and the immediate necessity of the organ. Wounds which rupture the large blood-vessels in one or other of the large cavities, such as the head, the thorax, or the abdomen; those which penetrate the auricles or ventricles of the heart, the trunk of the aorta, or vena cava, are *mortal*. There are, however, so many cases on record, in which individuals are stated to have survived for some time with large abscesses in the brain, or even a ball in that part, that we are justified in viewing wounds of the heart as more fatal than those of the head. Next to these are wounds, which, from their depth, penetrate into the spinal marrow; wounds of the head, complicated with such severe injury, that venesection and the trephine do not alleviate them; a division or twisting of the spinal marrow in the cervicle vertebræ; a division of the eighth pair of nerves, and a general affection of the nervous system, from blows or injuries on parts which are the centre of its various departments,

* Bohn, pp. 28, 29.

such as the pit of the stomach. In the next place may be mentioned as mortal wounds, such as prevent the function of respiration; a total division, or a large wound of the trachea; and particularly, if, in the latter case, the under lip of the wound is retracted inwards—wounds penetrating through the bronchiæ, and wounds of the diaphragm, particularly of its tendinous portion. To this class belong also extensive wounds of the pharynx, œsophagus, and stomach; of the duodenum, thoracic duct, and mesentery, and particularly, if a large number of the lacteals be divided; together with severe wounds of the liver, spleen, pancreas, gall-bladder, and the ductus cysticus, and choledicus. Wounds of the urinary passages, kidneys, ureters, bladder, impregnated uterus, and amputation of the male genital organs, are all ordinarily mortal, unless immediate aid be afforded, as are also extensive and penetrating ones from fire-arms accompanied with fracture of bones.

All these accidents, from the importance of the organs that are injured, the extravasations that occur, or the hæmorrhage which accompanies them, and which it is often impossible to check, are usually mortal. Such, however, are the powers of nature, and so extensive are its resources, that hope should seldom be abandoned. If called upon to make an immediate report, it is proper to form a prognostic on these principles, and to mention the danger that is present. On the trial, however, the conviction must be decidedly stated, that the wound was a mortal one, and that no surgical aid could have saved the patient, or, when applied, had no beneficial effect.

Among *dangerous wounds*, or those concerning which we cannot give a decided prognostic, must be ranked such as are inflicted on organs essential to the exercise of the vital, natural, or animal functions; and, as to their consequences, they may be divided into those which may become mortal, and those which may interrupt the exercise of any function. To the first class belong all penetrating wounds, though unaccompanied with symptoms that indicate immediate danger; all contused wounds, whether on the head, thorax, or abdomen; all wounds of the extremities, and, particularly, where surgical aid cannot be procured in time to suppress hæmorrhage, and all compound fractures and luxations, particularly if the part be much surrounded by nerves and muscles, and if it be near a joint. Even simple contusions or blows, may become dangerous, from a rapid disorganisation of parts, and a consequent mortification; and especially if, on tendinous or ligamentous parts, the supervention of tetanic affections is to be dreaded.

In the second class are included all wounds made in any of the secretory organs and their ducts; in the organs of sense, as the eye, ear, nose, and mouth; in the generative organs, as the testicles, penis, and unimpregnated uterus. Also, fractures of the clavicle or sternum, and depression of the xiphoid or ensiform cartilage; transverse wounds of the great pectoral or dorsal muscles, and wounds of the muscles of the abdomen, particularly near the linea alba and pubis; wounds of the perineum combined with injury to the canal of the urethra, pricking of the tendons of muscles, together with wounds of important branches of nerves.

Slight wounds comprehend those injuries in which the skin and the muscles are divided, the latter in the direction of their fibres, and where

no tendon, aponeurosis, large nerves, or blood-vessels, are touched, and the system has not received a severe shock. To this class also belong simple luxations and fractures.

But, as we have already observed, there are circumstances which render this division an arbitrary one, and which cause a mortal wound of the lowest class to be inevitably mortal, a dangerous one to become mortal, and a slight one, dangerous. These circumstances may be reduced into four classes, each of which deserves particular notice.

1. The constitution and age of the patient, and his antecedent or coexistent maladies, may exercise a baleful influence on the injury received. Thus, for example, there may be a complete transposition of parts; the heart is sometimes found on the right side of the thorax; the spleen has been discovered to occupy the place of the liver; the stomach has descended as low or even lower than the umbilical region, while the bladder has risen into the abdomen. It would certainly be unjust, except in cases of premeditated murder, to consider the criminal as responsible for the fatality of wounds given under such circumstances. Again, an individual may be suffering under hernia, and, in that situation, may receive a mortal wound from a cutting instrument, or may die from a contusion or blow on the part, which under other circumstances would not prove dangerous.* The condition of the wounded person may also be rendered hazardous from a variation in the ordinary distribution of blood-vessels; from the presence of aneurism;† from an extreme thinness of the bones of the cranium,‡ or a venereal caries

* Bohn, pp. 70, 71.

† Two men, long at enmity, met in a public and much frequented place. The one, alighting from his horse, passed to the place where his adversary stood, addressed some contemptuous words to him, and gave him a blow on the shoulder with a riding-whip that he held in his hand. The other furiously ran after him, but before he had gone a dozen paces, fell down dead. There were no external marks of injury, but on dissection, an aneurism, for which he had frequently consulted the physician, was found to have burst. — Chaussier, p. 11.

‡ A remarkable case of this description is stated in a late journal. A respectable individual put an end to his existence by hanging himself. Dr. Wesener was directed by the proper officers to examine the body. The examination of the thorax and abdomen presented nothing beyond what is usually observed in such cases, but, on opening the head, he found the following deviation from nature. About the middle of the sagittal suture, the bones of the cranium were, for the space of a sixpence, as thin as the most delicate lamella of bone, and in this spot were two openings, each about the size of a pin's head, through which two vessels ran, which arose from the superficial veins of the dura mater, and anastamosed with the veins of the scalp. On cutting into the scalp, though with great care, the blood flowed over the galea aponeurotica in such quantities as quite to redden it, and it appeared, on examination, that the emissaria santorini were cut through. It is evident, from this statement, that a blow on the spot in question would probably have caused death, either by direct depression, or by causing internal hæmorrhage.—Quarterly Journal of Foreign Medicine and Surgery, vol. ii. p. 105. From Hufeland's Journal.

Another case, equally striking, is quoted from Frank, of a man wounded with a sabre on the frontal bone, an inch and a half from the sagittal suture, where it is obliterated in the adult. A portion of the external table of the skull was removed, and, after being neglected for some days, the patient applied to Frank. He saw symptoms that induced him to apply the trephine in the neighbourhood of the wound. As soon as he reached the diploe, a torrent of blood issued forth, and the patient died the same day of the hæmorrhage. On dissection, seven vascular communications were found between the dura mater and diploe, through so many foramina in the internal table of the skull in this place. — Notice of Robert on the Influence of Anatomical Varieties on Surgical Operations, in Medico-Chirurgical Review, vol. xiii. p. 299.

of the same part; from having large umbilical vessels; or, finally, from being afflicted with some chronic disease, or suffering under debility. Slight wounds may also be rendered dangerous, and even mortal, from an extreme irritability of the nervous system, from previous habits of drunkenness, or from a scorbutic, cancerous, cachectic, or venereal habit. And above all, is there serious apprehension, when these are inflicted on persons of a hæmorrhagic disposition. Cases of this description are by no means uncommon, and the slightest abrasion in them will often cause alarming discharges.* All the possible circumstances now enumerated should be kept in view, and particularly when wounds have been involuntary, or belong to what is termed in law, manslaughter.

But it may happen that while the patient is suffering under a wound, he is attacked with disease and dies; and the question then arises, whether this fatality is owing to the wound or the disease. In some instances the solution is easy, but in others it is attended with considerable difficulty. Thus, for example, a fever attended with comatose symptoms may supervene on a wound of the head, and pleurisy may follow a wound of the thorax. The probability evidently in such instances is, that the injury has produced the disease; but there is, notwithstanding, sufficient latitude left for doubt, and circumstances may arise which

* Metzger (p. 327) mentions a case of death produced in this way by a scratch of the thumb-nail. Several relatives had previously died in a similar manner.

The following are references to American cases of this description:

New York Medical Repository, vol. vi. p. 1. An account of this hæmorrhagic disposition occurring in several families, by Dr. John C. Otto of Philadelphia. The males alone were subject to it, though females were capable of transmitting it to their male children. These families resided in New Hampshire; and Dr. Otto adds, that Dr. Rush informed him, that he had, during the course of his practice, been twice consulted in similar cases, in the state of Pennsylvania. Another instance had been communicated to Dr. R. by Mr. Boardly, of a family in Maryland, where also the males alone suffered; and additional particulars concerning this are given in Coxe's Medical Museum, vol. i. p. 286.

Coxe's Medical Museum, vol. i. p. 284. Case by Dr. E. H. Smith, in a boy, fatal at four years of age.

New England Journal of Medicine and Surgery, vol. ii. p. 221. Case by Dr. Hay of Reading (Massachusetts). The hæmorrhagic disposition appears to have been in this family for upwards of a hundred years. The males alone were subject to it; but, in some cases, the sons escaped, while the grandsons suffered severely, and some died prematurely.

American Medical Review, vol. i. p. 278. Case by Dr. Gideon Humphrey, of a family in Pennsylvania.

Transactions of the Physico-Medical Society of New York, vol. i. p. 305. Case by Drs. William and Samuel Buel. All the sons of a family were affected; the sons of one daughter, and her male grandchildren, but not the female.

North American Medical and Surgical Journal, vol. vi. p. 37. Case by Dr. Reynell Coates, of a young gentleman in Pennsylvania, of the family mentioned by Dr. Humphrey. Dr. Coates notices several of the American cases in this paper.

Maryland Medical Recorder, vol. ii. p. 263. Case by Dr. Jameson.

Transylvania Journal, vol. iv. p. 518, and vol. v. p. 133. Two cases by Dr. Hughes of Kentucky.

Boston Medical and Surgical Journal, vol. viii. p. 219. By Dr. Woodward of Quincy.

I have also a manuscript case communicated to me by Dr. Curtis, a graduate of the Western Medical College, and which formed the subject of his inaugural dissertation. It occurred in the practice of Dr. Sprague of Otsego county (New York).

will prevent us from assigning the wound as the cause of death. On the other hand, should gangrene, buboes, petechiæ, or the other symptoms of malignant fevers, appear on a wounded person in a hospital, or during the warm season of the year, or during the prevalence of such an epidemic, it would certainly seem that the cause of death is distinct from the danger of the wound. A similar observation will apply when an inflammatory or typhus fever supervenes on slight wounds, and renders them fatal.*

The following instance, in which Zacchias was consulted, will illustrate the difficulty that may occur. During a period when the plague raged at Rome, one Ansovini received, in a quarrel, a wound on the head, which denuded the bone, but left no fracture. He withdrew by the assistance of two friends, one of whom continued to visit him, but died in four days thereafter of the plague. The wound appeared favourable for the first three days, but at the termination of that period a fever came on, accompanied with headach, bilious vomiting, and violent inflammation of the wounded part. On the fourth the wound was gangrenous, and petechiæ and buboes occurred; and on the sixth day death followed. The person who inflicted the wound was arrested by the minister of justice, on the ground that it was the cause of death, or at least it predisposed the individual to the attack of the plague. Zacchias was consulted by the friends of the accused, and he decided

Several sons and a grandson were successively affected with copious hæmorrhages from the slightest injuries. Shortly after birth, in each of them, purple spots appeared on various parts of the body. The discharge in several instances yielded readily to the operation of saline cathartics.

Of recent foreign cases, I have noted the following:—

Medico-Chirurgical Transactions, vol. viii. p. 224. By Mr. Blagden.

Edinburgh Medical and Surgical Journal, vol. xxv. p. 291. By Mr. Davis, surgeon, near Bristol. A family in which none of the males reached manhood—the females escaped.

Ibid. vol. xxv. p. 454 (from Hufeland's Journal). Cases by Dr. Elsaesser, near Stuttgard, and Dr. Krimer, of a similar character.

Ibid. vol. xxvi. p. 33. By Mr. Murray of Alford.

Ibid. vol. xxxii. p. 439 (from Rust's Magazine), by Dr. Steinmetz; the males of three generations.

Ibid. vol. xxxvi. p. 217. By Dr. Riecken, of a family at Birkenfeld, in Oldenburgh.

Lancet, N. S. vol. xiii. p. 132. Cases quoted by Mr. Wardrop.

American Journal of Medical Sciences, vol. iii. p. 196, and vol. v. p. 202 (from a German Journal), by Dr. Schreyer of Vogtsberg. The male children alone affected; and of these, three only out of five. The residue remaining perfectly healthy. North American Medical and Surgical Journal, vol. ix. p. 123, (from the Proceedings of the Medical Society of Copenhagen). A case by Dr. Thal.

Medico-Chirurgical Review, vol. xxv. p. 232.

* Bohn, p. 83. This author divides the symptoms into three classes.

"Alia ex vulnere ipso, ut tali, hanc â parte læsa immediate emergant; alia aliam extra vulnus causam agnoscant: alia indifferenter se habeant, id est, modo â vulnere, modo aliunde eveniant: probe omnes ac singulæ ponderandæ sunt in vulnerato circumstantiæ, et ex harum demum collatione, cujus generis sint illa individui præsentis, prudenter inferendum."

In the Commonwealth *v.* Green (Ashmead's Reports in First Judicial District, Pennsylvania, vol. i. p. 289), the doctrine is distinctly laid down, that when a wound not mortal in itself, from want of proper applications, or neglect, turns into gangrene or fever, and the patient dies, the person inflicting it is to be deemed guilty of murder, if the testimony required in addition shall warrant it.

that the wound had not been the cause of death, because there were no symptoms immediately after its infliction that indicated a mortal injury to the head—that the appearances which supervened were too rapid in their progress to appertain to it, and evidently belonged to the plague; and it was also manifest, he had taken this disease from the friend who visited him. Finally, two diseases were present in the individual, and the ordinary course of one is fatal, while that of the other is to proceed to a favourable termination. It is certainly proper to assign the former as the cause of death.*

In cases brought before courts of justice it is, however, to be recollected, that they are far from being as easy of solution as the one just quoted. They are generally of intemperate persons who have engaged in brawls, receive injuries, and, after an uncertain period, die; and the question arises, whether the habits of drunkenness or the blow has caused the loss of life. As a general rule I would always lean towards the accused, unless the proof of malice is conclusive. The habitual use of spirituous liquors is so apt to produce a diseased state of the system generally, that, with the above exception, we shall best promote the ends of justice by considering the offence as a secondary one.

Discussions on this subject, however, are so frequent, that it can hardly be dismissed with these remarks; and I will, therefore, in addition to what has been said in a previous chapter, detail some cases as illustrative of the testimony and inferences proper on such occasions.

An intemperate individual in Philadelphia died thirty-eight hours after an affray. He walked and spoke after it, and even drank part of a pint of spirits, but was shortly after seized with insensibility, dilated pupils, oppressed breathing, and died without any return of sense. The bone and the brain beneath the injured part were examined and found natural. The mucous membrane of the cardia and the upper part of the stomach was greatly inflamed; the other parts were not diseased. Before the court, Drs. Hartshorne and Klapp gave it as their opinion, that the injury to the head had not been the cause of death; and that there was no appearance of a blow on or near the region of the stomach. The accused was accordingly acquitted.†

Mr. Shaw mentions the following instructive case in his Manual of Anatomy.

An industrious man, returning home from his work, found his house empty of every thing, his bed and the tools of his trade sold for gin by his wife, whom he found in the gin-shop drinking and dancing. He brought her home, and in the passage of his house struck her and ordered her to go up stairs. She refused—he carried her upon his shoulders, and the contention continuing up stairs, he struck her again. There having been no one present, we have only the husband's

* Zacchias' Consilium, No. 74.

† This case is given by Dr. Klapp, in American Medical Recorder, vol. i. p. 156. A similar state of the stomach is found in cases of apoplexy, as shewn by Professor Warren in his dissections. New England Journal, vol. i. p. 34. And it is possible that it may also follow from blows on the head; but, in the present instance, after the dissection, there can be hardly a doubt that it should be ascribed to the first rather than to the last.

account of her death. He said that while sitting on her chair she fell down, upon which he threw her on the bed, conceiving she was in a fit, such as he had seen her in formerly. Some of her neighbours coming in, found her dead.

Sir Charles Bell examined the body, and on the trial, gave the following deposition.

There was nothing remarkable in the abdomen and thorax, further than that the stomach contained a quantity of gin, and that there was a blush of redness on the lower orifice of the stomach and duodenum. On the head, there were several bruises, but the bone was not at all hurt, and no extravasation appeared under it. The vessels of the pia mater were empty of blood, as if from pressure. There was a serous effusion under the arachnoid, and in the cavity of the brain, similar to what has been found in those who die of intoxication. On the surface of the brain there was what appeared to be spots of extravasated blood, but, upon tracing them towards the base, they appeared to be streams of blood which had flowed from a vessel ruptured in the base of the brain, and the base was covered with coagulated blood, in which also all the roots of the nerves were involved. The blood had penetrated into the ventricle, by perforating its floor. And, on removing the brain and tracing the vessels, the anterior artery of the cerebrum, going off from the internal carotid of the left side, was found half torn across, and from this the extravasated blood had come.

Now, this rupture had been the cause of death; and as to the cause of the rupture, "Mr. Bell's opinion coincided with the best authorities in pathology, that there is a state of the vessels, in which an external injury or shock is more apt to produce rupture; and drunkenness may be supposed to be the artificial state of excitement which most resembles this state of the vessels. Being asked whether the blows were the cause of the rupture, he said, he conceived it very likely that a shock would rupture the vessel; and being then asked, whether he conceived that this woman was more likely to have a vessel ruptured, from having been intoxicated? he was of opinion, that intoxication and the struggle were likely to produce such a degree of activity of the circulation in the head, that a less violent blow might produce rupture, than what, in other circumstances, might have proved fatal." The man was acquitted.*

* Manual of Anatomy, vol. i. p. 46. Mr. Shaw adds, that a case similar in many respects occurred some time previous, but the man was condemned upon clear evidence of his intention to commit murder. A parallel case to the one in the text is given in the Medico-Chirurgical Review, vol. iv. p. 969, from a French journal. The drunken quarreller fell dead without a blow, and, on dissection, enormous extravasation was found in the brain. See also Dictionnaire des Sciences Mèdicales, art. *Ivresse.*

It may, however, be urged, that the tendency of the remarks in the text is to exonerate all and every one from the consequences of injuries inflicted on the intemperate. Not so, if these injuries are recent; and, if they cannot be confounded with the effects of natural disease, they are to be estimated like all other wounds. Severe blows, followed rapidly by convulsions, coma, and death, and exhibiting, on dissection, effusion of blood upon the brain, without any other disease of that part, present a very conclusive case of the effects of violence. Such an instance is related by Mr. Watson, in the Edinburgh Medical and Surgical Journal, vol. xxxvii. p. 97.

Again, there are certain diseases which frequently accompany wounds, yet also arise independently, and which may thus cause matter of doubt. Of these, I will only specify erysipelas and tetanus.

"Erysipelas (says Sir Astley Cooper) often succeeds the most trifling injury of the scalp, and, like carbuncle, when it occurs in this situation, generally destroys life. *Whatever renders the body irritable, predisposes to it.* The slightest causes produce it after operations at certain seasons and in particular states of the constitution, for it has often happened, that the stimulating effects of adhesive plaster have produced this disease, and have led to the death of the patient."*

Taking these as undisputed facts, what should be the testimony of the physician in cases where it supervenes on blows or wounds?

In 1823, a prostitute at Edinburgh entered the house of a female brothel-keeper in a state of drunkenness, and, after various irregularities, inflicted on her, with a heavy smoothing-iron, a denuding wound of the scalp, an inch and a half long. The woman was slightly stunned, and the wound bled profusely. Very little evidence was obtained concerning her state for thirty days afterwards, but at that time the wound was an open sore, and she constantly complained of headach. She had not, however, omitted the habit of frequent intoxication, and was at a ball about a fortnight before her death, where she danced and became drunk. Eight weeks after receiving the wound she was attacked with erysipelas of the head and scalp, and died of it in ten days. There was no proof to shew where the erysipelas began, as the practitioner who attended had gone to sea. On dissection, the ordinary appearances produced by that disease were found in the scalp and within the cranium; the wound had passed into the state of a round, indolent ulcer, and a small hole, produced apparently by ulcerative absorption, penetrated the skull opposite the middle of the ulcer in the integuments. The hole was widest at its inner end. The dura mater corresponding with it was not diseased, and no purulent matter was deposited between that membrane and the bone.

On these facts, referring to the irregular habits of the female, the probable neglect of the wound, and, above all, the presence of an epidemic erysipelas at the time in Edinburgh, the medical witnesses declared that the death of the deceased could not, with any certainty, be ascribed to the wound inflicted by the prisoner. The charge of murder was consequently abandoned, and the accused was found guilty of the assault.

It is remarked by the reporter of this case, that an important link of the testimony was lost, in not knowing where the erysipelas commenced. "The diagnosis between idiopathic erysipelas and that symptomatic variety which supervenes upon injuries of the head, is sufficiently simple. The former never begins, so far as we know, on the head, but always on the cheek or tip of the nose; the latter, never but about the bruise, incision, or sore, produced by the injury."†

* Lectures, vol. i. p. 112.

† Trial of Christian Paterson for the murder of Margaret Baird. Edinburgh Medical and Surgical Journal, vol. xxi. p. 488. MS. communication of Dr. Dunlop, containing the medico-legal examination.

Respecting tetanus, there can be comparatively but little diversity of opinion. It is a disease known to follow injuries of every description, and, if it supervenes after such infliction, is, without some manifest and potent reason, to be deemed its consequence. Mal-treatment is more likely to be urged in such cases, and the attending surgeon's skill may thus be questioned.

Not long since, Captain Moir, in England, wounded a man by firing at him with a gun. The ball penetrated the inner side of the right arm, a little below the elbow, and passed out on the outside, a little above the olecranon. A profuse hæmorrhage followed, but soon ceased. No bone was fractured. The surgeon called administered some brandy, as he was faint. In a short time, excitement took place, for which he was bled, but locked jaw followed, and he died on the eighth day. On the trial, Captain Moir was found guilty, and probably with great justice.

It was urged by Dr. Venables, in a communication on this case, that the administration of the brandy was improper, and might have caused the tetanus, equally with or instead of the wound. Such an opinion, however, is hardly tenable.* There was no dissection.†

* London Medical Gazette, vol. vi. pp. 750, 791. Medico-Chirurgical Review, vol. xviii. p. 151. Dr. Venables criticised the treatment in other respects.

† There can be no doubt that diseases of internal organs sometimes succeed injuries of various parts of the body. In illustration, I refer to Mr. Rose's paper *on depositions of pus and lymph, occurring in the lungs and other viscera after injuries*, in Medico-Chirurgical Transactions, vol. xiv. He quotes Morgagni and others; and there is a case by Deveaux, in 1685, noticed by Chaussier, p. 208, where the surgeons directly ascribed an abscess in the liver to a previous blow on the head. Dr. Darwall's remarks subjoined below are well worthy of consideration.

"The circumstance of depositions of pus occurring in the viscera from injuries of distant parts, has lately been attracting considerable attention. It is, however, scarcely alluded to in the text; nor, with a few exceptions, have surgeons usually regarded such depositions as connected with, or induced by, the injury. In the present note, I purpose to shew the various circumstances under which this has happened, but without offering any explanation. The cases have, however, been too uniform to admit of a doubt of the visceral disease being the consequence of the distant injury.

"Morgagni relates some cases in which *the lungs were found in a state of suppuration after injury of the head.*

"A boy, thirteen years of age, was struck on the right temple with a stone. He was carried to a hospital, and went on well till the fourteenth day, when fever ensued. The wound assumed an unhealthy appearance, he became delirious, and died on the twenty-fifth day from receiving the injury.

"On examination, besides the injury of the head, the lungs were very red, and small abscesses filled with pus were observable.—Morgagni Epistol. li. 18.

"A second case is related, in which, after a similar injury, the lungs exhibited many small abscesses, and some tubercles in their progress to suppuration.

"The following case will shew how these cases will bear upon medical jurisprudence. It is taken from the evidence at an inquest which was held at Birmingham last year.

"A father and son were working together at an anvil, when the son, a boy of fourteen years of age, missed his aim in attempting to lay hold of a piece which the father had forged and cut off from an iron rod; while the boy was stooping to pick the piece up, the father knocked him down by a blow on the head with the remaining part of the iron rod. He fell down, and his head bled much; he was, however, able to walk to the hospital, where the wound was dressed, and back again home.

In 1827, a man at Edinburgh robbed another, and in the scuffle that ensued, kicked him several times, cut his nose with a blow, and turned him out of the house. The injured person went home, told his friends that he had been "robbed and murdered," and was confined for several days to his bed. He was not, however, considered in danger. On the third day, he complained of stiffness of the jaws, contraction of the mouth, and great difficulty of swallowing. He went out, however, to work two days after, but in forty-eight hours became so unwell as to return home. He was so ill with the stiffness, that he could hardly swallow a little spoon meat. The disease increased, and he died on the eleventh day after the injury.

This occurred on the 23d of July; on the 10th of August a surgeon visited him for the first time, and found him apparently in the last stage of typhus fever. He died on the 12th.

"On dissection, there was considerable injury about the scalp, and matter had formed under it. There was no fracture, but matter had also formed under the dura mater, and the left hemisphere exhibited appearances of inflammation.

"In the chest 'the lungs were very much condensed, and like liver in consistency: they were inflamed, and there were three or four abscesses of recent formation. The pleura was covered with lymph; the left cavity of the chest contained a quart or more of fluid, and the right nearly as much.'

"The medical witnesses did not decide which was the proximate cause of death, nor whether the state of the lungs had any connexion with the injury of the head, and the verdict was,

"'That the deceased died after a blow from his father; but whether from the effects of the blow or from the disease, there is no evidence.'

"*Injuries of the head also frequently give rise to abscesses in the liver.*

"Bertrandi, in the Mémoires de l'Académie Royale de Chirurgie, relates several instances of this kind, and states, that he had frequently observed suppuration of the liver when it was least expected. In some cases there is evidence of affections of the liver before death, and jaundice occurs, but this is not always observable.

"'A peasant, forty years of age, was admitted into the hospital at Turin for a wound in the head, which penetrated to the dura mater, and remained two months. He left the hospital in June, and returned to his usual agricultural employment. Towards the end of July he was readmitted; his face, neck, and the upper part of the trunk, were enormously emphysematous, his face was marked with erysipelatous patches, his respiration was difficult, and he died in a few hours. There was nothing particular found about the head, but there was an immense abscess pointing on the convex surface of the liver. He was reported to have been jaundiced some days before, and to have alternated between a state of stupor and delirium. He had complained of a feeling of weight in the side, but never of pain.'

"*The liver and lungs frequently suffer from injuries of other parts.*

"An athletic man was admitted into the hospital on the 23d of June, under the care of Mr. Keate, with compound fracture of both bones of the right leg, a little below their centre. He went on well till the 26th, when he became feverish; a distinct rigour appeared on the 30th, and in a few days tenderness in the epigastrium and right hypochondrium occurred. The remedies employed failed to relieve him: he gradually became worse, and died on the 17th of July.

"*Sectio cadaveris.* — There was a little opacity on the tunica arachnoides, with some deposition of lymph. The plexus choroides was converted into a tubercular mass of a gland-like appearance.

"The chest and abdomen presented the principal marks of disease. The pleura on the right side was intensely inflamed, and serum and pus were collected in its cavity. On the left side, the membrane was also inflamed, and serum and lymph, but no pus, were discovered. In the substance of the lungs, more especially the left, were tubercular masses of mixed lymph and pus, numerous and varying in size. In the liver was the same sort of tubercles, exceedingly numerous, and seated for the most part immediately beneath the peritonæum investing the viscus. — Medical Gazette, vol. ii. p. 510.

On dissection, there was found a small lacerated wound upon the nose, at the lower extremity of the suture, which unites the nasal bones. The internal parts were generally natural, except that the posterior part of the fauces was of a dark red colour, from congestion of the vessels of the lining membrane, and a similar appearance was observed in the membrane lining the air-passages.

The medical witnesses (Messrs. Newbigging, Liston, Watson, &c.) gave it as their opinion, that the deceased died of tetanus, occasioned by the wound. On being questioned, whether the going out of the patient might not have been the cause, they replied, that the symptoms on the third day were proof of the disease being already present.

"In another case of simple fracture, which terminated fatally almost a month after the accident, 'innumerable depositions of lymph and pus had been formed in the liver and the lungs.'

"The following case, quoted from the same periodical, exhibits a deposition in the liver and right knee-joint after an operation for urinary fistula. It is extracted from the Ephémérides de Montpelier for March 1828. 'A soldier, aged 22, was affected with yellowness of the skin and with tension of the right hypochondrium, after an operation for urinary fistula, which had given him great pain. The symptoms disappeared when the sound was removed from the bladder, but returned on its being again introduced into the urethra. He was seized with nausea and bilious vomiting, yellowness of the skin, excessive tenderness of the right hypochondriac region, irregular rigours, and violent pain of the right knee. He died. The liver was found studded with purulent deposits, and generally softened; a collection of pus was found in the right knee-joint.—Medical Gazette, vol. ii. p. 668.

"A case of purulent deposition in the lungs after amputation, is given in the same journal. The limb was amputated in consequence of a severe compound fracture. The man was in perfect health at the time of the accident.

"Depositions of pus in the lungs have been found likewise after inflammation of the veins, some cases of which have been lately reported by Mr. Arnott.

"The spleen occasionally suffers in the same manner.

"The following description of the appearances observable in such cases, is given by Mr. Rose, in the fourteenth volume of the Medico-Chirurgical Transactions. The paper in which it is contained deserves a very attentive perusal.

"'The disease consists apparently of depositions in the cellular texture of the affected organs, partly of a white or yellowish coloured lymph, and partly of pus. These depositions vary in size, from beyond the bulk of the largest walnut to something less than a common pea. Where the lymph is most abundant, they may be described as a soft white tubercle, of irregular shape, not contained in a cyst, but imbedded in the cellular substance of the part, and gradually blending with its natural structure. When pressed, some pus exudes from them. Where the pus collects in greater quantity, it is lodged in an irregular cavity, probably in the middle of some of the tubercles, and the walls of the abscess are formed of flakes of lymph. The number of these tubercles and abscesses vary in different instances, there being sometimes only one or two, and sometimes the whole viscera being filled with them. In the lungs they are chiefly formed in the parts adjacent to the pleura pulmonalis; and there is often at the same time an effusion into the cavity of that membrane of of a seropurulent fluid mixed with lymph. In the liver and spleen they are dispersed throughout the substance, sometimes shewing themselves in one or more yellow patches, not elevated, on the convex surface of the great lobe of the former viscus, and at other times lodged in its substance. The parts adjacent to them shew evident marks of increased vascularity.'

"Several other cases have been noticed in Birmingham, within the last few months, of a similar kind. They have chiefly been discovered in the bodies of persons who had been killed, and upon whom inquests were held. In one instance of this kind, where death occurred within forty-eight hours from receiving an injury of the head in fighting, the lungs were gorged with blood, and the pleura exhibited extensive marks of very recent inflammation."—Darwall.

Lock-jaw from cold was very uncommon in Scotland, and he had not left the house until the fifth day.

The charge of murder was abandoned by the public prosecutor, because the injuries received were not of a mortal nature; nor had they been inflicted with a design to commit murder. And the prisoner was found guilty of culpable homicide, and sentenced to fourteen years' transportation.*

2. The passions of the patient and his negligence or delay, or that of his attendants, may render slight wounds dangerous, or dangerous ones mortal. This may happen, 1. By his obstinate refusal to undergo the proper treatment, either from fear or some other cause. 2. From errors in regimen, such as intemperance, from exposure in a very cold or a very warm place, or from giving himself up to the free indulgence of his passions. 3. By disobeying the directions of his physicians, as for example, if a man who has been wounded in the throat, should laugh, talk, or sing. 4. By yielding to anger or fear, so far as to tear off the bandages and dressings of the wound. All these circumstances will aggravate an injury, and render it dangerous or mortal.† There are others which may be deemed accidental causes, such as a want of proper aid, of whatever kind it may be, and from whatever source it may arise. Both of these, of course, increase the guilt of the criminal, if it can be proved that he inflicted the wound with a knowledge of them. To this class, also, belong every obstacle opposed to the surgeon's performance of his duty, and all attempts to disturb the patient, such as the prevention of sleep, and producing agitation of mind.

A curious case occurred at Montpelier in 1833, which I prefer noticing under this head, although it might probably be equally well considered under the former.

On the 12th of May, Charles Crés received a slight blow on the head; he became indisposed on the 14th, and a serious illness finally developed itself, of which he died on the 20th. The physicians in attendance certified that there had been a slight contused wound on the right parietal bone, and they were of opinion that this was the cause of the headach and other severe symptoms that followed. They had no doubt that inflammation of the brain was present, and that this had given rise to the gastro-intestinal inflammation which succeeded it.

On dissection, however, *no mark of disease could be found in the brain—its vessels, or its membranes, or its bony covering.* The contused wound was superficial, not extending even through the integuments. The ventricles contained but a small quantity of serum. The lungs were, however, extensively diseased; crepitus was wanting in several portions, and, on cutting into them, a large quantity of dark blood was discharged. The other parts were generally healthy.

These counter reports were submitted to the Professors at Montpelier, for their opinion. They agreed that death was not attributable

* Edinburgh Medical and Surgical Journal, vol. xxxvii. p. 95. Syme's Justiciary Reports, p. 158.

† Mahon, vol. ii. p. 28.

either to concussion or compression of the brain, nor to inflammation of its substance or envelopes. None of the symptoms of the first two was at any time present. Indeed Crés, immediately after receiving the blow, was so little affected, as in his rage, to collect stones for the purpose of hurling them at his antagonists. No indication of compression could be shewn, nor was a single mark of inflammation present. But could not this last have disappeared after death? They answer, no: death does not dissipate the marks of recent inflammations.

What, then, was the cause of death? Undoubtedly an inflammation of the lungs. He had been subject to this previously, and it is probable that *anger, fatigue, and, probably, intemperance*, all united in predisposing to the attack.

The professors, therefore, decided that the injury could not be deemed the *direct* cause of death—although they conceded that, under the circumstances, it might be deemed what physicians call an *occasional* one—resembling in this the fatality that sometimes follows from slight or minute injuries. It is almost needless to add, that the charge of murder was abandoned.*

3. Insalubrity of the atmosphere, whether it be of a local nature, or the general constitution, may render slight wounds dangerous, and dangerous ones mortal. This circumstance has been noticed some centuries since, and the experience of every military campaign confirms its correctness. Thus, according to Bohn, Sebezius states, that wounds of the head were more readily cured in Italy and Spain than in Germany; and Foderé mentions his having observed the same on the coast of the Mediterranean, when compared with Paris. Ambrose Paré, a great name in surgery, observes, that at the siege of Rouen, many of the besiegers died of small and simple wounds, in consequence of the unhealthy atmosphere, but which was attributed by the army to poisoned weapons—an idea, which similar effects induced the inhabitants of that city also to harbour.†

Severe cold, excessive heat, storms of rain, snow, or hail, have all been observed to increase the danger of wounds, and for proofs of this, I need only to refer to works on military surgery.

The air of large hospitals has also been found injurious, and it is constantly observed, that a larger proportion die of wounds in the Hotel Dieu at Paris, than in the Hospital de la Charité.‡ The very name of hospital gangrene is sufficient to apprise us of the extent of the fatality that is sometimes experienced. In such cases, it is the duty of the medical examiner to apply the maxim of Hippocrates, that every thing which happens to the injured person, contrary to correct probability, does not belong to the essence of the disease. Thus, if there is a general or local morbid state of the air, and the most cautious examination proves that the wound had not affected any

* Annales D'Hygiène, vol. xi. p. 474.

† Bohn, p. 78. Foderé, vol. iii. p. 276.

‡ Mahon, vol. ii. p. 25. "Dans certains hospitaux, et notamment à l'Hotel Dieu de Paris, le trepan est presque toujours mortel."—Metzger, p. 376.

essential organ, it is his duty to state these facts, and to mention that death has originated from several causes, of which the wound is the slightest, although it may have excited the developement of the others.

4. The ignorance or negligence of the surgeon may aggravate or endanger the condition of a wounded patient.* This happens when futile or injurious medicines or applications have been used—when the instruments employed are in bad order—when the surgeon is either ignorant or rash—or when, seeing the danger, he does not obtain the aid of skilful persons. In general, when a dissection proves that no wound mortal in its nature has been received, and when none of the circumstances already enumerated can be urged as causing its fatality, the death of the patient should be attributed to the surgical attendant, rather than to the author of the wound, provided it be proved that he neglected the sick person, or maltreated him, by leaving foreign bodies in the wound, which might have been taken away; by not suppressing hæmorrhage; by not evacuating collections of pus when necessary; by employing tents improperly; by neglecting or hurrying operations; or by not causing the proper regimen to be observed.†

Notwithstanding the distinctions that have now been made, there are some doubtful and complicated cases, concerning which great difference of opinion may arise, and the skill of the surgeon often forms the disputed point. To this class most commonly belong wounds of the head, such as those, for example, in which there are no symptoms indicating the necessity of trepanning, and yet extravasation is found after death. The diversity of advice given by eminent surgeons on this point, during the last twenty or thirty years, may also lead to unpleasant discussions. But it is the duty of the surgeon to acquaint himself with the most approved modes of modern practice—to apply them to the symptoms presented to his view, and then, if, on examination, the injury is found to be such that no efforts of art could have prevented its fatality, the death of the patient is to be attributed to the nature of his wound.‡

2. *Of the nature and prognostics of wounds of particular parts.*

I shall endeavour to make this section as concise as possible, as it is only intended to be a general guide to the medical examiner. The opinions deducible from it are subject to many qualifications, which the peculiarities of every case alone indicate, and they are evidently not to be quoted as universally applicable.

We shall notice *wounds of the head* in the first place; and here a

* Bohn, pp. 93, 96.

† The laws at a very early period attended to this circumstance. In the Roman code the *Lex Aquilia* declared, "Si verberatus fuerit servus, non mortifere, negligentiâ autem perierit de vulnerato actio erit, non de occiso." So, also, in the ancient French jurisprudence. If negligence or bad treatment was proved, it freed the individual, unless premeditated design was established.—Foderé, vol. iii. pp. 290, 291. The same principle practically exists in our own judicial determinations.

‡ The principal authority used in this section, is Bohn—*De Renunc. Vulner. in genere.* Foderé (vol. ii. pp. 351–394) and Mahon's (vol. ii. pp. 1–62) observations are generally derived from this source.

preliminary remark cannot too soon be made, or enforced, viz. that in no other part is the prognostic more uncertain, nor is there one in which the physician has more occasion for suspending his judgment. The general prognostic of wounds of the head depends on the nature of the injured parts; the age and condition of the patient; the nature of the instrument with which the wound has been inflicted; the force or violence used; the manner in which it was applied; and the effects that followed.

A wound of the integuments of the cranium, if inflicted with a cutting instrument, such as a knife or razor, may be deemed a simple wound, which will heal within the space of a few days.* But if the instrument, although a cutting one, is of great weight, and has been projected by a strong arm, we should reserve our prognostic, on account of the subsequent affection of the brain, which may justly be dreaded. If a sharp-pointed instrument has been used, and it has penetrated as far as the bone, the inflammation and pain that follow are more severe than from incised wounds. When a contused wound has been inflicted, as by a stick or stone, the prognostic will depend much on the immediate symptoms, and it will be dangerous in proportion to the dizziness, nausea, insensibility, &c. that are experienced for a short time thereafter.† A superficial contusion, accompanied with laceration and none of the above symptoms, may generally be deemed a slight wound. But a contusion, however slight, on the region of the temporal muscles is scarcely ever exempt from danger, on account of

* Wounds of the integuments of the skull are extremely capricious in their results; the slightest, especially punctured wounds, often communicating inflammation to the bone and membranes of the brain, while wounds much more extensive heal readily. Of the latter, a striking example came under my own immediate observation. A soldier got drunk on the line of march, and was put into a baggage-wagon, out of which he fell, his head coming right in the track of the wheel, which passed obliquely over it, stripping the whole of the integuments off one side of it, and leaving the bone completely bare. The integuments were replaced and secured by stitches, and the whole kept *in situ* by means of bandages. He travelled for four days on the wagon, when he was put into the hospital, and in less than a fortnight was enabled to resume his duty.—Dunlop.

† I have found in the collection of pamphlets made by the late Sir James Mackintosh, and which (amounting to upwards of one hundred volumes) is now in the possession of my friend M. H. Webster, Esq. of this city, one with the following title: "An appeal to the public, touching the death of Mr. George Clarke, who received a blow at Brentford, on the 8th of December, of which he languished and died on the 14th. By John Foot, Surgeon. London, 1769."

Mr. Clarke received a blow on the head with a bludgeon, during the election riots, from Edward M'Quirk. The wound bled profusely. On his way home, he felt faint, and took some brandy. He went to bed, and his symptoms gradually became aggravated. He was bled on the 10th, but without any improvement. On the 12th, an apothecary was called in, who found him in a violent fever, with delirium. He applied remedies, and on the next day Mr. Bromfield, the surgeon, was sent for, but does not appear to have prescribed. He died in the night.

Mr. Foot was called on to examine the body before the coroner's jury. He desired the aid of Mr. Bromfield, who refused to come, "because he apprehended it might be an Old Bailey business." There was a contused wound on the head, by the side of the sagittal suture, upon the right parietal bone; the scalp was elevated for a considerable space round the wound, and the pericranium was much inflamed and separated from the skull. On removing the upper part of the skull, the dura mater directly under the part where the injury was inflicted, was found greatly

the intimate connexion of this part with the brain, by means of its nerves, blood-vessels, and membranes.

Wounds of the pericranium in good constitutions, and well treated, are not dangerous; but in bad ones, they are often serious, and are succeeded by an erysipelatous inflammation, which is readily extended to the brain. A complete division of the pericranium is much less to be dreaded, than a wound from a sharp-pointed instrument. In venereal patients, caries of the bone is a frequent consequence of such injuries.*

Fracture of the bones of the cranium may take place without any correspondent injury of the integuments, and the symptoms in such cases are extremely equivocal and deceitful. As the form of the head is an arch, we should recollect that a blow does not necessarily fracture the part on which it falls, but often extends to other parts.† Our deductions must, however, be drawn from the circumstances that immediately followed the infliction of the wound; from those that afterwards supervene, and from a consideration of the causes producing them. Among the first are vertigo, loss of sense and motion, vomiting, and bleeding from the nose and ears. Among the latter, may be coma, convulsions, and paralysis. Fracture may, however, occur without any of these being present; and, again, they may all be present, without any fracture, and result from concussion of the brain.‡ It should be remembered, that fracture, accompanied with depression of the bone, is usually more dangerous than when none is present.

inflamed and detached from the bone. Between it and the pia mater was a quantity of coagulated blood. The pia mater was inflamed, and some of its vessels ruptured. There was no fracture.

From these appearances, and the history of the case, Mr. Foot gave it as his opinion, that the blow had been the cause of death, and he repeated this on the trial, where it also appeared that Clarke was a healthy young man, and of temperate habits. M'Quirk was found guilty.

Shortly after his conviction, the above testimony was referred to the Court of Examiners of the Surgeons' Company, on the ground that neither Mr. Bromfield nor the apothecary had been examined on the trial, and that Mr. Foot had never seen the deceased until after his death. The court gave it as their opinion, but without assigning reasons, that Clarke *did not die* in consequence of the blow; and M'Quirk received a full pardon.

Of the Court of Examiners above mentioned, Percival Pott was a member; and Mr. Foot, with perfect fairness, points out his inconsistency, by referring to his *Memoir on the nature and consequences of those injuries to which the head is liable from external violence.* The only possible ground for the opinion of the Court of Surgeons was, that the injury had been neglected. It is evidently a case greatly influenced by strong party considerations.

* Was there ever a case known in which the bones of a venereal patient run into caries, where no mercury had been exhibited? [Dunlop.] Probably not; but my object was to indicate the increased irritability, and consequent danger, in persons so situated being wounded. Sir A. Cooper states fatal results from operations on persons who had just gone through a mercurial course.—Lectures, vol. i. p. 30.

† On a trial before the Court of Justiciary, in Scotland, in 1812, it was proved that the murder was committed by repeated blows on the top of the head, yet on dissection, it appeared that death followed from extravasation of blood from four fractures, all of which were at the base of the skull.—Dunlop's MS. Lectures.

‡ In the London Medical Repository, vol. xxiii. p. 346, is a case of a man wounded with a pickaxe in the left hemisphere of the brain, with laceration of the left ventricle, who walked a mile and a half to the hospital. He died, however, in two days.

Concussion of the brain is always dangerous, as are, also, all wounds of the brain and its membranes.* On these it is not necessary to enlarge at this time. It is, however, proper to remark, that the prognostic of wounds of the head is, for the most part, that they are dangerous, and require the strictest attention. And this is rendered more necessary, since it has often happened that injurious and even fatal consequences have been produced long after the infliction of the injury, and that, too, where the immediate symptoms have given little or no reason for such a termination.†

The opinion of the medical examiner must, therefore, be founded, not only on general principles, but on the symptoms that are present: and, when called into a court of justice, he should explain how uncertain the recovery from such injuries always is; and, on the other hand, that persons have survived the most terrible accidents. The presence or absence of fever, or delirium, or coma, and the healthy or livid appearance of the wound, all aid in determining on the danger. The following aphorisms of the illustrious Vicq d'Azyr, are quoted by French surgeons as comprising the experience of the art on these points, and they are evidently deserving of remembrance. 1. That the largest wounds of the head are not always the most dangerous. 2. That it is possible to lose a considerable quantity of the brain, without death ensuing. 3. That the slightest injuries are often succeeded by fatal consequences, and that hence they should in no case be neglected.

* "It seldom happens that concussion destroys, but when it does, nothing is found upon the examination which will account for the symptoms. It is, therefore, an alteration of function, but not a disorganisation. But where the concussion is very violent, it is attended with lesion of the brain."—Sir A. Cooper's Lectures, vol. i. p. 119.

† The succeeding case will illustrate the difficulties that sometimes envelope the cause of death. "A woman received a blow on the head from a laundress's iron, but no fracture or injury of the cranium was discoverable, though it was thereby laid bare. She was (by the advice of the celebrated Cheselden) trepanned, and still no mark of injury about the cranium was discovered. She went abroad, and followed her ordinary business for a fortnight afterwards; but at the end of twenty days from receiving the injury, died. On opening the head, they found a very large imposthume in the middle of the brain. This occasioned some perplexity about the real cause of death. The surgeon who had managed the case was rather inclined to attribute the death to the blow, but would by no means deny that it might have proceeded from some inward cause. The deceased had been subject to frequent and severe headachs before the accident occurred. Mr. Cheselden, being examined on the trial, declared that he could not conceive how a blow should be the cause of death, where there was no extravasation, and the person could go about for a fortnight afterwards. His allowing, however, that *similar appearances were sometimes found in the brain of persons subject to headachs*, was of more importance to the prisoner."—Smith, p. 246. The following is one among a thousand instances where death has been induced at *distant periods* from the infliction of violence on the head. The patient died several weeks after receiving the injury, and on dissection, Mr. Charles Bell discovered a fracture at the base of the skull; and the foramen magnum having been thereby roughened, a sudden turn of the head had forced a spiculum of bone into the spinal marrow.—Smith, p. 252. The principal and important inference to be drawn from such cases is, "the *impropriety* of maintaining the general proposition, that the death of persons recovering from the *immediate* symptoms of violence, should never be ascribed to that violence." Mr. Howship relates a case, where a slight blow on the head, at the age of fifteen, produced death *forty years* afterwards. Pain was frequently present during life, and latterly

4. That a contusion of the bone alone may gradually extend itself, so as to affect the brain.*

"Wounds of the dura mater alone are more injurious than when both dura and pia mater are wounded. In this last, the brain immediately projects and fills up the wound. Inflammation of the dura mater spreads over the cavity down the spine (by continuity of surface). I have seen many instances of recovery when both were wounded; few, where the dura mater alone has been wounded."†

Mr. Brodie, in his remarks on injuries of the brain, observes, that he has never been able to discover an instance of recovery from a wound of the posterior lobe of the cerebrum, the cerebellum, or medulla oblongata.‡

Wounds of the face are more or less dangerous, according to the part injured, but, in considering these, it is also necessary to take into account the deformity and irregular cicatrices that follow them. The latter circumstances have been noticed in the jurisprudence of England and our own country, as we shall state in the succeeding section.

Superficial wounds of the face are easily healed, but when deep, and attended with much loss of substance or denuding of the bones, they are tedious, and leave considerable deformity. Wounds of the forehead, in which the frontal muscles are divided transversely, or of the eyebrows, cause the upper eyelid to fall down, and may produce a lasting debility of the parts. Wounds of the eyes, when of considerable extent, must always be deemed dangerous, from the nature of that organ, and from the intimate connexion between it and the brain. A

somnolency and impaired vision. On dissection, the bone at the place injured was seen transparent, and almost wholly absorbed, and the portion of brain under it was indurated and schirrous. — New England Journal, vol. ix. p. 403. Again, in the Medico-Chirurgical Review, vol. v. p. 273, a case is quoted from Lallemand on the Brain, of a boy, who had received blows on the head: symptoms of a low fever followed, and he died on the twentieth day. On dissection, purulent effusion was found, and marks of inflammation and adhesion in the arachnoid opposite the right petrous portion of the temporal bone. The parents, on being questioned, confessed that he had long complained of pain in the head and the right ear. The mastoid bone was now examined, and its cells found full of pus. The physicians consequently testified, that disease had existed anterior, and that the blows could only have accelerated the fatal termination.

* Foderé, vol. iii. p. 312. I must be permitted in this place, to caution the young surgeon not to use the trepan, without a due regard to the rules laid down in surgical works. He may otherwise be injured in his reputation before a court of justice, and his practice may be condemned by those who are better informed. "There can be only one genuine reason for trepanning, viz. to remove such pressure from the surface of the brain as gives rise to *existing* bad symptoms." — Samuel Cooper.

† Sir A. Cooper's Lectures, vol. i. p. 155. "If effusion of blood be found between the dura mater and the skull, and if a bruise on the scalp correspond to the part, we may conclude that it has been caused by the blow; but if blood is found between the dura mater and the brain, though we should discover the marks of blows, or even fracture of the skull, still the question may be,—might not the patient have been attacked with apoplexy during the struggle?" — Shaw's Manual of Anatomy.

‡ Medico-Chirurgical Review, vol. xiii. p. 430, from Medico-Chirurgical Transactions, vol. xiv.

wound with a sharp-pointed instrument, has been known to pass through the orbit, and prove fatal.* Wounds of the transparent cornea always

* "A man has been working in a hay-field, he has slipped and fallen, the prong of a fork has entered his eye, he has got up, drawn it out, thrown it from him, and instantly fallen dead, apparently without any cause. A speck of blood has been observed on the eye, it has been wiped away, an aperture has been observed, and, upon examining the part, the fork has been found to have penetrated into the brain." —Abernethy's Lectures, Lancet, vol. xii. p. 3.

Macklin, the comedian, was tried for murdering another actor, by plunging at his eye with a piece of pine stick, which entered the brain through the orbit; he was acquitted, as no *malus animus* could be proved.

In the Edinburgh Observer of the 27th of January, 1833, I find the following paragraph. "Ten days ago, James Bradshaw, hatter in Greenock, having been engaged in a scuffle, received a wound in the head. He remained, slightly complaining, until the 21st. On dissection, he was found to have been killed by an injury on the eye, which had forced in the bone immediatly behind the eye (the superior orbital plate, I presume) on the brain."

Baron Hume, in his work on Criminal Law, p. 256, mentions the case of a man of the name of Richard Carse, who was tried for murder, which he perpetrated by beating another man about the head with a *quaigh* or wooden dish, a splinter of which detached itself and entered the brain through the eye, when it snapped off short, and caused his death in a few days; the splinter was taken out of the eye after death.

These are cases where injury of the eye has caused death; in opposition to them, I shall relate some where the eye has received injuries as severe as those, to all external appearance, but which the patient has survived.

A case is related by Gooch, where a man had his eye blown out by the bursting of a gun. The surgeon dressed it, but on the second dressing, he perceived something hard among the injured substance of the eye; on examining it, he found it was metallic, and, getting hold of it with his forceps, he pulled it out, when, to his surprise, he found that it was the breech of the gun, which had been forced backwards by the recoil, and been jammed into the orbit. Notwithstanding this extensive injury, which totally annihilated the eye, the man made a perfect recovery.

Mr. Liston of Edinburgh related to me the case of a man, who, while blasting the roots of trees, had a splinter driven into the eye, which, from its length must have passed through the foramen opticum and penetrated into the brain. Mr. L. removed it long after, and the man recovered.

Another more extraordinary case, which also involves, not only injury of the eye, but of the brain, was related to me by a gentleman who attended the patient. In a duel in the West Indies, one gentleman hit another in the eye, the ball of which was completely obliterated, and the leaden bullet, passing in through the orbit, came out in front of the external ear. Notwithstanding which, the officer recovered with the same facility as if he had only undergone the infliction of a flesh wound.

Sometimes balls find their way into the lower part of the orbit, or somewhere behind the ball of the eye, and deprive it of sight altogether. I saw an instance of this in Canada. Lieut. Gray, my brother officer, received a shot in the left cheek; the ball lodged behind the right eye, and totally deprived him of the use of it. What renders this case the more extraordinary is, that though the shot, which was a small one of that kind known by the name of "buck shot," and which the Americans introduced in warfare, must have either penetrated through the nose, or through the brain, no bleeding at the nose followed the wound, and the only appearance by which it could externally be known that the ball had injured the eye, was, that it was very much inflamed and blood-shot for some days. When these appearances went off, he was completely deprived of sight in the right eye, and something like a squint, or at least a want of power, in moving that eye in concert with the other, remained ever after.—Dunlop.

The reader will derive much useful information on this point, by consulting "Cases and observations illustrative of the fatal effects of punctured wounds and injuries of the orbit," by Dr. John Scott, in Edinburgh Medical and Surgical Journal, vol. xlii. p. 359.

leave a scar, and intercept vision.* Wounds of the iris cause a loss of sight, and if the instrument penetrates to the vitreous humour, the eye is left empty, thus combining blindness with deformity. Wounds of the nose from a cutting instrument leave great deformity, and particularly if the cartilaginous part be injured — if inflicted with a round instrument, or by a blow, it may not only be crushed, but the sense of smell may be destroyed. The ethmoid bone has been driven in this way upon the brain.† Lastly, a sharp-pointed instrument has sometimes penetrated the nose, touched the brain, and hence proved fatal.‡ Wounds of the external ear are unaccompanied with danger, but the deformity is a serious one. Wounds of the internal ear may either destroy hearing, or, from their vicinity to the brain, prove in themselves dangerous. Wounds of the lips, if there be great loss of substance, not only deform, but are injurious to the speech, and are sometimes accompanied with a constant flow of saliva, particularly when any of the glands have been opened. Wounds of the ranular artery sometimes occur in children, from dividing the frœnum, and where the hæmorrhage cannot be suppressed, they have been known to prove fatal.§ Wounds of the parotid gland are always tedious in curing, and they sometimes become fistulous.

In all cases of wounds of the face, the physician should state, in his report, the degree of deformity that has been produced.

Wounds of the neck also vary greatly as to their danger. Wounds of the integuments and muscles of the neck may be considered simple wounds, but it must be added, that they generally heal with difficulty, in consequence of the mobility and looseness of the parts.‖ Transverse

* Dr. Monteath mentions a case of a person attempting to separate two persons, who were fighting, and who received a blow on one of his eyes. The eye-ball was burst and vision entirely destroyed.—Medico-Chirurgical Review, vol. ii. p. 640.

† "A man was killed by a blow on the nose—the consequence of which, in the interim, was, that the lower jaw could not be opened, and, in the opinion of the surgeon, he died from inanition, sixteen days after the accident. He was, also, unable to perform the usual natural evacuations. There was no fracture about the head, and the external wound had nearly healed up."—Smith, p. 254.

‡ Blows on the nose, which have the effect of fracturing the bone, produce frequently, not only personal deformity, but, ultimately, loss of the power of smelling, and sometimes an insufferable stench, proceeding from the diseased state of the bone inside of the nose, called by the French surgeons, *punais*, which has the effect of rendering its unfortunate victim quite unbearable in society. I had a case of this kind under my charge, while in the army. The patient was a lad of the name of Tobin, who, though I tried every mode of recovering him, was ultimately obliged to be discharged from the regiment, because the stench he created was so intolerable, that it was found impossible for any one to sleep in the same barrack-room with him. He had received an injury which had beat in the bones of his nose, previous to entering the regiment, but, so far as I am aware, the disease broke out afterwards. —Dunlop.

§ Wounds of the arteries of the cheek internally sometimes prove dangerous, from the bystanders not having skill or presence of mind enough to stop the bleeding by the very simple means of placing the finger inside of the mouth, and compressing the artery against the thumb externally. And, instead of this, they generally resort to the application of styptics and charpie. A young lady in the west of Scotland nearly lost her life from this mode of treatment. Wounds of the artery sometimes cut in dividing the frœnum of the tongue, are easily commanded by squeezing the divided end in a cleft twig covered with lint.—Dunlop.

‖ There is a remarkable case of sudden death from the division of the external

cuts may, indeed, prove dangerous, and affect the motions of the head, or of the pharynx or larynx, and thus prove an impediment to the due exercise either of speech or deglutition. Wounds of the carotids and internal jugulars are generally fatal,* since it is often impossible to procure the necessary assistance in time to check the mortal hæmorrhage, and, for this reason, lacerated wounds of these parts are not so soon fatal as clean cuts.† Wounds of the pharynx and œsophagus are peculiarly dangerous, as other important parts are generally divided along with them; but even if injured alone, as from stabs or gun-shot wounds, they are much to be dreaded, since the nourishment of the system must be carried on through them, and the action of deglutition is directly opposed to a speedy adhesion of parts.‡

jugular vein alone, related in the Boston Medical Magazine, vol. iii. p. 117. The individual was in prison waiting his trial for piracy. He awoke in a state of delirium, attempted to strangle himself, but, failing in this, went to the window and broke out a piece of glass, and wounded himself with it, just under the angle of the lower jaw. Then, by a rapid succession of cuts, he extended it from side to side, but fell immediately into the arms of his companion, and, after gasping two or three times, was dead. He had not lost more than a pint of blood.

On dissection, neither the trachea nor any of the arteries or nerves was found injured. And nothing but a divided vein was seen, and which was probably the principal external jugular. The reporter (Dr. Flint, I presume,) suggests, whether this sudden death may not have arisen from the admission of air into the vein.

* There is one instance, and only one, of a divided carotid not proving fatal. In this instance, Mr. Carpue of London, being called at the moment, secured the vessel. —Dunlop. The case of General Arrighi (Duke of Padua) may be added. He was wounded by a musket-ball, at the siege of Acre, by which the external carotid was cut across, near the place where it is given off by the internal, and as it enters the parotid. The gush of blood from both apertures attracted the attention of the artillerymen, and one of them instantly pushed a finger into each opening and thus arrested the flow of blood. Baron Larrey was immediately called, and, by maintaining pressure, saved the life of the patient.—Larrey's Memoirs, vol. i. p. 176. Some other cases are given by him in his later editions. There is also an instance of recovery, probably from a wounded carotid, given by Delpech.—Medico-Chirurgical Review, vol. vii. p. 244. Another by Mr. Garret, in the Midland Medical and Surgical Reporter, vol. ii. p. 235.

† But even the latter may be compatible with a very short continuance of life, and even some powers of locomotion. At least, this would seem probable, from the following case, mentioned by Professor Amos in his Lectures on Medical Jurisprudence at the London University.

At the Warwick assizes (1832), John Danks was tried for the murder of Mary Green. After conviction, he confessed that he had cut her throat with a knife in a hovel, and the surgeon found a wound seven inches long and three in depth, dividing the trunk of the carotid, and all the principal branches of the external carotid and jugulars; yet, in this state it would appear that she ran twenty-three yards, besides crossing a bar gate, three feet ten inches high. At this distance, at least, the body was found, and the criminal persisted to the last in denying that he had touched her except in the hovel, where he left her for dead. A gentleman went over the ground after the trial and it took him about thirty seconds. Scarcely any blood was observed in the intermediate space, and this is explained by supposing that she closed the wound with her cap, and also by holding down her head. Much blood had, however, flowed down her breasts and lodged about the pubes. In the hovel, also, a large quantity was observed.—London Medical Gazette, vol. x. p. 183.

‡ Larrey relates of a grenadier, wounded in Egypt by a bayonet, the broken point of which remained for six weeks deep in the left side of the pharynx, behind the arch of the palate. On its extraction, which was effected with great difficulty, the voice, which had been entirely lost, was instantly restored.—Medico-Chirurgical Review, vol. xviii. p. 474.

Even wounds of a portion of the fibres surrounding the œsophagus, are dangerous, inasmuch as they produce a weakness of the action of deglutition, and also, by the inflammation that sometimes supervenes, tend to induce compression on the trachea. Wounds of the larynx are serious injuries, as they derange or weaken the voice.* A wound of the recurrent nerve alone, on one side, seriously affects this organ, but if both be divided, a complete muteness will follow. Injuries of this description, however, if not of a complicated nature, cannot be considered mortal. Penetrating wounds of the trachea are always dangerous, since from its never being in a perfectly quiet state, it is difficult to produce a speedy reunion.† Numerous cases, however, prove that a partial transverse division is not mortal, but it is allowed that a complete division is generally so;‡ more, however, from the vessels that must be divided to accomplish this, than from the injury itself.§ Wounds of the par vagum, either on one or both sides, are absolutely fatal. Fractures of the cervical vertebræ are highly dangerous, and if

* A Prussian major was wounded in the larynx by a musket-ball. The wound healed, but the voice was lost. He recovered it, however, gradually, in the course of a year. Case by Dr. Francke.—Quart. Jour. of For. Med. and Surg. vol. i. p. 338.

† A fatal case of rupture of the trachea by a kick, is mentioned in the Edinburgh Medical and Surgical Journal, vol. xviii. p. 412.

‡ A case occurred in the neighbourhood of Glasgow, where the trachea was totally divided by violence. A boy driving the gin of a coal-pit, placed himself on the end of the lever. On stretching out his head to look at something, his throat came in contact with a post; such was the force with which he was going round, that the trachea was ruptured across. He survived for several days, but in great agony.—Dunlop.

§ There are, however, cases mentioned by surgical writers, in which the trachea was completely cut asunder, and even the œsophagus opened, without any wound of the carotid artery. — Dorsey's Surgery, vol. i. p. 69. The following are references to cases in which both the trachea and œsophagus were divided.

Edinburgh Medical and Surgical Journal, vol. xvi. p. 353. The case did not terminate fatally, although the parts did not unite.

Coxe's Medical Museum, vol. iv. p. 24. By Dr. Van Cleve of Princeton. A blacksmith thrust his red-hot nail-rod at a man, and perforated both the trachea and œsophagus. Died in a few hours, in attempting to swallow.

Lancet, N.S. vol. v. p. 309, and Maryland Medical Recorder, vol ii. p. 241. Case by Professor Luders of Kiel; attempt to commit suicide with a curved knife: no large blood-vessels or nerves wounded; the parts gradually united.

Hennen's Military Surgery, p. 291. Case by Dr. James Johnson, seen at Prince of Wales' Island in the East Indies. A Malay cut his comrade's throat while asleep; the larynx divided, and also half of the œsophagus; supported by enemas, and gradually recovered.

Case of wounded trachea and œsophagus, with a razor, by Dr. Neumann, where the patient survived fourteen days.—London Medical Quarterly Review, vol. iii. p. 209, from Graefe and Walther's Journal.

"The following case was communicated to me by my friend, Mr. Marshall, author of a work on the Medical Topography of Ceylon, under whose charge the patient was. When the Indian army was sent to Ceylon, during the mutiny in that country in 1818 and 1819, a native cooly or labourer, who followed the camp, was shot through the throat, the ball dividing the windpipe and œsophagus both together. He lived for some days after in a state of the most dreadful and excruciating suffering; the contents of the stomach, or the food he attempted to swallow, choking up the windpipe, and producing violent fits of coughing, which threatened him with instant death from suffocation. His breathing was so loud that it could be heard outside of the tent where he lay."—Dunlop.

the spinal marrow be injured, they are fatal.* Luxation of the neck is generally fatal, from pressure on the same part.† Wounds piercing the vertebræ, or passing between them, are suddenly mortal. Injuries of the neck from contusion are always dangerous, and, should they end in death, must be judged of by the appearances that are found on dissection, as extravasated blood, laceration, &c.‡

Wounds of the thorax are divided into external wounds; into penetrating wounds, unaccompanied with injury to any of the organs in that cavity; and into penetrating wounds, with lesions of those organs.

External wounds from a cutting instrument belong to the class of simple wounds, but, from contusions or falls, may become dangerous, either through the extension of inflammation to the internal parts, or from the rupture of some blood-vessels. Fracture of the ribs, if not complicated with their sharp points pricking inwardly, is not absolutely dangerous, although there is even then some impediment to respiration, and some apprehension of inflammation. But should the rib be much splintered, and the points not be reducible, it may end fatally. Penetrating wounds are not in general dangerous, unless combined with fracture of the ribs, or the rupture of some blood-vessels. Internal hæmorrhage, or emphysema, is often a dangerous and even fatal symptom. Wounds of the lungs are dangerous, and the prognostic is always doubtful when the injury has been inflicted at the upper part of the thorax, or at the posterior side near the junction of the ribs with the vertebræ. The symptoms here require the strictest attention, as no case should be despaired of.§ These organs are also subject to concussion, which is termed *wind concussion*, and is usually fatal. Fractures, luxations, and contusions of the vertebral column, are all highly dangerous, and may sooner or later prove fatal.

* A remarkable case was stated by Soemmering, in 1793, of a patient in whom there was a fracture and luxation of the vertebral column. He suffered extreme pain, and his extremities gradually became gangrenous—*but he survived five months.* Metzger, p. 320. See an analysis of Caspar on Wounds of the Spinal Marrow, by Dr. Geddings, in American Journal of Medical Sciences, vol. vi. p. 192.

† Dr. Spencer of Ticonderoga relates a case of this kind in a man who fell backwards in attempting to scale a fence. The dentatus was luxated anteriorly on the third cervical vertebra. He lost all sensation below the head, but preserved his speech and mind to the last. He died in forty-eight hours.—Boston Medical and Surgical Journal, vol. x. p. 173.

‡ An instance of a very severe wound of the neck, occurred in the case of General Ripley, wounded in the sortie from Lake Erie in 1814. An account of it, with the narrative of his recovery, by Dr. E. L. Allen, will be found in the Transactions of the Physico-Medical Society of New York, vol. i. p. 85.

§ A very extraordinary case of this kind came under my care some years ago. Sergeant Verney of the 89th regiment, at the battle of the Falls of Niagara, received a shot on the breast, about an inch and a half on the right side of the sternum, which came out behind about the same distance from the spine; the lungs were completely penetrated, and the air passed through both apertures. On his being brought to me, I thought the wound must necessarily prove mortal, and having a great many wounded to attend to, I merely dressed it with lint, but secured by straps: next day, instead of finding him dead, as I expected, I found that he was easier, and that fever had commenced. I bled him freely, and paid particular attention to him; and, in the course of a fortnight, he was so well as to be fit to be removed to the general hospital at York. He afterwards recovered completely.

Mr. Maiden's case, of the man who was transfixed through the thorax by a gig-shaft, must be fresh in the memory of every medical man.—Dunlop.

It is difficult to conceive of the pericardium being wounded without a correspondent injury of the heart. But, if separate, it is to be deemed a highly dangerous wound.* Wounds of the heart, of its ventricles and auricles, are mortal; but it is remarkable that numerous cases are on record, where life has been prolonged for a considerable time after the infliction of the injury. Bohn quotes several cases of the kind;† and an instance occurred in the British army in Spain some years since, where a soldier survived for thirteen days with a musket-ball in his heart.‡ The reason in some of these cases is, that the instrument which causes the wound prevents, by its closing the aperture, the fatal hæmorrhage which otherwise would soon follow. In other cases it may be the clot. Formidable, however, and imminently dangerous as these wounds are, it is not to be denied that probably some have survived an injury of the heart. "There is reason to believe," says Dr. Dorsey, "that the heart has often been slightly wounded without fatal consequences."§ Wounds of the base of the heart are, however, almost invariably mortal. Wounds of the aorta

* Larrey mentions several cases which he deemed wounds of the pericardium, and that were cured. Sir. A. Cooper relates one, where the wound was inflicted with a reaping-hook, and the patient survived two or three weeks.—Lectures, vol. iii. p. 169.

† Pages 26, 221, 222.

‡ Instances of people living for any period, longer or shorter, after the heart has received a severe injury, are to be found in every work on forensic medicine; and these are not to be looked upon merely as physiological curiosities—they sometimes involve questions of life and death.

A case was tried in Glasgow in 1819, of which the following is an outline. The keeper of a house of bad fame in Greenock was indicted for the murder of a sailor, by shooting him through the chest. It appeared from the evidence of the medical witnesses, that the auricles, and part of the aorta, next the heart, were shattered to atoms by the slugs and brass nails with which the piece was charged; and in their opinion he must have dropped down dead the moment he received the shot; therefore, as the body was found in the street, and the door of the house was eighteen feet up an entry, it followed that the prisoner must have run into the street and there shot him. For the prisoner it was urged and proved that he had shot him through the door of his own house, which he was attempting to enter by force. And, besides direct testimony from those within the house, and from a lad who was along with the deceased at the time, it came out in evidence that there was a stream of blood from the door of the house to the spot where the body was found, which could not have run from the body towards the house, as the threshold of the door was on a higher level than the pavement of the street. On this evidence the prisoner got an unanimous verdict of acquittal.—Dunlop.

§ On this interesting subject of wounds of the heart, I have collected some references which may be of use to the medical witness. The case in the text, of the soldier in Spain, is in the Edinburgh Medical and Surgical Journal, vol. xiv. p. 129.

Triller in Schlegel, vol. v. p. 249: A wound fatal after 14 days.

Pelletan's Surgery: The aorta wounded with a small sword, yet the patient survived two months.

Medical Records and Researches, p. 59. Case by Dr. Babington: the right ventricle and both lobes of the lungs penetrated by a bayonet; survived nine hours.

Medico-Chirurgical Transactions, vol. ii. Case by Mr. Featherton: ventricle wounded by a bayonet; but the patient walked about the ward on the second day. He died in 49 hours.

Medico-Chirurgical Review, vol. xiv. p. 463. Case by Boyer, at La Charité: wound of the left ventricle with a knife; died in nine days.

American Journal of Medical Sciences, vol. xv. p. 532. Case by Dr. Fris, at Naples: survived a wound of the ventricle, with a knife, ten days.

New York Medical and Physical Journal, vol. v. p. 314. Case by Professor

and vena-cava are fatal.* It is hardly possible that the thoracic duct can be wounded without affecting other vital parts; but if it should occur, we must deem it fatal, as the chyle, instead of passing in its ordinary course, is diffused into the cavity of the thorax.† For similar reasons the lower part of the œsophagus is scarcely, if ever, wounded separately; but, if so, it is certainly mortal, as it prevents the proper passage of the food, and totally impedes the function of nutrition. Wounds of the vena azygos are mortal, as they are attended with a hæmorrhage which it is impossible to suppress. Wounds of the diaphragm, if made with a sharp-pointed instrument, such as a sword, are dangerous, if only the muscular parts be injured; but if the tendinous ones are also injured, they are considered fatal.‡

Stevens: wound from a needle; the pericardium was punctured in ten or twelve places, and the right ventricle lacerated. No doubt the beating of the heart against the head of the needle caused these punctures. Death ensued in a few hours.

Medico-Chirurgical Review, vol. x. p. 245. Case by M. Ferrus: a maniac wounded himself with an iron stilet; survived twenty days; and, on dissection, the instrument was found strongly fixed in the substance of the left ventricle. The case is also given in detail by Orfila, Leçons, 2d edition, vol. ii. p. 480.

Ibid. vol. xxii. p. 453. Case at Hotel Dieu: right ventricle wounded with a kitchen-knife; survived a month.

Ibid. vol. xxiii. p. 84. Dupuytren's cases.

Ibid. vol. xxv. p. 183, from the Transactions of the Provincial Medical and Surgical Association, vol. ii.: a boy shot himself with a gun made out of the handle of a toasting-fork; it entered the thorax and disappeared. The boy walked about, and said he was well, for a fortnight, but finally wasted away, and died in five weeks and two days after the accident; and, on dissection, the stick was found in the right ventricle, forcing itself between the columnæ carneæ and the internal surface of the heart, and encrusted with a thick coagulum. No wound could be discovered in the heart or pericardium. This case is related by Mr. Davis.

Sedillot (p. 243) relates of a young student of medicine, who, desirous of destroying himself, inflicted a wound with a double-bladed knife in the cardiac region, and afterwards divided the crural vein. On dissection, the left ventricle was found to be penetrated, but the hæmorrhage was so slight as clearly to indicate the other wound as the cause of death.

Let it not, however, be supposed, from these examples, that wounds of the heart are not *suddenly* mortal. Individuals often die, either instantly after a wound, or life is only protracted for a few minutes.

In the case of Mrs. Hamilton, murdered by Clough in 1833, at Bordentown (New Jersey), by repeated stabs with a dirk, seven wounds penetrated the left lung, and three entered the left ventricle. She walked some distance down stairs after this, and held some conversation, but soon fell, and died in fifteen minutes.

Robert Cully, the policeman, stabbed through the heart in London, May 14, 1833, ran thirty yards, and then, exclaiming, "I am very ill," fell down and expired.

Instances of the heart being found cicatrised are given in Lancet, vol. vii. p. 22, Bougon's case. Western Journal of Medical and Physical Sciences, vol. i. p. 329. Case by Dr. Randall of Tennessee, of a negro boy shot in the breast with a fowling-piece. He survived 67 days, and at one time was able to walk about. On dissection, the spots where the shot entered were found cicatrised, and three shot were found in the right ventricle, and two in the right auricle. Dr. Drake, in his observations on this case, refers to other instances.—See his Journal, vol. i. p. 329, and vol. iii. p. 297.

* See Hays' American Cyclopædia of Medicine and Surgery, vol. ii. p. 185, art. *Wounds of the aorta*, by Dr. Geddings. Dr. Dunlop, in his MS. Lectures, mentions that it was formerly the custom in the Portuguese army, to punish delinquents by striking them on the back with the flat of a heavy sword, of which the consequence sometimes was rupture of the blood-vessels of the chest, and even of the aorta.

† Blumenbach refers to a case in Lentin, where life continued, though in a weak state, for many months after a rupture of the thoracic duct.—Elliotson's Blumenbach, p. 362.

‡ I have taken this distinction from the systematic writers, although I am

As a general deduction from these remarks, it may be observed, that the prognostic in wounds of the thorax is, in most cases, an unfavourable one, although they are not often mortal, unless some primary organs be injured. John Bell, indeed, directs his pupils never to call any wound mortal, unless it be plainly a wound of the heart. This advice may be proper in surgery, but it can have no bearing in legal medicine, since it practically excludes all prognostics whatever. I have therefore given the best founded opinions that I could obtain, and will only add, that the prognostic in wounds of the lungs should in general be delayed, as the cases of recovery from desperate ones are so numerous, that we can never be justified in peremptorily declaring any particular instance a mortal wound. Wounds from fire-arms are, however, always more hazardous than those from cutting or sharp-pointed instruments.

Wounds of the abdomen, like those of the thorax, are divisible into external or penetrating wounds. The former are to be deemed simple, unless they have been accompanied with a violent shock of the system, or are of large extent. Penetrating wounds are to be dreaded, either from touching the peritoneum, and thereby causing inflammation, or from producing ventral hernia, and in the latter case, the apprehension will be graduated on the nature of the viscus that has passed out, and the inflammation and strangulation that accompany it.*

Penetrating wounds may also strike one or more of the viscera contained in the abdomen, and in that case, the accidents that occur, and the medico-legal questions that arise, are among the most perplexing of this branch of our subject. Wounds of the stomach are to be deemed highly dangerous, although there has been great diversity of opinion concerning their mortality. Bohn and Teichmeyer pronounce all mortal, and the instances of escape, as almost miraculous; while Alberti, Boerhaave, and Valentini, consider those only mortal which have injured the lower part and the two orifices. A wound of the stomach was declared accidentally mortal by the medical faculty of Giessen, and absolutely mortal by the medical college at Frankfort; while, in another case, a wound was considered mortal by the faculty at Leipsic, and not so by those of Helmstadt and Wirtemberg.†

perfectly convinced of the correctness of a remark of Dr. Marc, that *it is useless to distinguish between wounds of its tendinous and muscular portions.* — Godman's Western Reporter, vol. i. p. 44. A very curious case of wounded diaphragm, which, from its consequences, proved fatal at the end of eleven months, is mentioned in the Edinburgh Medical and Surgical Journal, vol. viii. p. 42.

Cases of recovery from a punctured wound are given in London Medical Repository, June 1824, by Mr. Wood; in Lancet, N. S. vol. iv. p. 421, from a stab in the muscular part, by Professor Bernt. Percy (Dictionnaire des Sciences Médicales, vol. ix. art. *Diaphragm, rupture of*) says, that when not immediately fatal, patients suffer greatly from it; and, on dissection, the edges of the rupture are found callous and rounded. A medico-legal case, in which rupture of the diaphragm was present, is stated at p. 535.

* The necessity of returning it as early as possible is very manifest; and if this be not done, the criminal may escape punishment, at the expense of the surgeon's reputation.—See a case of this kind in Smith, p. 263.

† Mahon, vol. ii. p. 122. Valentini's Pandects, vol. ii. pp. 413–432. All the writers on legal medicine agree, that a wound inflicted on a full stomach is more dangerous than one on that organ when empty. It should, therefore, be a subject of inquiry, how long before the injury a meal had been taken.

This contrariety of opinion has arisen from a consideration of the following circumstances: wounds of the stomach have sometimes been cured without any bad consequences; various substances, such as knives, forks, pins, &c., have been swallowed without immediate injury; and the operation of gastrotomy has been occasionally performed with safety.* All these facts tend to shew, that wounds of the stomach are not absolutely mortal, but they do not permit us to deny their danger.† Certainly, if inflicted with a sharp-pointed instrument, and penetrating, they are to be deemed hazardous, and the chance of death is increased when the blood-vessels or nerves of the part have been injured.‡ But a rupture or division of the coats of the stomach may also be affected by a severe contusion, or a blow on the part, without any external wound, surgically speaking, being present. Fabricius mentions the case of a man who was so dreadfully trodden under foot, that not only the stomach was burst, but there was a rupture of the diaphragm, and the food passed into the cavity of the thorax, and notwithstanding this, except some slight elevations of the epidermus in the form of vesicles, the integuments and abdominal muscles did not appear in the least injured.§ It will not uppear surprising that sudden death should be the consequence of a blow on the epigastric region, when it is recollected that it is the seat of the solar plexus, and of the semi-lunar ganglion,‖ parts especially subservient to life, and also, that on dissection, no inflammation of the stomach and the other organs should in such a case

* See a case of this nature in the Medico-Chirurgical Review, vol. i. p. 103. Also in Philosophical Transactions, vol. xix. p. 178.

† The remarkable case of Dr. Beaumont is of itself sufficient to shew that life can be preserved after a severe and extensive wound of the stomach. Other cases of recovery from wounds have been related by Mr. Travers, in North American Medical and Surgical Journal, vol. ii. p. 199; by Mr. Breton, in Transactions of the Medical and Physical Society of Calcutta, vol. i. p. 59; by Mr. Scott, in Medical Communications, referred to by Sir A. Cooper; Lectures, vol. iii. p. 155; by Dr. Beatty, Cyclopædia of Practical Medicine. art. *Death from wounds*, vol iv. p. 556.

‡ Dr. Andrew Duncan, jun., in a clinical lecture at Edinburgh (1830), mentioned the following case, which may serve as a check to hasty opinions. A man died in the infirmary, of rupture of the ascending aorta. Death was not, however, immediate, as he survived several hours in consequence of a clot acting as a partial valve. On dissection, the stomach was found distended with blood, and the bystanders were already engaged in conjectures as to the cause, when the removal of the fluid shewed the perfect state of that organ, and it became evident that the blood must have been swallowed, according as it was discharged from the aneurism.—Lancet, N. S. vol. vi. p. 169.

§ Mahon, vol. ii. p. 126. Dupuytren mentions the case of a soldier struck with a cannon-ball obliquely on the left flank, which produced no external wound, but an early death discovered dreadful injury to the kidney, the lumbar vertebræ and nerves, the lower ribs, and the parietes of the abdomen. The skin alone had resisted the disorganising action of the shot.—Medico-Chirurgical Review, vol. xxv. p. 298.

‖ The effects of severe blows on the stomach, though well known to the vulgar, are hardly accounted for satisfactorily by the learned. A severe blow on the head, the seat of nervous contraction, often does not produce so violent an effect as a very slight blow over the semi-lunar ganglion. A case occurred in London, some years ago, where a man killed his comrade by giving him a pat on the pit of his stomach with his open hand. By the practice of the Scotch courts, if one man kills another by a blow on the stomach, the fact of his having done so is construed into malice, or what amounts to the same thing, *recklessness*, as it is termed.—Dunlop.

be found.* Wounds of the intestines are less to be dreaded than those of the stomach, and the instances of recovery are infinitely more numerous. But although all surgical works abound with these, we must not deem them destitute of danger, and if death follows after proper treatment, it is to be attributed to the injury.† Wounds of the smaller intestines are more dangerous than those of the larger, not only because they perform more important functions, but are supplied with a greater

* "Inspectio et sectio aliquando nihil declarant," says Bohn, p. 114. So, also, sometimes with blows on the head; and a case of the latter description is cited by Smith (p. 250.), from the History of the Royal Academy of Sciences of Paris. "A stout young criminal, condemned to be broken on the wheel, ran head foremost against the wall of his dungeon, with his hands behind him, and instantly fell dead. On opening the head, not the slightest appearance of injury was discoverable, either in the skull, brain, cerebellum, or spinal marrow, except a very minute separation in the squamous suture, which could not account for so sudden a death. The substance of the brain was unusually firm."

This point is so important, that I must be permitted to enlarge somewhat on it. "Slight injury to the stomach (says Sir Astley Cooper), although it does not occasion any sensible organic change, will sometimes destroy life. A man recovering from fever, and walking in Fleet Street, quarrelled with a woman; another female came up and gave him a blow in the region of the stomach, which caused almost instantaneous death. Upon dissection, to discover the cause of his expiring so suddenly, no morbid change was perceptible. Again, a healthy labourer at the India House was attempting to lift a heavy weight, when another labourer came up and said, "stand on one side, and let an abler man try;" at the same time, he gave the former a slight blow on the region of the stomach, when the poor fellow immediately dropped down and expired. On examination, there was not any mark of violence discovered." (Lectures, vol. i. p. 11.) Dr. Paris remarks, that inflammation is out of the question in these cases, and, therefore, the slight redness of the stomach that is occasionally observed, can alone be accounted for, by regarding it as the effect of the sudden cessation of the action of the heart (which has been found empty) producing an accumulation of blood in the extreme arterial branches.—Paris's Medical Jurisprudence, vol. ii. pp. 121, 174.

Mr. Lambert, a respectable individual in New York, received a blow on the stomach from some rioters, immediately after coming from a supper party. He died almost immediately. On dissection, no mark of injury could be discovered, except some small red spots on the internal surface of the stomach, and there was no mark of external contusion. The brain was healthy. Dr. Post and the other witnesses concurred in believing that the blow was the cause of death, and not sudden fright. The prisoners were convicted of manslaughter. I have given the details of this case in the New York Medical and Physical Journal, vol. v. p. 427.

If we deem the above cases of any weight, we can hardly justify the following decision, mentioned by Dr. Yeats. "Some years ago, I was subpœnaed to give my opinion concerning the cause of death of a young woman, who had been severely kicked in the region of the stomach by a man. She was never well from that time to the day of her death, which happened several months after, and she frequently vomited blood. On opening the body after death, the internal coat of the stomach was found inflamed. During my examination, I was asked by the court, whether the appearances would not appear without the ill treatment she had received; upon my affirmative answer, that such appearances sometimes occurred from constitutional causes, the judge directed the jury to acquit the prisoner, who was on his trial for murder."—Brande's Journal, N. S., vol. iii. p. 166.

† Several cases of rupture of the intestines from violence are related.—Dublin Hospital Reports, vol. iv. p. 349; by Mr. Speer, of the cæcum, from a fall in wrestling. Western Medical and Physical Journal, vol. i. p. 550; by Dr. Drake, of the jejunum, from the kick of a horse. Medico-Chirurgical Review, vol. xxiv. p. 142. Two cases of rupture of the jejunum, one from a kick, and the other from a cart passing over the abdomen, quoted from Bransby Cooper. All these proved fatal.

Lydia Alder was tried in 1744, for the murder of her husband, whom she kicked in the groin, in consequence of which, having at the time an inguinal rupture,

number of nerves.* Wounds of the mesentery cannot be deemed mortal, unless some of the large blood-vessels of the organ, or its principal glands, be injured, and in these cases, the danger arises from not being able to suppress the hæmorrhage, or to supply the loss of the chyle. Wounds of the omentum are to be estimated like those of the mesentery; but it deserves remark, that a contusion is apt to induce inflammation and gangrene.† Wounds of the pancreas seldom occur, unless some other viscus be injured at the same time. If they should happen separately, the cause must have been an instrument entering at the back, and its wound cannot be considered as mortal, unless some arterial or venous vessels have been injured. Wounds of the liver are generally mortal, and their fatality originates in some blood-vessel being injured, or in the consequences that ensue. Superficial injuries are, however, frequently healed.‡ Wounds of the gall-bladder are deemed absolutely mortal, as its fluid is stimulating to a high degree, and

mortification came on, and he died. Verdict, manslaughter.—Paris and Fonblanque, vol. ii. p. 122.

The following is a curious case, as well for its antiquity as the medical testimony presented. I apprehend, also, that at the present day a conviction, under the circumstances elicited, could hardly take place.

In 1678, in a drinking bout, Philip, earl of Pembroke, struck Mr. Cony on the head, and afterwards kicked him. The next day he was seized with severe pains in the shoulders, and afterwards in the bowels, which continued until his death. Fainting fits occurred, but it was proved that he had been subject to them. There was no discoloration or bruises on the abdomen. He died on the sixth day, and after death, a large black bruise was found on the breast: the body was swollen and discoured in various places, and a large quantity of extravasated blood was, on dissection, seen in the lower part of the abdomen.

Dr. Conquest deposed that Cony was very intemperate, and had drunk large quantities of beer during his illness. To these he attributed the gripes and vomiting, and the extravasation, although he states expressly that the bowels were not ruptured or bruised. The patient never complained of kicks or bruises. Dr. Lower, who saw him, in consultation, the day before he died, found no marks of fever, either in his tongue, pulse, or water. The caul was withered and consumed, and Mr. Raven (I presume a surgeon) deposed that "it was well known to all physicians, that in all natural deaths there must be extravasated blood in the lower belly."

Lord Pembroke was tried by his peers at Westminster Hall, and 18 votes declared him not guilty, while 40 pronounced him guilty of manslaughter.—Hargrave's State Trials, vol. ii. p. 461.

* It would appear that the small intestines possess some of the irritable sympathy so conspicuous in the stomach—death being brought on by some unaccountable cause when they are only slightly injured. Foderé mentions a case where instant death was caused by a small prick in the small intestines, inflicted by the point of a butcher's knife, though there was neither a sufficient effusion of blood to account for such a result by its effects on the vascular system, nor a sufficient length of time for inflammation and its consequences to arise.—Dunlop.

† If the omentum is protruded, and not speedily returned, it will, in common with all the other viscera of the abdomen, inflame and bring on gangrene; but the omentum is less obnoxious to inflammation than any other viscus. A strong illustration of this fact was related to me by a medical friend. A peon, or messenger, was brought to him in India, who had received a stab in the side, three weeks before, through the wound of which the omentum had all this time protruded. On examination, he found that the viscus was adhering to the wound all round, and that inflammation had commenced without and been communicated to the interior of the cavity. Gangrene supervened, of which he died in a few days after.—Dunlop.

‡ A case of recovery from a stab into the liver with a table knife, is given by Dr. N. R. Smith, in North American Archives, vol. i. p. 385.

occasions inflammation and most violent pain.* Wounds of the various ducts are mortal. Those of the spleen are to be estimated like wounds of the liver; if deep and penetrating, death will follow from hæmorrhage. There are, however, many cases of recovery from injury to this organ.† It is a common circumstance in cases of sudden death from accidents, falls, &c., to find the spleen or liver lacerated; and this is, therefore, to be deemed a fatal injury.‡ Wounds of the kidneys have often been successfully treated; they are, however, dangerous, according to their depth, and the effusion of urine (if any) into the abdomen.§ So, also, with wounds of the ureters. Wounds of the bladder would not seem to be even very dangerous, if we look at the success which

* There are but very few cases on record of wounds of the gall-bladder distinct from other injury. I have collected the following. Philosophical Transactions, vol. xxxvi. p. 341; an officer in whom the fundus was penetrated. He lived a week. Sir Astley Cooper's Lectures, vol. iii. p. 164; case by Mr. Edlin. Wound with a bayonet. Death ensued in 13 hours. Sabatier mentions another case, fatal on the third day. Dr. R. Coates, in the article, *Wounds of the abdomen*, in Hays' Cyclopædia of Practical Medicine and Surgery, however, refers to two cases of recovery, one by Paroisse, and the other by Fryer. "I have never known a patient," says Hennen, "recover after a wound of the gall-bladder, except a previous adhesion had taken place to the parietes," and then quotes Paroisse's case. A case, he adds, I believe unique, is reported by Dr. Thomson, where nature had provided against the extravasation of bile from the substance of the liver into the cavity of the abdomen, by the means of newly formed adhesions of considerable extent.—Military Surgery, p. 344. See also Cooper's Surgical Dictionary.

† A case is related by Mr. Ferguson, where a part of the spleen was removed with safety.—Philosophical Transactions, vol. xl. p. 425. Two others are mentioned by Dr. Blundell, in his Physiological Researches; one on the authority of Mr. Cline, and the other on that of Dr. O'Brien, Medico-Chirurgical Review, vol. vi. p. 404. Dr. Dunglison (Physiology, vol. ii. p. 249) refers to cases of recovery from wounds, related by Adelon and Sir C. Bell; and there is a similar instance of cure by Dr. Powell, in American Journal of Medical Sciences, vol. i. p. 481.

Fatal cases are related by Dr. Abercrombie; by Dr. Ingalls, Boston Medical and Surgical Journal, vol. i. p. 296; by Dr. Tuthill, London Medical and Surgical Journal, vol. vi. p. 304; and in Lancet, vol. xi. p. 584, occurring in Guy's Hospital; and American Journal of Medical Sciences, vol. vii. p. 549, from Rust's Magazine.

All these, except the last, occurred from falls or severe blows; in that, a woman long afflicted with intermittent fever, was, in a quarrel with her husband, struck by him with a long elastic switch, and died in two hours. There was no mark of violence externally, though the blow was given over the region of the spleen, and, on dissection, that organ was seen ruptured. It, however, and the liver were so soft, that a slight pressure sufficed to tear them. The man was acquitted from these circumstances.

‡ On the morning of the 1st of January of the present year (1824), three soldiers attempted to get out of Edinburgh Castle, to join the riot with which the new year is uniformly ushered in by the people of Scotland, but mistook their way in the dark, and precipitated themselves over the perpendicular side of the rock. They were found dead the next morning, and the livers of the whole of them were found, on dissection, to be lacerated.—Dunlop.

A rupture of both the liver and *pancreas*, originating from a blow on the ribs by the wheels of a stage-coach, is mentioned in the Lancet, vol. xii. p. 384. A fatal case of rupture of the liver, from a fall from a wagon, and where death followed in fourteen hours, is given by Dr. J. Green of Lowell; American Journal of Medical Sciences, vol. vi. p. 539. Another fatal case in 52 hours, from a wheel passing over the abdomen, is related in Midland Medical and Surgical Reporter, vol. ii. p. 76.

§ A successful case of treating a severe wound of the kidney was related to me by my friend Dr. Knox of Edinburgh. A boy, at the Cape of Good Hope, received a deep wound in the left kidney from a butcher's knife, which was thrown at him.

ordinarily attends the operation of lithotomy. They may, however, prove hazardous from the effusion of its contents, or the injury of a blood-vessel.* Wounds of the neck and sphincters of the bladder are apt to leave incontinence of urine; and when this does occur, it should be stated in the report. Wounds of the uterus are dangerous in proportion to the hæmorrhage that follows, and the symptoms that supervene. If that organ be impregnated, the danger, is, of course, increased.†

In all these instances of wounds of the abdomen, the danger is aggravated from extravasation, and this, again, is increased according to the nature of the fluid, which may be either blood, chyle, bile, fæcal matter, or urine. An extravasation of blood is often within the power

He was brought to Dr. Knox, who caused him to be placed and retained in such a position, that the wound should be the most depending part of the body. In a short time he made a complete recovery. There are instances of death arising from slight blows on the kidney, where it contains a calculus. A gentleman in India was tried for the murder of his servant, whom he killed by a blow on the loins; on its being proved that the kidney contained a calculus, the ragged points of which had punctured the blood-vessels, he was acquitted.—Dunlop.

A case, which the narrator supposes to have been a wound of the kidney, and which was cured, is given by Dr. Borthwick.—Annals of Medicine, vol. iv. p. 466. Hennen also relates of an officer who was wounded by a musket-ball in that region, and who suffered long, but finally passed, with his urine, a piece of cloth.—Military Surgery, p. 330. He adds, however, that the cases on record of recoveries after wounds of the kidney are not numerous.

Fatal cases of rupture of the kidney from blows, are mentioned by Mr. Laidlaw, in London Medical and Physical Journal; American Journal of Medical Sciences, vol. xi. p. 199; and by Bransby Cooper, Medico-Chir. Rev. vol. xxiv. p. 144; by Dr. Kirkbride of Philadelphia, American Journal of Med. Sciences, vol. xv. p. 359.

* Fatal cases of rupture of the bladder from external violence, are given by Cloquet, North American Medical and Surgical Journal, vol. v. p. 231; by Dewar, Edinburgh Medical and Surgical Journal, vol. xxxi. p. 86—in his remarks on this case, Dr. Craigie refers to all the instances on record; and by Dupuytren. This last case occurred at the Hotel Dieu, and, although pronounced by Dupuytren to be a ruptured bladder, was doing well; when, from some imprudence in eating, peritonitis came on, and he died on the seventeenth day. On dissection, marks of adhesion were seen between the intestines and bladder. This is a very remarkable case.—American Journal of Medical Sciences, vol. xii. p. 535.

"When the bladder is penetrated in any part of its parietes, covered with peritoneum, it is usually mortal."—Larrey.

† "A medical friend of mine related to me the following case. When in Ceylon, he was called to see the wife of a sergeant, who had received a stab in the side with a knife, wounding the uterus, she being then in the eighth month of her pregnancy; and on asking her how she got hurt, she said, that in carrying out some knives which she had been cleaning, her foot slipped, and she let them fall and fell on the top of them, when one of them entered her side and produced the wound, of which she soon afterwards died. She had, however, told some of her companions, the women of the regiment, that it was her husband who had inflicted the wound; and as it was known that they did not live on the happiest terms, this excited suspicion, and the husband was ordered for trial. On dissection it appeared, that the wound had entered from above and gone downwards, which could not well have happened had she been wounded in the manner she described to the surgeon. From circumstantial proof it was like to have gone hard with the prisoner, but he was let off on the evidence of one of the surgeons, who, when interrogated on the subject, said *that the wound was not necessarily mortal.* I have since learned the private history of the jury in this case; it is as follows. The Ceylon jury consists of thirteen; of these, one declined voting, six were of opinion that it was manslaughter, and six wished to bring it in murder. In this state they sat for some hours, till at last, one of those that were for the severer sentence relented, and a verdict of manslaughter was given."—Dunlop.

of the surgeon, but its consequences are, however, always to be dreaded. The other evacuations can scarcely, if ever, except in the case of the urine, be remedied by means of operations, and are hence very generally mortal.*

Wounds of the testicles are dangerous, particularly if they have been contused or injured by a sharp-pointed instrument. Their division, indeed, by a cutting instrument, may be mortal, unless the subsequent hæmorrhage be speedily prevented. The same remark applies to wounds of the penis; but in other respects, injuries of this organ are not to be deemed dangerous. Wound of the female organs are often highly dangerous, from the profuse hæmorrhage that ensues.†

The extent and variety of injuries that the abdomen, and the viscera contained in it, may receive, call for all the skill of the surgeon; and his judgment will be frequently exercised in deciding on the fatality or danger of wounds of this part of the system.

Wounds of the extremities are to be decided upon according to their nature; but the majority of them are not dangerous. Of simple wounds I have already spoken; and it is sufficient to add, that when the integuments and first layer of muscular fibres only are wounded, they will heal without difficulty. The presence of syphilis and scrofula may, however, cause their degenerating into ulcers; and it must also be noticed, that wounds of the extremities, in which the muscular fibres are transversely divided, will take a long time to heal. Contusion also may increase the inflammation, or induce suppuration.

* "The complete effusions of bile, urine, and fæculent matter, prove uniformly fatal, by their quality inducing a destructive inflammation."—Travers on Injuries of the Intestines, London edit. p. 72. It has been proposed to avert the evils arising from these fluids remaining in the cavities, by removing them by puncturing, as is practised in dropsical cases; and this I could suppose may be practicable in some cases, as where any very fluid liquid is to be got out; water, for instance, or serum, may be drawn off by puncturing at the lower part of a cavity where it may be lodged; but in other instances, there would be but little to hope for from the operation. Bile, urine, fæces, and chyle, are highly irritating in their nature; and though, which is very doubtful, we were enabled to remove them from the cavity, we should find it impossible to command the wounded gall-bladder, biliary duct, kidney, ureter, or intestine, from which they proceed; so that the operation would only be inflicting pain without any rational hope of success, as they would be renewed as fast as they were removed; and as for blood, unless the puncture was made instantly, it would most likely coagulate, and in that form it would be impossible to get it through a small punctured hole; making a large incision is, of course, quite out of the question; and blood, if likely to find its way out at all, will do so through the hole through which the wound was inflicted.—Dunlop.

† Two interesting cases are related by Mr. Watson of Edinburgh.—Edinburgh Medical and Surgical Journal, vol. xxxvi. p. 85. In both, there had been an incison into the labia pudendi, evidently with a cutting instrument, and either a razor or a knife. Death followed in each after a very few hours. The murderer was convicted in one case, and in the other, only escaped because the medical witnesses stated that it was *possible*, but *very improbable*, that the wound might have been occasioned by falling on glass, or a sharp body. The wound was not lacerated, nor penetrating, but a clean incision; and it is evident, in order to inflict it as supposed in the defence, that "the female must have sat down upon a piece of glass standing erect, and her clothes must have been out of the way, as they were not cut." All this, too, must have happened on a pair of stairs.

It is remarkable that, in both cases, the murderers were the first to call medical aid, probably supposing that the hæmorrhage would be attributed to flooding.

Wounds of tendons are generally tedious, and when cured, are often followed by a loss of substance, and a want of mobility in the parts. Compound fractures are sometimes hazardous, as also fractures near articulations, or of parts surrounded by large masses of muscles. Comminuted fractures are extremely tedious in their cure. Finally, fractures in young persons, and in those who are in good health, are more readily healed than in old persons, valetudinarians, and pregnant women. Wounds complicated with dislocations sometimes induce alarming symptoms, as also those in which an important nerve is divided. The prognosis, however, is favourable, unless serious symptoms supervene on the disease, and which are referable to it. Wounds of the arteries and veins are not, at the present day, considered dangerous by modern surgeons, if timely aid be afforded; but under other circumstances, a wound of a large artery may prove fatal. The system may be injured, or so much blood may have been lost as to render assistance of little value.* It is extremely rare that wounds of the veins prove dangerous, except the brachial or femoral ones be wounded near the trunk. Wounds of the articulations are generally to be dreaded, and the apprehension is increased when they are complicated, as, for example, with contusion, hæmorrhage, or fracture.†

* The following case may also occur: "J. Denton was indicted in September 1813, at the Old Bailey, for the murder of C. Denton. He had struck her with a knife, and she lived a month thereafter. The medical testimony stated that the wound had nearly divided the arteries of the arm; *it mortified, and she died in consequence.* He was condemned and executed.—Edinburgh Annual Register, vol. vi. part 2, p. 121.

† "There was a very interesting case came on before the Justiciary Court, during the autumn circuit, at Glasgow, in the year 1822. A man of the name of Pace, gamekeeper to Lord Blantyre, was tried for the murder of a poacher, whom he shot so severely in the left arm that it was found necessary to amputate it above the elbow. The man died of erysipelas phlegmonoides in the right leg; and the question on the trial was, whether the erysipelas was brought on by the wound or not. Upon this question the medical men differed totally. Mr. John Burns, the most eminent surgeon in Glasgow, gave it as his opinion, that the debility caused by the wound brought on the disease of which he died. Dr. John Thomson of Edinburgh was of opinion that it was brought on long before he received the wound. It appeared in evidence, that the poacher had been out in the exercise of his vocation for two nights, and had slept without shelter; that during that time he had eat but little; and, above all, that he had a foul ulcer in his leg, the absorption from which undoubtedly laid the foundation of the disease before the injury was received. Under all these circumstances, what could have been the best mode of treatment in such a case, supposing he had received no wound at all? Undoubtedly, the very treatment he did receive in consequence of it—copious bleeding, light diet, being kept quiet and still; and the counter-irritation of the amputation, so far from increasing the inflammation which was going on in the groin, must have acted like a blister, or a seton, in repressing and counteracting it. This appears to me to be the rational view of the case, and in this view the jury saw it, for the prisoner was acquitted.

"There are some wounds more apt to produce serious effects in different parts of the body than others. Thus, a cut in the adductor muscle of the thumb (that muscle which lies in the palm of the hand) more frequently brings on lock-jaw than an injury of equal extent any where else. While on the subject of lock-jaw, which must be looked upon as a spasmodic action of the muscular system generally, rather than a mere contraction of the temporal muscle only, which is merely a symptom of the disease, I may remark, that a predisposition to this is brought on by particular climates, especially within the tropics, which could not *a priori* have been

Finally, the prognostic from wounds from fire-arms is, in all cases, more serious than that of wounds from cutting instruments.*

Such are, in as short a space as possible, the various prognostics of the numerous wounds (in a medico-legal sense) to which the body is

expected. When the expedition sailed from England to Buenos Ayres, in 1807, in the hospitals of most of the regiments employed there, lock-jaw was a very frequent effect of a wound in any part of the body. The same troops went to the Cape of Good Hope, where no such effects ever appeared at all. The 89th regiment went from that to Ceylon, where no lock-jaw ever followed a wound; and thence to Java, where it was the cause of death in two-thirds of the wounds. Here we have four hot climates, two of them notoriously unfavourable to Europeans, and two of them the healthiest that we know of, and yet the tetanus took place in South America and Java, and was not to be found in Ceylon or the Cape; the former quite as unhealthy generally as Java can possibly be.

"A fall from a height, or a sudden blow, may produce laceration of a joint; and whenever this takes place, and terminates fatally, such an event must be attributed to bad habit of body, or the pre-existence of some irritating disease; in which case, should it be made the subject of judicial inquiry, it is the duty of both the lawyer and surgeon to make minute investigation into the patient's previous health and habits. It is seldom, however, that it comes under the investigation of a criminal court, at least in so far as its causing death; but in civil cases it is often tried, as in the upsetting of coaches, &c. There was a case of this kind recorded some time ago in the newspapers, where the plaintiff, a gentleman who had been upset in a coach, recovered £800 damages against the defendant, a surgeon, for unskilful treatment of a dislocation of the shoulder-joint, by which the plaintiff was partially deprived of the use of his right arm. In all similar cases, almost a similar verdict would be just; for, though there may be exceptions, yet, generally speaking, permanent lameness after a luxation (unless, from disease of the bone, anchyloses have taken place after it is put in its proper position) may be fairly attributed to mismanagement on the part of the surgeon."—Dunlop.

* It must not be forgotton that fire-arms, loaded with powder only, may inflict dangerous and even mortal wounds. In answer to the question proposed to him in writing, what are the effects produced by a fire-lock charged with powder only? Dupuytren replied, that he knew a case in which a man, in a quarrel, was shot with such a weapon, the muzzle being close to his abdomen. His clothes and the parietes of the abdomen were lacerated—the wound penetrated the interior, and the man fell dead. He was examined, and Dupuytren was called in to decide what the piece had been charged with; whether shot, ball, or powder only. There was nothing found but the wadding. It often happens, he observes, that persons determined to commit suicide, forget, in their bewildered state, to put the ball into their pistol; and frequently wretches, who wish to shock their friends with their calamity, discharge into their mouths pistols charged only with powder: but the effects are dreadful. The wadding traverses the palatine vault, and the sudden expansion of air, from the explosion, lacerates the velum, and the lips and cheeks are torn in a radiated manner, in consequence of the excessive distention. Sometimes the lower jaw is fractured.—London Medical Gazette, vol. vii. p. 7.

It is probable that the case of Dr. Elliot, tried at the Old Bailey in 1787, for shooting at Miss Boydell, was of this description. He fired a pistol when very near her, as she was walking. Part of her clothes were burnt; and a surgeon swore that she had two contusions below the shoulder-blade, which corresponded with the mark on the gown. The jury found him guilty of shooting, but *they did not find that there was ball.* On this he was acquitted.

There is another point connected with this subject, which deserves further inquiry. It is the nature of burns caused by the explosion of gunpowder. Mr. Lonsdale has suggested, that the presence of particles of the powder in an *unexploded* state under the skin (as is often seen), is owing to the discharge from some fire-arms. He has repeatedly noticed severe injuries from the explosion of gunpowder lying free; but in no one instance of this were any particles left in the skin. May not the resistance offered to its expansion in the other case be the cause?—London Medical Gazette, vol. xi. p. 696.

liable.* But I must again remark in this place, that these or similar rules are not to be taken as infallible guides. It is only to aid the examiner in pronouncing an opinion, that they deserve any attention; and he should rely principally on the circumstances of the case that is immediately before him. "It has, indeed, been argued, that it is not enough to say that the person died of the wound, but that the wound must be characterised as mortal, thus taking advantage of the systematic arrangement in books on surgery, and deducing the conclusion, that when a man dies of a wound that is not there arranged as mortal, it must have originated from bad treatment, or misconduct, or irregularity on the part of the patient.† But the insufficiency of these divisions has been often proved. Thus, "in a case of one John Shaw, at the Scotch bar, three physicians and two surgeons swore, that by the rules of their prognostics, the wounds received by James Houston were mortal, whereas Houston was alive, and the plaintiff in the very cause in which these gentlemen gave this testimony."‡

When a surgeon is called on to examine a wound, the effects of which may become the subject of a criminal trial,§ he should ascertain,

* The authorities on which this section is founded, are Bohn, Foderé, and Mahon. The two last are in many respects a copy of the former. I have also consulted Samuel Cooper's surgical works, Dorsey's Surgery, Charles Bell's Operative Surgery, Sir Astley Cooper's Lectures, Larrey's Memoirs, and Hennen's Military Surgery, together with Metzger and Belloc, and the dissertations in Schlegel.

† Lawyers are very apt to push the question as to the mortality of wounds to a considerable length, and by this means often embarrass the medical witness. I recommend the answer of the surgeon who deposed on the trial of Count Koningsmark for the murder of Mr. Thynne, to the notice of the latter. Mr. Thynne was shot with a blunderbuss, and Mr. Hobbs, the surgeon, swore that he had examined the body after death; that four bullets had entered it; "that they tore his guts, and wounded his liver, stomach, and his gall; wounded his great guts and his small guts, broke one of his ribs, and wounded the great bone below."

Sir Francis Withens.—Did he die of those wounds?

Mr. Hobbs.—Yes, he did die of those wounds.

Mr. Williams.—Did you apprehend them all mortal, or any, or which of them?

Mr. Hobbs.—I believe there never was a wound but it might prove mortal.—Hargrave's State Trials, vol. iii. p. 473.

‡ Edinburgh Medical and Surgical Journal, vol. i. p. 339.

§ I mention the following case, as it may be important for the surgeon to be aware of the doctrine contained in it. In the case of the King *v.* Salisbury, the prisoner was committed to Newgate for stabbing a gentleman with a knife, so that his life was despaired of. She moved that a physician and surgeon of her own nominating might be permitted to be present at the dressing of his wound, so as to be able to satisfy the court that he was out of danger, in order that they might bail her. *Sed per curiam.* There never was a motion of this nature, especially so early as this. The course is, for the friends of the party injured to lay his condition before the court, when they oppose the bailing; if they do not do it, we may order such an attendance for our own satisfaction; but at present the defendant has no right to demand it.—1st Strange's Reports, p. 547.

In the Commonwealth *v.* Trask, the court said, "if a person be imprisoned for dangerously wounding another, who happens to be in a languishing condition, the court will order that the offender be kept in prison until it shall appear that the wound be mortal."—Massachusetts Reports, vol. xv. p. 277.

On the other hand, I may be permitted to advise magistrates not to grant warrants for committing a man to jail on the mere oath of the injured person. The attending surgeon should certify to the imminence of the case. Mr Dease (p. 105) mentions some deplorable cases from inattention to this.

1st, whether it has been already dressed, or if some surgeon has not been attending to it; and, 2d, whether the situation of the wounded person allows of an examination. Both of these are important, as much may depend on the skill and care with which the first dressing has been made: and again, should an examination take place while the patient is in a feeble state, and death follow during it, popular opinion will certainly attach great blame to the surgeon. The juridical examination of a wounded person must also be deferred in some cases, where the point, or part of an instrument remains in the wound. Here a consultation is frequently required to determine on the propriety of its removal; and the question has often arisen, whether the death of the patient will not be hastened by immediately withdrawing it.

Let us, however, suppose the wounded person to be in a fit situation for the surgical and juridical examination. It is then necessary, before proceeding to it, to ascertain the nature and shape of the instrument by which the injury was inflicted. Inquiry should also be made as to the relative situation of the parties, at the moment of the wound—their respective stature and position. The examiner cannot be too minute, and he should be cautious in not making any observations on the nature of the wound, before he has fully satisfied his own mind, lest they may hereafter be used to the disadvantage of his evidence. The form, length, breadth, depth, and direction of the injury, together with all the other circumstances already mentioned, should be noticed, and a detailed summary of the whole should then be drawn up in the form of a report. I must, however, caution concerning the impropriety and, indeed, inutility of declaring any wound, concerning which there can be the least doubt, absolutely mortal. All that can be required by judicial officers is a declaration, that, in the opinion of the examiner, the life of the wounded person is in danger from the injury he has received; and on this they are sufficiently enabled to take all the precautionary steps that may be necessary.* During the illness, it will be proper to keep a journal, and, if the event prove fatal, we have a safe guide to resort to in dissection. The wounded parts must be minutely examined, and from them a just conclusion can be drawn whether the injury was the cause of death.†

* There is one circumstance, which strongly illustrates the propriety of this advice, and which I place here to be distinctly understood. It is, that not unfrequently, mortal injuries are inflicted without any external marks being present. Chaussier mentions an instance of a person crushed by a carriage, on whom no swelling or bruise could be discovered. Dr. Wagner, in his Annual Report for 1833, of the School of State Medicine in Prussia, relates the case of a child run over and killed, and in whom the spleen and kidney were crushed, while no external injury, except a very slight excoriation, was observable on the body.—London Medical Gazette, vol. xiii. p. 974. For further instances, see the same Journal, vol. xv. pp. 668, 727, 729. In all these (four in number), either the liver, spleen, lungs, or intestines, were ruptured. Yet the surface of the body presented little, if any, marks of injury. The explanation, doubtless, is to be found in the yielding nature of the walls of the abdomen.

Although these cases have generally been the result of accident, yet it is *possible* that similar ones may be matters of legal investigation.

† Foderé, vol. iii. pp. 402–432. I must briefly advert to one possible case, which may also occur, viz: that of a man wounded while labouring under a fatal disease. A trial involving this point was held at the Hereford assizes (England), in 1830.

It is not necessary, in this place, to state the distinctions that exist in our law and that of England, respecting the crime of killing, since they relate to the intent, and can have but a slight bearing on the nature of wounds. There is one English statute, however, which deserves mention. It was passed in the reign of James I., and declares, "that the thrusting or stabbing another, who has not a weapon drawn, or who hath not then first stricken the party stabbing, *so that he die thereof within six months after*," shall be adjudged murder, though done upon sudden provocation.* In the state of New York, the same statute was enacted, and it contained the same provision as to time (*six months*). It is to be deemed murder, "although it cannot be proved that the same was done of malice aforethought." †

This is, however, omitted in the Revised Statutes, enacted in 1828, and therefore is no longer in force. The revisers, in recommending this alteration, and, indeed, in having no restriction as to time, remark, that the presumption on which it was founded is unsound, viz: "that if the person wounded does not die within the given time, it must have arisen from some other cause. Common experience teaches the contrary."

A provision as to a specific period of time during which death must follow, in order to constitute the crime of murder, appears, however, to have entered into the laws of various countries. Thus, among the Lombards, the criminal was held guilty if the individual injured died within a year.‡ In Prussia, on the contrary, the *practice* is, that the death must take place within nine days, although the *penal code* of that country contains no directions respecting this subject.§ In France it is fixed at forty days,‖ while in England, the individual was held amenable for the consequences during a year and a day.¶ All these restrictions are evidently improper, since death may follow at a longer or shorter period of time, and be strictly and indisputably traced to the wound in question. It is a much safer mode to look at the intent, and proportion the punishment accordingly.

There are some adjudications on record which it may be well to

A consumptive and intemperate person was struck severely on the head and robbed. There were four contused wounds found. He recovered, however, from these, but ever after complained of pain in the head, more or less, until his death, which took place in four months, with the ordinary symptoms of consumption.

The question was, whether death had been hastened by the injuries. The surgeons differed in their testimony. Some state the brain to have been perfectly healthy; others, that it was soft, moist, and discoloured; and, through this difference, the prisoner escaped from the charge of murder. The lungs were greatly diseased.—Midland Medical and Surgical Reporter, vol. ii. p. 228.

On a recent indictment for murder in England, where the death was alleged to have been caused by a wound, it was ruled as not necessary to describe its length, breadth, or depth.—Rex *v.* Tomlinson, 6 Carrington and Payne's Reports, p. 370.

* Blackstone, vol. iv. p. 193. † Revised Laws, vol. i. p. 67.

‡ Bohn, p. 101. § Metzger, p. 325. ‖ Ballard, p. 325.

¶ Blackstone, vol. iv. p. 197. This would also seem to be the present law in North Carolina, as in the State *v.* Orrel, the court said, "when the death does not ensue within a year and a day after a wound is inflicted, the law presumes that it proceeded from some other cause; hence an indictment upon which it does not appear that the death happened within that time, is fatally defective."—1 Devereux' North Carolina Reports, p. 139, quoted in the American Jurist, vol. vii. p. 366.

mention, from their connexion with the subjects canvassed in the present and preceding sections.

It is stated by Starkie, that "it is sufficient to constitute murder, that the party dies of the wound given by the prisoner, although the wound was not *originally mortal*, but became so in consequence of neglect or unskilful treatment, but it is otherwise where the death arises not from the wound, but from unskilful applications or operations used for the purpose of curing it.*

On a recent trial, where an individual was indicted for manslaughter, by a blow of a hammer, Judge J. Parke observed, "it is said that the deceased was in a bad state of health, but that is perfectly immaterial, as, if the prisoner was so unfortunate as to *accelerate* her death, he must answer for it."†

The rule in Scotland does not appear to be so strict, although the general principle is maintained. Thus, it is not a good plea, if a person receives a gun-shot wound at some remote place in the country, where no surgeon skilled in such wounds resides, and of which wound the person dies, although the practitioner there had exercised his best knowledge. (Case of Edgar, 1747.) And again, although the patient languishes, and death does not ensue even for weeks or months, yet if the wound be in itself severe, and goes on from worse to worse, so that the patient is plainly consumed by it as a disease, it is the same as if he died on the spot.‡ But in the case of Angus Cameron, 1811, the deceased was an infirm and deformed lad who died in consequence of a kick from the prisoner in the groin, where he had a rupture. The prisoner was ignorant of this, and he was only sentenced to six months' imprisonment. So, also, in another case, a blow on the shoulder dislocated the joint, and death insued, but it was shewn that the deceased was scrofulous and unhealthy, and the injury unskilfully treated. The verdict was culpable homicide only.§

3. *Of Mutilation.*

It will readily occur to the reader that there may be many wounds, which though not mortal in their nature, are still incurable, and these may either leave permanent deformity, or incapacitate or weaken one or more of the functions of the body. Laws directed to the punishment of such injuries, have, accordingly, been enacted in various countries, and as some are in force in this state, the propriety of a brief notice is evident.

I will commence by mentioning those in force in France, as there is a uniformity between the English law and our own.

The code of 1791 established a scale, founded on the proportionate magnitude of the injury. Whenever an individual was so wounded as to be unable to apply himself to any manual labour for the space of forty days, the criminal was directed to suffer two years' imprisonment.

* Starkie on Evidence, vol. ii. p. 946.
† Rex *v.* Martin, 5 Carrington and Payne, p. 128.
‡ Baron Hume's Commentaries, vol. i. pp. 269, 271.
§ Alison's Principles of Criminal Law of Scotland, pp. 98, 100.

Three years were appointed in case the arm, leg, or thigh, was broken; and four years, when there was an absolute loss of sight in one eye, a complete loss of the use of a member, or a mutilation of some part of the head or body. It was extended to six years, provided there was an absolute blindness, or a total inability to use either both arms or both legs.*

The code now in force does not contain these distinctions, but leaves to the judges the power of varying the period of imprisonment. It is, however, in one respect, more severe than the former, as it prescribes imprisonment generally against the individual who shall, either by wounds or blows, injure a person so that he is ill, or unable to labour, for the space of twenty days thereafter. And this imprisonment is to be not less than five, nor more than ten years.† One species of mutilation is, however, particularly noticed, viz., castration. It subjects the criminal to hard labour for life, and if it should prove fatal within forty days, he is to suffer death. Outrages against decency are alone to excuse from this punishment.‡

In the English law, the term *Mayhem* is applied to the cases now under notice. This is defined by Blackstone, to be "the violently depriving another of the use of such of his members as may render him the less able, in fighting, either to defend himself or annoy his adversary. And, therefore, the cutting off, or disabling, or weakening a man's hand or finger, or striking out his eye or fore-tooth, or depriving him of those parts, the loss of which in animals abates their courage, are held to be mayhems. But the cutting off his ear or nose, or the like, are not held to be mayhems at common law, because they do not weaken, but only disfigure him."

"By the common law, also, mayhem has for a long time been only punishable with a fine and imprisonment, unless, perhaps, the offence of mayhem by castration, which all our old writers held to be felony; and this, although the mayhem was committed upon the highest provocation."§

* Foderé, vol. iii. p. 427.

† Ibid. p. 428, Penal Code, art. 309. Huard, in his valuable dissertation on wounds, objects to the above enactment. He considers it too severe, since there are some lesions that cannot be cured in twenty days, as fractures, violent contusions, and even sprains, and yet the violence may not have been more, or even as much, than that which caused a wound which healed in twenty days. He urges, as a strong objection to these specifications of time, that there may be many circumstances, apart from the violence itself, which may delay the cure, and mentions several of those which we have enumerated in the first section of this chapter. The law in his country, he adds, is defective in not referring to the intent. Orfila and other French authors agree in this opinion. There has been an alteration of the law (passed in 1824), so far as relates to the degree of punishment. The court may reduce it if they think proper. The obnoxious specification of the crime, however, remains. Orfila's Leçons, second edition, vol. ii. p. 422.

‡ Foderé, vol iii. p. 244. By the 231st article of the Penal Code, if any violence be offered to a magistrate in the exercise of his duty, so as to cause effusion of blood, wounds, or sickness, the punishment is imprisonment, and if death follows within forty days, it is declared a capital offence.

§ The ancient Anglo-Saxon laws contained a regular scale of fines for personal injuries of this description. The loss of a leg or eye subjected the offender to a fine of fifty shillings; a wound that caused lameness, thirty shillings; one that

Subsequent statutes have, however, more clearly defined the crime and its punishment. By a statute passed in the 5th year of Henry IV. it was enacted, that the beating, wounding, or robbing a man, and then cutting out his *tongue*, or putting out his *eyes*, shall be considered a felony. Next was the statute 37 Henry VIII. which directs that if a man shall maliciously and unlawfully cut off the *ear* of any of his majesty's subjects, he shall not only forfeit treble damages in a civil suit, but ten pounds by way of fine to the king, which was his criminal amercement. After this was passed the Coventry act, in the reign of Charles II., and so called from its being occasioned by an assault on Sir John Coventry in the street, and slitting his nose, in revenge (as was supposed) for some obnoxious words uttered by him in parliament. This ordains, that if any man shall, of malice aforethought, and by lying in wait, unlawfully cut out or disable the *tongue*, put out an *eye*, slit the *nose*, cut off a *nose* or *lip*, or cut off or disable any *limb* or *member* of any other person, with *an intent to maim or to disfigure* him, he shall be deemed a felon without benefit of clergy.*

A more recent act was passed in the 43d of George III. All wilful and malicious maiming, stabbing, or cutting, with intent to murder, rob, *maim, disfigure or disable, or to do some grievous bodily harm*, is declared felony.

Again, by a law passed in 9th of George IV. chapter 31, it is enacted, that if any person shall maliciously shoot at another, or cut, stab, or wound, with intent to maim, disfigure or disable, or to do some other grievous bodily harm, it shall be deemed felony in all cases where, if death had ensued, it would have amounted to murder.† Some interesting decisions have been made in England under these respective laws, and as they are, in a degree, applicable to our own statute, I will mention a few.

In 1721, Mr. Coke, a gentleman of the bar, and one Woodburne, were indicted, the one for hiring and abetting, the other for actually slitting the nose of Mr. Crispe, the brother-in-law of Coke. On the trial, Mr. Sturgeon, the surgeon, swore that there were several wounds on the face, one wound divided the right side of the nostril, and made an oblique cross over the wound, and ended near the right under jaw. The nose was cut from without into the nostril, the edge of the nose

caused deafness, twenty-five shillngs; piercing the nose was punished with a fine of nine shillings; a front tooth was compensated for by six shillings, and an eye-tooth by four shillings. Money, it must be remembered, was in those days one hundred times more valuable than at present.— Edinburgh Encyclopædia, vol. ii. p. 94. (American edition.)

For these in detail, as well as the laws of the ancient Lombards, the Angles, and the Salic law on the punishments for mutilation, see Dunham's History of Europe during the Middle Ages (Lardner's Cyclopædia), vol. i. p. 14; vol. ii. p. 134; vol. iii. pp. 65, 72, 130.

* Blackstone, vol. iv. pp. 205–207.

† It is stated in the London Law Magazine (vol. i. pp. 130, 132), that Lord Lansdowne's act, as this last (9 George IV.) is called, originated in an attempt of one Howard to murder with a *blunt* weapon. Lord Ellenborough's act (43 George III.) was restricted to shooting, stabbing, or cutting. It is urged against the present law, that it is too extensive; that it may be construed to include common broils, and an ordinary assault and battery may be made a felony and be punished with death.

was not cut through, but there was a cut or slit in it, that went through. Mr. Coke, with great effrontery, said that his aim was to murder, and not to maim or disfigure. When the verdict of guilty came in, he asked whether the nose could be said to be slit, within the meaning of the statute, when the edge of it was not cut through. To this the lord chief justice (Sir Peter King) replied: "It is true, the edge of the nose was not slit, but the cut was athwart the nose, which cut separated the flesh of the nose, and cut it quite through the nostril. This I take," he added, "to be a slitting of the nose, and *the surgeon swore the nose was slit.*" Both Coke and Woodburne were executed.*

In the case of one Carrol, at the Old Bailey sessions, in July 1765, it appeared that he had struck the prosecutor (Mr. Kirby) with a razor-bladed knife across the nose and eyes, and, upon examination, it appeared that the two great blood-vessels in the forehead were divided, that there was a large transverse wound across the nose, so wide open that the bone was visible. It began from the right, and went across the eyelids and across the nose. The muscles of the nose were cut through, and it proceeded to the left eyelid, and terminated at the temple. A nerve was also cut. It was stated in evidence, that in many old writers on surgery, such wounds were called slits, but that slit is not the word made use of now. The word *slit* is understood as synonymous to the word *cut*, but the idea which was formerly conveyed by the word *slit* is now expressed, in speaking technically, by the word *divided.* The jury found the prisoner guilty, but it was questioned whether a transverse cut was a slitting, within the meaning of the act, *the wound not having perforated the nostril.* It was accordingly referred to the judges, who held that the offence was properly proved, and the prisoner was accordingly executed.†

Lastly, one Tickner was tried, in 1778, at the Old Bailey, under the same act, for injury done to William Jacob. There were several wounds on various parts of the body, but the cut on the nose had divided the integuments in an oblique direction. It went down to the bone, but not through the bones of the nostrils, nor did it penetrate to the nostrils, and was rather a scratch than a slit. It was, however, sufficient to leave a mark visible for some time. The prisoner was convicted, but Sergeant Glynn ordered the execution to be respited, until the opinion of the twelve judges could be procured, whether this conviction was proper within the meaning of the Coventry act. They were of opinion that the conviction was right.‡

Under the act of the 43d of George III., for malicious shooting or cutting, there have been the following adjudications.

A striking on the face with the sharp claw of a hammer, by which the face was cut, was held to be within the act. *Atkinson's Case*, York Assizes, 1806.

* Hargrave, vol. vi. p. 211.

† East's Treatise, p. 399. Lawyer's Magazine, vol. i. p. 202.

‡ Lawyer's Magazine, vol. i. p. 203. William Lee was tried at the Old Bailey, in 1763, for attempting to *cut his wife's throat* with a razor while asleep. The wound was three inches in length, and quite across, but did not prove mortal. This was held not to be an offence within the Coventry act.

So, also, cutting part of the skull with an instrument adapted to the purpose of prying doors open; a piece of the skull, according to the evidence, having been taken out as if sawed out; not *broken out*, but *cut out*. *Rex* v. *Hayward* or *Harwood*, 1805. The jury found that the intent was not to *cut*, but to *break or lacerate* the head. The judges held that this conviction was right, and the prisoner was executed.

In *Adams' case*, Old Bailey Sessions, 1808, and afterwards before the judges, it was held, that the striking with a square iron bar was not within the statute; because there the wound was not an incised one, but contused and lacerated.*

Under the 9th of George IV., as quoted, I find the following decisions.

A man was struck with a hammer, his collar-bone was broken, and his back and loins bruised. It was urged that was not a wounding, as the *skin was not broken*. The judge left the case to the jury, but reserved the point; and the judges agreed that this was not a wounding under the act.†

Again, a wound caused by throwing a sledge-hammer is a wound within the statute, although the hammer was blunt and not an instrument calculated to inflict a wound.‡ And even if the skin be broken with a bludgeon, and blood be drawn, this is a wounding.§ If a person wound by kicking the skin off one he intends to rob, he is punishable under this act, if the jury find that his act is either to disable, or to do grievous bodily harm.‖

In the state of New York, the law at present is as follows:

Every person who, from premeditated design, evinced by lying in wait for the purpose, or in any other manner, or with intention to kill or commit any felony, shall cut out or disable the tongue, or put out an eye, or slit the lip, or slit or destroy the nose, or cut off or disable any limb or member of another, shall, on conviction, be imprisoned in a state prison for a term not less than seven years.¶

With respect to the other states, the following classification of offences may probably be most satisfactory.

Cutting out or disabling the tongue is specified in the laws of Connecticut, Massachusetts, Rhode Island, Delaware, Vermont, Illinois, New Hampshire, New Jersey, Tennessee, Missouri, Georgia, and Michigan. *Disabling the tongue* is only mentioned in the laws of Indiana.

Putting out an eye is made a crime in the laws of Connecticut, Pennsylvania, Rhode Island, Delaware, Vermont, Ohio, Illinois, New Hampshire, New Jersey, Missouri, Tennessee, Georgia, Massachusetts, and Michigan. Putting out the eye or eyes of another, so that the person is thereby made blind, is particularly specified as a higher offence in Connecticut, and the punishment is imprisonment for life in the state

* Starkie on Evidence, vol. ii. p. 924.
† 4 Carrington and Payne, p. 381. Rex. *v.* Wood.
‡ Ibid. p. 446. Rex *v.* Withers. § Ibid. p. 558. Rex *v.* Payne.
‖ 5 Ibid. p. 504. Rex *v.* Shadbolt.
¶ Revised Statutes, 1828, vol. ii. p. 664.

prison. Pulling out or putting out an eye, while fighting, is mentioned in the laws of Pennsylvania, Rhode Island, and Georgia.

Slitting the nose, ear, or lip, is mentioned in the laws of Connecticut, Illinois, Georgia, New Jersey, Michigan, Delaware, Indiana, Tennessee, Ohio, New Hampshire, and Massachusetts.

Slitting the nose or lip, in Missouri.

Slitting the nose, in Pennsylvania and Rhode Island.

Cutting off the nose, or ear, or lip, in Pennsylvania, Rhode Island, Delaware, Indiana, Tennessee, Ohio, New Hampshire, Michigan, New Jersey, Missouri, and Massachusetts.

Biting off the nose, ear, or lip, in Delaware, Indiana, Tennessee, and Ohio.

Cutting off, biting, or slitting the tongue, in Ohio.

Cutting off all or any of the genitals, in Connecticut, Pennsylvania, Vermont, Tennessee, Delaware, and North Carolina. In the two last states this crime is punished with death.

Cutting or biting off, or disabling any limb or member, with an intention to maim or disfigure, is enumerated in the laws of Connecticut, New Hampshire, Michigan, New Jersey, Missouri, Tennessee, Georgia, and Massachusetts.

Cutting off or disabling any limb, in Rhode Island, Pennsylvania, and Ohio.

Maiming any person, in Delaware. *Disabling* any limb or member, in Illinois.

Branding any person, with intent to murder or kill, disfigure or maim, in New Jersey and Michigan.

Shooting or stabbing with any weapon, with intent to kill or maim, in Tennessee and Missouri.*

* Laws of Connecticut, 1830, p. 254. Laws of Massachusetts, 1807, vol. iii. p. 283. With reference to this state, see also the case of the Commonwealth *v.* Newell and others. — Massachusetts Reports, vol. vii. p. 245. Laws of Rhode Island, 1798, p. 589. Laws of Vermont, 1825, p. 254. Revised Laws of Illinois, 1833, p. 178. Laws of New Hampshire, 1830, p. 137. Laws of New Jersey, 1833, p. 237. Statute Laws of Tennessee, 1831, vol. i. p. 251. Laws of Missouri, 1825, vol. i. p. 283. Digest of the laws of Georgia, 1822, p. 349. Laws of Michigan, p. 207. Revised Laws of Indiana, 1831, p. 183. Revised laws of Delaware, 1829, p. 128. Laws of Delaware, 1833, p. 282. Laws of Pennsylvania, 1803, vol. v. p. 3. For the laws of Ohio, see American Quarterly Review, vol. x. p. 41. In North Carolina (session of 1831–32) castration with intent to murder or maim was made a capital crime.—American Jurist, vol. viii. p. 197.

CHAPTER XVI.

POISONS.

Definition of a poison. Resistance to poisons sometimes observed in man and animals. Modes in which poisons may be introduced into the system — variety as to the rapidity of their effects — laws founded on this circumstance. Division of poisons into irritant — narcotic — narcotico-acrid. 1. SIGNS OF POISON IN THE LIVING BODY. Symptoms of the irritant poisons — the narcotic — the narcotico-acrid. Causes that may modify or vary the progress of symptoms. Preliminary directions for the analysis of suspected substances — administration of the supposed poison to animals — mode — value of the evidence thus obtained. Of poisoning during illness — value of moral evidence. Of the poisons of the ancients, and what have been called slow poisons. Of poisons administered to several persons at the same time — variety of effects. Of poisoning as the result of suicide or homicide — pretended poisoning. Diseases and symptoms that may be mistaken for the effects of irritant poisons — idiosyncrasy — distension or rupture of the stomach, intestines, and other abdominal organs — cholera — inflammations — perforations — hæmatemesis — colic. Of narcotic poisons — apoplexy — epilepsy. 2. SIGNS OF POISON ON THE DEAD BODY. Danger of neglecting a medico-legal dissection — cases. Preservation of the contents of the stomach and intestines. Appearances on dissection from the irritant poisons — narcotic — narcotico-acrid — variety in these. Introduction of poison after death — appearances indicative of this. Appearances and diseases that may be mistaken for the effects of poisons. Vascularity of the stomach after death — how discriminated from the effects of inflammation. Ulcers or perforations of the stomach and intestines, through the action of the gastric juice, or as a consequence of disease — how these are to be distinguished from perforations induced by irritant poisons. Chemical examination — the poison cannot always be detected — being removed by vomiting — absorption — decomposition — should then be sought for in the solids. How far putrefaction renders their detection impossible — general outline of treatment — antidotes — removal of the poison by vomiting — the stomach-pump — cupping-glasses. Statistics of poisoning in France.

"THE means of ascertaining the traces of poisons, either on the living or the dead body, is one of the most important subjects in legal medicine, and its importance is only equalled by its difficulty."

I propose to consider the subject under three general divisions.

1. The signs of poison in the living body.
2. The signs of poison on the dead body.
3. The various kinds of substances that may produce, or have produced, these dangerous and fatal effects.

Previous to an examination of these, a few preliminary observations will be proper.

What is a poison? The ancients considered every thing as poisonous that produced malignant symptoms, and attacked directly what we style the vital principle. Thus, miasma was with them a poison, and their remedies, or antidotes, were accordingly directed to the support and cherishing of the vital heat, and to increase action throughout the body. Hence, also, the name of alexipharmics, and the belief of driving out poison by transpiration. The common idea of a poison by the moderns, on the other hand, is that it is a substance, which, on being applied in one or other way to the human body, is capable of destroying the action of the vital functions, or of placing the solids and fluids in a situation that prevents the continuance of life. Dr. Mead's definition includes every substance which, in small doses, can produce great changes on the living body. This is evidently too extensive, since it embraces many articles that are not regarded as poisons, and excludes others that are really so. Thus, a small quantity of bread or water has produced great changes, whilst opium or corrosive sublimate has been taken in large quantities, without injurious effects. The definition given by Foderé, although liable to criticism, is, probably, as unexceptionable as any that has yet been offered. He considers poisons to be those substances which are known by physicians as capable of altering or destroying, in a majority of cases, some or all of the functions necessary to life.* The great and leading object in medico-legal cases, necessary to complete the idea of a poison, is the intent with which the substance is given.

Another interesting question is the manner in which poisons act. This has been a subject of fruitful discussion among modern physiologists, and our own country has not been wanting in ardent examiners respecting it.†

It is not compatible with the limits of this work, to enter into a full consideration of this subject, and a brief account would only provoke criticism. The varied results obtained by different experimentalists, have inclined them respectively in favour of the blood-vessels, the nerves, or the lymphatics, as the medium by which poisons produce their effects.‡

A concise notice of the consequences observed from each individual poison, will be more appropriate to the object of the work, and this will accordingly find its proper place in the third division of the subject.

* Foderé, vol. iii. p. 449.

† See Ducachet's Inaugural Dissertation on the action of poisons. Somerville's Inaugural Dissertation on the organs of absorption.—Chapmans' Journal, vol. ii. p. 408. Report of the committee of the academy of medicine, on the means by which absorption is effected.—Ibid. vol. iii. p. 282. Dr. Milner's Experiments.—Ibid. vol. iv. p. 10. Dr. Hubbard's Experiments.—Ibid. vol. iv. p. 242. Drs. Lawrence and Coates' Experiments.—Ibid. vol. v. p. 327. Also Dr. Hale's Boylston Prize Dissertation.

‡ Among European writers on this subject, I may venture to mention Christison, chap. i. Addison and Morgan on the operation of poisonous agents, London, 1829; the experiments of Segalas, in Brande's Journal, vol. xxi. p. 401; Dr. W. C. Henry, Philosophical Magazine and Annals, vol. x. p. 293; Cyclopædia of Practical Medicine, art. *Toxicology*, by Dr. Apjohn; Edinburgh Medical and Surgical Journal, vol. xxxii. p. 129; Magendie's Lectures on Absorption, in Lancet, N.S., vol. xv.

The remarkable resistance that is sometimes observed to the action of poisons, also deserves an early allusion. Instances of this nature are so numerous, that a selection of the more striking will be sufficient to illustrate the position.

Among the Hungarians, the seeds of the *Palma Christi* are often taken to the amount of thirty-six grains, without any inconvenience, and some of the French peasantry use a decoction of *colocynth* as a common purgative. The common dose of the extract of the *aconitum napellus* is one or two grains, and it is deemed dangerous to use it in larger quantities; but Foderé was consulted concerning the case of Charles IV. of Spain, who, while residing at Marseilles, was attacked with a rheumatic gout, and he recommended the medicine in question. M. Soria, the king's physician, replied, that at a former period, it had been administered for a length of time, and to such an extent that the patient took a drachm daily, without any good or evil effects. This monarch was now sixty-two years of age, athletic, and had an excellent appetite.* The fumes of mercury, of lead, and of copper, are well known to be injurious to those who inhale them, yet no fact is better established than that of workmen resisting their effects for many years. "In the mines of Peru," says Humboldt, "from five to six thousand persons are employed in the amalgamation of the minerals, or the preparatory labour. A great number of these individuals pass their lives in walking barefooted over heaps of brayed metal, moistened and mixed with muriate of soda, sulphate of iron, and oxide of mercury, by the contact of the atmosphere and the solar rays. *It is a remarkable phenomenon*," he adds, "*to see these men enjoy the most perfect health.*"† Again, in all the Savoyard and Swiss Alps, milk is collected and kept in small copper vessels, and in Germany preserved fruits are put into vessels of this metal, in order to give them a green colour, and all without inducing any injury.‡ The most astonishing of cases, however, on record, is that of the old man, at Constantinople, who had been in the habit, for thirty years, of swallowing enormous quantities of corrosive sublimate, until his dose came at last to be a drachm daily. He was living in 1800.§

These exceptions to general rules are best explained on the principle of idiosyncrasy, or of habit rendering the system innoxious to their effects.‖ And such extraordinary instances should, above all, never influence us in legal medicine, nor lead us to the idea, that

* Foderé, vol. iii. p. 468.

† Political Essay on the Kingdom of New Spain. ‡ Foderé, vol. iii. p. 449.

§ This case was first mentioned by Dr. Pouqueville. Mr. Thornton doubted the story, and criticised the name given him. Lord Byron, in the notes to his Childe Harold, attacked Mr. Thornton in his turn. And thus "this man (says Mr. Hobhouse), though nearly one hundred years old, was, like Partridge, the almanack-maker, almost reasoned out of existence by a verbal criticism which has turned out to be incorrect." — Hobhouse's Albania, vol. ii. p. 945. London edition.

Dr. Strohmayer relates of a peasant who resided near a convent in the Tyrol, and took for a long time ten grains of arsenic daily with his food. The monks fully testify to the truth of this statement! !— Boston Med. and Surg. Journal, vol. xii. p. 211.

‖ The quantity of opium taken daily by the Turks is also a striking proof of this.

because one person has taken a particular substance without any ill effects, it is therefore not a poison. The academy of Berlin was consulted in 1752, whether copper was a poison. They replied, that they did not consider it decidedly so, since several had taken it with impunity, either separately or mixed with food. Now, if this decision receives a general application, we may undoubtedly adduce examples of wonderful escapes from the effects of almost all noxious substances, and thus destroy the idea of poison altogether.

There is another curious fact connected with this subject, which it is proper to mention. It is the different effects which some substances produce on man and other animals—being noxious to the one, and innoxious to the other, and vice versa. Thus, sweet almonds are said to kill dogs, foxes, and fowls—aloes is destructive to dogs and foxes—pepper to hogs, and parsley to the parrot. On the contrary, hogs feed on henbane (hyoscyamus), pheasants on stramonium, and goats on water-hemlock (cicuta virosa), with impunity.* Many, however, of the principal poisons produce similar results on man and other animals, and on none, probably, is the resemblance greater than with the dog.

Poisons may be introduced into the system in various ways: through the nose, in the form of odours; through the lungs, by inspiration; by the mouth and œsophagus, in the form of food; by the rectum, in the form of injection, and through the skin, in some instances (although this is denied by several physiologists), by absorption.†

The rapidity of the action of poisons varies considerably. Concentrated hydrocyanic acid destroys an adult man, as we shall see, almost in an instant; while others take away life within an hour—a few hours—a day, or a longer period. Some, indeed, when the sufferer escapes the immediate consequences, prove fatal after months or a year; but with a sufficiently marked train of symptoms to indicate with certainty the original cause. It is on this account that a particular period has been introduced in the laws of some countries; and if the poisoned person dies within it, the criminal is to suffer punishment.

* Foderé, vol. iv. p. 203. Mahon, vol. ii. p. 302. Dr. Christison is disposed to doubt many of these statements.

† There are many curious accounts on record, of the mode in which poisoning was formerly supposed to be perpetrated. Thus, Zacchias says, that Pope Clement VII. was poisoned by the smoke of a candle; and it was also thought that dresses and jewels might be impregnated with venomous matters. Queen Elizabeth was to have been poisoned, by spreading some on the pommel of the saddle. "The queen, in mounting, would transfer the ointment to her hand; with her hand she was likely to touch her mouth or nostrils, and such was the virulence of the poison, that certain death must follow."—Aikin's Memoirs of Queen Elizabeth, American edition, vol. ii. p. 306. There is a minute of council extant, in the hand-writing of Cecil, which contains, among other things, the following caution: "That no manner of perfume, either in apparel, or sleeves, gloves, or such like, or otherwise, that shall be appointed for your majesty's savour, be presented by any stranger, or other person, but that the same be corrected by some other fume."—Ibid. vol. i. p. 299.

Of all or most of these, we may remark, that they are altogether fabulous—the suggestions of ignorance or malice.

In England, it is deemed murder if the party poisoned die within the year; while in Scotland, according to the opinion of Baron Hume, it would seem that a person might be punished although death took place at a period indefinitely remote; provided the operation of the poison can be distinctly traced as causing it.* In the state of New York, the law formerly was similar to the English. If the individual poisoned died within a year and a day, it was murder; if beyond that, the punishment was imprisonment in the state prison for a term not exceeding fourteen years.† This enactment is, however, omitted in the Revised Statutes; and it is now provided, that "if any person shall be convicted of having administered, or of having caused and procured to be administered, any poison to any other human being, with intent to kill such human being, and which shall have been actually taken by such being, whereof death shall not ensue, he shall be punished by imprisonment in a state prison, for a term not less than ten years.‡

In all the states, wilful but unsuccessful attempts to destroy life by poison, are ranked among the higher crimes; but I cannot find any limitation as to time.§ In England, the administration of any poison or other destructive thing, or causing it to be taken, is, by a recent act, declared felony.‖

In the former edition, when noticing the action of individual poisons, I pursued the arrangement adopted by Foderé and Orfila. This was to consider them under six divisions, viz. *Corrosive, astringent, acrid, narcotic, narcotico-acrid, and septic.* Subsequent examination has convinced me that this is too minute, that it unnecessarily separates some, and that a class is introduced (the septic) which can have no existence. I have, therefore, readily adopted the division used by

* Christison, p. 39. † Revised Laws, vol. i. p. 409.

‡ Revised Statutes, vol. ii. p. 665. The following are, also, made offences: "Mingling poison with any food, drink, or medicine, with intent to kill or injure any human being; wilfully poisoning any spring, well, or reservoir of water; and administering or exposing any poisonous substance, so that it should be taken by any horse, cattle, or sheep."—Ibid. pp. 666, 689. "If any physician, while in a state of intoxication, shall, without a design to effect death, administer any poison, drug, or medicine, or do any other act to another person, which shall produce the death of such other, he shall be deemed guilty of manslaughter."—Ibid. p. 662. If, under the same circumstances, a physician, or any other person, prescribes either of the above, and life is endangered, it is declared a misdemeanor.—Ibid. p. 694.

§ The following cases shew that the laws follow such as use poisons, even when the individual whom they intend to destroy does not take them, but some third person, who had taken them accidentally. A, intending to kill his wife, gave her a poisoned apple, and she, being ignorant of it, gives it to a child, against whom A never meant any harm. The child died. A was convicted on this for murder.—Saunders' Case, Plowden's Reports, p. 473. Again, if A sends poison, intending it for B and with intent to kill him, and it comes into the possession of C who takes it, but does not die; A may be indicted for a capital offence, under the 9 George IV. chap. 31, sect. 11.—Rex *v.* Lewis, 6 Carrington and Payne's Reports, p. 161.

‖ 9 George IV. chap. 31, sect. 11. Under this act, Justice Park decided that putting arsenic into coffee was administering poison, or causing it to be taken. Rex *v.* Harley, 4 Carrington and Payne's Reports, p. 369.

Professor Christison, and shall consider poisons under the three grand classes of

IRRITANTS,
NARCOTICS, and
NARCOTICO-ACRIDS.

1. *Signs of poison on the living body.*

A person is supposed to be poisoned, if, being in perfect health, he is attacked, after having taken some food or drink, with violent pain, cramp in the stomach, nausea, vomiting, convulsive action, and a sense of suffocation; or if he be seized, under the same circumstances, with vertigo, giddiness, delirium, or unusual drowsiness.*

All these symptoms may, however, be the effect of sudden illness, and the examiner should, therefore, recollect whether an epidemic or sporadic disease, resembling that of the patient, does not exist. He should also inquire into his strength, mode of life, and habit of body, and ascertain whether he had previously complained of ill health. The time at which the noxious substance was taken, and the vehicle in which it was given, the taste or odour that was perceived on its administration, and the food or drink that has been lately swallowed, are all subjects that require particular notice.

Poisons, also, are generally characterised by the rapidity with which the symptoms follow each other, and by their steady march to a fatal termination. For this, however, as with the early affections, there may be other causes assigned, independent of the action of noxious substances. Nor are these effects invariable, although common. Some of the most fatal, as arsenic, are occasionally accompanied with remissions; others, as nux vomica and its alkaloid, attack in paroxysms. There is also no doubt but that, as suggested by Dr. Christison, the occurrence of sleep, immediately after taking some of the irritant poisons, may retard the developement of symptoms.

Having formed an opinion, from a review of the above circumstances, that a poisonous substance has been taken, the next question that arises is, to what class it belongs. Although (as I have already remarked) the symptoms of poisons are somewhat equivocal and unsettled, yet there are certain leading and characteristic appearances, which, in a majority of cases, serve to distinguish the two great divisions from each other. And these two are the *irritant* (corrosive or acrid) and the *narcotic*.

"The class of *irritant* poisons comprehends both those which have a purely local, irritating action, and likewise many which also act remotely, but whose most prominent feature of action still is the inflammation they excite wherever they are applied."†

We may suppose that one of this class is the cause of present

* These are the most striking *preliminary* symptoms. Mahon has collected a long list from the older writers, which, however, includes most of the appearances observed during the whole progress of the action of poisons. It is evidently too general to be of much practical value.—See Mahon, vol. ii. p. 263.

† Christison, p. 96.

disease, if the patient has observed that the food or drink which was its vehicle, had not its ordinary taste; if he has felt a heat, an irritation, or an extraordinary and sudden dryness at the root of the mouth and œsophagus, with a constriction or sense of strangling in those parts; if this be succeeded by an obstinate anxiety to vomit, and sharp pains in the stomach and intestines; if there be great thirst, copious discharges, by vomiting and by stool, accompanied with tenesmus and followed by hiccup, by a sense of constriction across the diaphragm, and a difficulty of breathing; if there be great pain in the region of the kidneys, followed by strangury; if convulsions, cramps of the hands, trembling of the lips, extinction of the voice, repeated faintings, cold sweats, and a small chorded and irregular pulse be present; and if, in addition to all these, the intellectual faculties remain perfect, until the disease arrives near its fatal termination.*

A narcotic poison, on the other hand, produces the following effects: stupor, numbness, a great inclination to sleep, coldness, and stiffness of the extremities, a cold sweat of a fœtid or greasy nature, swelling of the neck and face, protrusion of the eye, with a haggard cast of countenance, thickening of the tongue, frequent vertigo, weakened eyesight, or objects presented to it in a fantastic manner, coma, delirium, general debility, palpitation of the heart, the pulse at first full and strong, but afterwards unequal and intermittent, paralysis of the lower extremities, retraction of the lips, general swelling of the body, and dilatation of the veins. At the conclusion of the disease, slight convulsions and pain are sometimes present.†

If we pursue the arrangement proposed above, we shall find that the narcotico-acrid poisons are distinguished by a combination of several of the above symptoms. They are, agitation, pain, acute cries; sometimes stupor and convulsive motions of the muscles of the face, jaws, and extremities; vertigo, and, occasionally, extreme stiffness of the limbs, and contraction of the muscles of the thorax; the eyes red and starting from their sockets, the pupils frequently dilated; insensibility to external impressions; mouth full of foam; tongue and gums livid; nausea, vomiting, frequent stools: often these symptoms attack in paroxysms, and the patient is left comparatively easy for a few moments.‡

It may appear easy, after this enumeration, to distinguish the nature of the poison that has been taken, but in ordinary practice it is, notwithstanding, very difficult. There are substances, very distinct in their characters, which produce similar effects, as, for example, cantharides, acrid vegetable substances, and caustic minerals. All these belong to the class of irritants, and generally exhibit similar

* Foderé, vol. iv. p. 190. Orfila's Toxicology, vol. i. p 15; vol. ii. pp. 98, 514. "In general," says the last author, "the patient preserves the use of his intellectual faculties during the first periods, but a short time before death he falls into a state of great insensibility and immobility, and is agitated by convulsive movements." He also mentions purple spots over the body, and a miliary eruption, as occasional symptoms of this class.

† Foderé, vol. iv. p. 190. Orfila's Toxicology, vol. ii. pp. 170, 515.

‡ Orfila's Toxicology, vol. ii. p. 367, 516.

symptoms. The difficulty is increased, when it is recollected, that ordinary and innoxious substances, so far as concerns their poisonous nature, sometimes cause the most alarming symptoms. Foderé observes, that he has seen a roasted chestnut produce all the symptoms of poison, until a dose of tartar emetic dispelled its influence.*

On the other hand, a variety is frequently observed in the symptoms excited by the same poison, on different individuals. Many causes may conduce to this, such as the mode in which it is exhibited: poison given in the liquid form is generally more rapid and marked in its effects than when it is exhibited in the solid state; and the substances previously or subsequently taken may also modify the symptoms. Instances of this variety are to be found in all authors on toxicology. Marc produced salivation in a dog, by giving him a large dose of opium, while sleep, the common consequence, was wanting.† So, also, Morgagni relates of a female, aged sixty, who had eaten a paste composed of milk and arsenic, which had been prepared for rats. She died in twelve hours after, but without having suffered any severe pains or convulsions. On dissection, however, her stomach was found eroded.‡

I apprehend that the circumstance of the patient's vomiting or not vomiting, has the greatest influence on the course and variety of the symptoms. This is a subject to which I shall have frequent occasion hereafter to refer, but it may be remarked, at present, that there are many persons who vomit very readily, whilst in others the act is very difficult, and almost causes convulsions. In the former case the poison may be rejected before it has time to produce injurious effects, while in the latter, death will be the inevitable consequence. And, again, the poison, from the quantity taken, or for some other reason, may itself produce vomiting, and thus prevent the fatal termination. Dr. Petit of Lyons relates of a person who survived after taking half an ounce of arsenic, and he attributes this to the violent vomiting that ensued. Deschamps gives an account of a female who recovered after taking two drachms of tartar emetic, which was followed by vomiting; whilst another, who, by buying small quantities from different apothecaries, had obtained eleven grains of the same salt, died from using it.§ It is probable that large doses produce their effects early and violently, and the stomach endeavours to reject them as soon as perceived, while small ones seem to have time to act not only on the system generally, but also on the structure of parts.

A minute and accurate notice of symptoms is hence worthy of every attention, but it only forms the commencement of the inquiry in cases of supposed poisoning.

* I shall notice this point more particularly at the conclusion of the section.

† Foderé, vol. iv. p. 195. ‡ Morgagni, vol. ii. epist. 59, p. 366.

§ A still more striking case was mentioned in a Boston paper of the month of February 1817. A man named George Beals, aged 21, and residing at Springfield, Massachusetts, with an intent to destroy himself, swallowed, at one draught, one ounce and a half of arsenic, immediately after having eaten a hearty supper of beefsteaks. He was seized instantly with a violent vomiting, and was subsequently affected with spasms, but was restored to his usual health in three or four days. In about a month after, he destroyed himself by hanging.

It is the further duty of the physician to examine every article of a suspicious nature, such as phials, boxes, or papers, containing powders. These should be carefully put aside without remark. If the patient preserve his senses, we may obtain much necessary information from him, and possibly may also procure the remainder of the drink or substance that he has not completely taken. If this be impracticable, the matter vomited should be preserved, as also the linen or sponges used to collect the fluid which may have been deposited on the floor of the chamber, and a sufficient quantity should be sealed up, and reserved for the inspection of a competent chemist.

For a proper analysis of the matter vomited, of the matter found in suspected repositories, or the matter found in the stomach or intestines, or both, after death, the following preliminary directions require attention. Never make any experiments on the suspected substance, without repeating them on ingredients that are deemed analogous, and in which the quantity of poisonous matter is ascertained. For this purpose, several solutions should be made of substances which it is supposed may probably resemble the poison given, and, from the result, a comparison can be instituted. Again, the analysis should never be commenced until the tests are all prepared, and their accuracy determined. The order of proceeding should be previously laid down in the mind of the operator, and, when ready, he should perform the experiments at one time. The risk of losing a part of the suspected substance, from employing inconclusive experiments, is thus avoided. Thirdly, if the quantity of matter received be sufficient, it should be divided into small portions, so that the various tests can be applied to each, but if there be only a very small quantity, the symptoms should be carefully considered, together with the indications they present, and an opinion should be formed as to the poison which most probably has caused the present disease. The tests applicable to it should then be employed. In pursuing this examination, it is of little importance, comparatively speaking, whether a decisive opinion can be formed as to the *quantity* administered: it is sufficient to prove the *nature* and *quality* of the substance.

Chemistry can thus lend its aid in detecting mineral substances, but it often fails in ascertaining the nature of a vegetable poison. Of late years, however, great advances have been made even in this department, as will be seen more particularly when noticing opium, hydrocyanic acid, &c. But, even in cases where the powers of analysis are at fault, some approach to the actual truth may be made by a careful examination of the contents of the elementary canal. Grains or berries, or the ligneous parts of plants, have thus been detected.

The kitchen utensils should always be noticed, since it may happen that a copper vessel badly tinned is the sole cause of these violent effects; and we should also remember, that the green colour which is frequently observed in the matter vomited, may be owing to vitiated bile, as well as to a mineral or vegetable poison.

It is an ancient direction, that part of the suspected substance should be given to some animal, in order to test its injurious nature. But the uncertainty of this proof has been shewn in a former page,

where it was mentioned that some articles, poisonous to man, are innoxious to animals; and it is therefore a point of considerable interest to ascertain on which of them it is most likely to produce similar effects. Physiologists generally recommend a dog as the subject, and Orfila says it should be a small, robust one, that is fasting. The suspected substance should not be put into his food, as is the ordinary practice, nor, indeed, should he be allowed to swallow it. This would produce the hazard of losing the whole by vomiting; and he hence advises that the œsophagus should be detached, and perforated with a small hole; into this a glass funnel is to be introduced, and the liquid poured through it into the stomach; the œsophagus is then tied below the opening. If the substance be solid, it should be put into a small paper cone, in order that it may be pushed down into the stomach through the opening. This, he adds, is the only method by which vomiting can be prevented, and the suspected substance exhibit its true character.* The testimony to be derived from this proof of poisoning is, however, barely *presumptive*. The poisonous substance may be decomposed in the stomach of the patient by food or antidotes; it may have been rejected by vomiting, or it may have been absorbed, so as to leave only a minute quantity in the intestinal canal; and, in all these cases, the animal will probably escape uninjured. "Experiments of this kind, separately considered, possess no value, only as they present a positive result—that is to say, death; but we repeat again, they ought not to be regarded, even when well made, except as a secondary means, proper for corroborating the conclusions drawn from chemical analysis, symptoms, and lesions of texture."†

While, therefore, such investigations are not to be totally discouraged, it is proper to suggest that in many, indeed in most instances, the suspected matter found is not sufficient to warrant the medical examiner in employing it for this purpose. He will generally have the alternative presented of omitting all other experiments if he makes these. Besides, as has been conclusively remarked by Professor Christison, "if the quantity of poison in the suspected substance is great enough to affect one of the perfect animals, it may be recognised to a certainty by its physical or chemical properties."‡

It must also be recollected, in connexion with the circumstance under notice, that the human fluids, and particularly the *bile*, may, from disease, acquire such an acrimony as to be fatal to animals. Morgagni relates a remarkable instance of this kind. A child died of tertian fever after having suffered violent convulsions. On dissection, the stomach was found to contain green bile, which tinged the scalpel

* Orfila's Toxicology, vol. ii. p. 532. It has been objected to this mode of experimenting, that the operation on the œsophagus will destroy life, or produce alterations of texture; but our author shews by numerous examples, that the ligature on this part in dogs constantly produces, during the first two days, nothing more than a slight fever, and a little dejection, which is incapable of destroying them in so short a time; and, also, that if animals be killed when in this state, no lesions will be discovered on dissection. If poisons, on the contrary, be introduced through the opening, their effects will be early manifested.—Vol. ii. p. 482.

† Orfila's Toxicology, vol. ii. p. 535. ‡ Christison, p. 62.

of a violet colour. Having dipped the point of his instrument in the bile, he wounded two pigeons, who expired almost instantly in violent convulsions; and some of it, mixed with bread, was given to a cock, who also expired in a short time.*

Until now, I have considered the subject of poisoning persons in a state of health. I may add that this is often attempted on individuals who are ill; and the difficulty of distinguishing the symptoms of disease from those of poison is proportionably increased. It may be said that the disease has taken a sudden turn—that the medicines used have been prejudicial, and that present appearances are a convulsive or final effort of the system. In such cases, attention to the following circumstances is required:

1. The sudden occurrence of symptoms which do not usually accompany the disease under which the patient labours. Thus, we should feel suspicious if, in an ordinary case, nausea, vomiting, hiccup, fainting, cold sweats, with bloody stools, should suddenly and rapidly follow each other; or again, if stertor, delirium, or insanity, should supervene on a case of common disease.

2. Moral evidence. This is to be attended to in all cases, but more particularly under the circumstances now indicated. The physician should never allow these to prejudice his mind, but he should never neglect noticing them; and I take this early occasion to say, that the physician is, of all persons, the best judge concerning them. Let him ascertain whether an enmity does not exist between the sick person and some one who attends or visits him; if so, inquire whether any poisonous substances have lately been purchased; whether these are still in the house; whether the alarming symptoms came on immediately after taking a drink, or any other substance of an innocent nature: and particularly ascertain whether any thing has been given without the orders of the physician, or by a person ignorant of medicaments.

Inquire, also, as to any suspicious conduct after the patient's death; such as hastening the funeral, preventing the inspection of the body, and giving a false account of the previous illness. In many cases, unfortunately, the crime of seduction is followed by attempts to destroy life; and hence, if a female has been poisoned, the investigation should extend to the decision of that fact.†

In illustration of these remarks I will only quote, at present, two cases; one comparatively ancient, and the other of late occurrence. When noticing individual poisons, numerous others must necessarily be mentioned, in which the moral evidence has thrown great light on their respective intricacies.

An individual aged fifty-six years, and subject to flatulence, took a bowl of chocolate and milk previous to starting on a journey. It was prepared by his daughter. He had advanced a very short distance, when he was seized with nausea, vomiting, and other severe symptoms, which obliged him to return home, and his death followed in nine hours after taking the chocolate. His body was not inflated; his

* Morgagni, vol. ii. epist. 59, p. 396. † Christison, p. 71.

visage was natural, but the nails were blue; and on his shoulders and breasts were spots of the same colour. This disease was considered cholera morbus; but Hoffman, from whom the narrative is taken, believed it to be the effect of arsenic rather than cholera, and for the following reasons: the symptoms which followed the use of the drink, such as copious vomiting, accompanied with a cadaverous paleness of the face, coldness of the extremities, great prostration of strength, poignant lancinating pain in the intestines, and the cessation of arterial action and convulsions, all succeeded each other with greater rapidity than is observed in ordinary cholera morbus. Again, the daughter was at enmity with the father, who had punished her for living with her valet; and it was also known that she had previously purchased arsenic.*

"William Muir was tried and condemned at Glasgow, in 1812, for poisoning his wife. In the course of the day on which she was taken ill, she was visited by a farmer of the neighbourhood, who had studied physic a little in his youth. He learned from her that she had breakfasted on porridge a short time before she felt herself ill, and that she suspected the porridge to have been poisoned. He immediately procured the wooden bowl, in which the cottagers of Scotland keep the portion of meal used each time for making the porridge, and finding in it some meal, with shining particles interspersed, he wrapped a sample in paper, and took the proper measures for preserving its identity. He then secured also a sample from the family store in a barrel. The two parcels were produced by him on the trial, and from experiments made in court, the late Dr. Cleghorn was enabled to declare, that the meal from the bowl contained arsenic, and that the meal from the barrel did not. These facts, besides proving that the woman had, next to a certainty, taken arsenic in the porridge, likewise, in conjunction with other slight moral circumstances, established that the poison had been mixed with the meal in the house, and on the morning when the deceased took ill, before any stranger entered the house."†

The subject of what have been called slow poisons, deserves a passing notice, although it must be confessed that this is so closely connected with popular superstition, that it is almost impossible to separate truth from falsehood. In Italy, for example, it was formerly said, that poisons were invented to destroy life at any stated period, from a few hours to a year.‡ This, however, is a mere fiction, and it

* F. Hoffman's Opera Omnia, vol. iii. sect. 2, chap. 8. p. 170.

† Christison, p. 72. The case was communicated by Professor Alison.

‡ We are indebted to Professor Beckmann for a very elaborate article on this subject, in which he has concentrated nearly all that is known concerning *secret poisoning*. Of this I shall present an abstract, aided with some facts from other sources. He considers it unquestionable that the ancients were acquainted with such a kind of poison, and thinks it may be proved from the testimony of Plutarch, Quintillian, and other respectable authors. The former states that a slow poison, which occasioned heat, a cough, spitting of blood, a consumption, and a weakness of intellect, was administered to Aratus of Sicyon. Theophrastus speaks of a poison prepared from aconite, which could be moderated in such a manner as to have effect in two or three months, or at the end of a year, or two years; and he also relates, that Thrasyas had discovered a method of preparing from other plants a poison, which, given in small doses, occasioned an easy but certain death, without

is now well understood, that we know of no substances which will produce death at a determinate epoch. But I shall have occasion in the

any pain, and which could be kept back for a long time without causing weakness or corruption. This last poison was much used at Rome about two hundred years before the Christian era. At a later period, a female named Locusta was the agent in preparing these poisons; and she destroyed in this way, at the instigation of Nero, Britannicus, the son of Agrippina.

The Carthaginians seem also to have been acquainted with the art of poisoning; and they are said, on the authority of Aulus Gellius, to have administered some to Regulus, the Roman general. Contemporary writers, however, it must be added, do not mention this.

The principal poisons known to the ancients, were prepared from plants, and particularly aconite, hemlock, and poppy, or from animal substances; and among the latter, none is more remarkable than that obtained from the sea-hare (*Lepus marinus*, or *Aplysia depilans* of the Systema Naturæ). With this, Titus is said to have been despatched by Domitian. They do not seem to have been acquainted with the common mineral poisons.

In the year 1659, during the pontificate of Alexander VII., it was observed at Rome, that many young married women became widows, and that many husbands died when they became disagreeable to their wives. The government used great vigilance to detect the poisoners, and suspicion at length fell upon a society of young wives, whose president appeared to be an old woman, who pretended to foretell future events, and who had often predicted very exactly the death of many persons. By means of a crafty female, their practices were detected; the whole society were arrested and put to the torture; and the old woman, whose name was Spara, and four others, were publicly hanged. This Spara was a Sicilian, and is said to have acquired her knowledge from Tofania at Palermo.

Tophania, or Tofania, was an infamous woman, who resided first at Palermo, and afterwards at Naples. She sold the poison, which from her acquired the name of *Acqua della Toffana* (it was also called *Acquetta di Napoli*, or *Acquetta* alone); but she distributed her preparations by way of charity to such wives as wished to have other husbands. From four to six drops were sufficient to destroy a man; and it was asserted, that the dose could be so proportioned as to operate in a certain time. Labat says, that Tofania distributed her poison in small glass phials, with this inscription, *Manna of St. Nicholas of Bari*, and ornamented with the image of the saint. She lived to a great age, but was at last dragged from a monastery, in which she had taken refuge, and put to the torture, when she confessed her crimes, and was strangled.

In no country, however, has the art of poisoning excited more attention than it did in France, about the year 1670. Margaret d'Aubray, wife of the Marquess De Brinvillier, was the principal agent in this horrible business. A needy adventurer, named Godin De Sainte Croix, had formed an acquaintance with the marquess during their campaigns in the Netherlands, and became at Paris a constant visitor at his house, where, in a short time, he found means to insinuate himself into the good graces of the marchioness. It was not long before the marquess died — not, however, until their joint fortune was nearly dissipated. Her conduct, in openly carrying on this amour, induced her father to have Sainte Croix arrested and sent to the Bastile. Here he got acquainted with an Italian, of the name of Exili, from whom he learnt the art of preparing poisons. After a year's imprisonment, Sainte Croix was released, when he flew to the marchioness, and instructed her in the art, in order that she might employ it in bettering the circumstances of both. She assumed the appearance of a nun, distributed food to the poor, nursed the sick in the Hotel Dieu, and tried the strength of her poisons undetected on these hapless wretches. She bribed one Chaussée, Sainte Croix's servant, to poison her own father, after introducing him into his service, and also her brother, and endeavoured to poison her sister. A suspicion arose that they had been poisoned, and the bodies were opened, but no detection followed at this time. Their villanous practices were brought to light in the following manner. Sainte Croix, when preparing poison, was accustomed to wear a glass mask; but as this happened once to drop off by accident, he was suffocated, and found dead in his laboratory. Government

next section, when stating the case of the late Prince Charles of Augustenberg, to shew that the idea of slow poison is still prevalent, even among the physicians of continental Europe.

caused the effects of this man, who had no family, to be examined, and a list of them to be made out. On searching them, there was found a small box, to which Sainte Croix had affixed a written request, that after his death it might be delivered to the Marchioness De Brinvillier, or, in case she should not be living, that it might be burnt. It was found to contain a great abundance of poisons of every kind, with labels, on which their effects, proved by experiments on animals, were marked. The principal poison, however, was corrosive sublimate. When the marchioness heard of the death of her lover and instructor, she was desirous to have the casket, and endeavoured to get possession of it by bribing the officers of justice; but as she failed in this, she quitted the kingdom. La Chaussèe, however, continued at Paris, laid claim to the property of Sainte Croix, was seized and imprisoned, confessed more acts of villany than was suspected, and was, in consequence, broken alive on the wheel, in 1673.

The marchioness fled to England, and from thence to Liege, where she took refuge in a convent. Desgrais, an officer of justice, was despatched in pursuit of her, and, having assumed the dress of an abbé, contrived to entice her from this privileged place. Among her effects at the convent, there was found a confession, and a complete catalogue of all her crimes, in her own hand-writing. She was taken to Paris, convicted, and, on the 16th of July, 1676, publicly beheaded, and afterwards burnt.

The practice of poisoning was not, however, suppressed by this execution; and it was asserted, that confessions of a suspicious nature were constantly made to the priests. A court for watching, searching after, and punishing poisoners, was at length established in 1679, under the title of *Chambre de poison*, or *Chambre ardente*. This was shortly used as a state engine against those who were obnoxious to the court, and the names of individuals of the first rank, both male and female, were prejudiced. Two females, La Vigoreux and La Voisin, were burnt alive by order of this court, in Feb. 1680. But it was abolished in the same year.

Professor Beckmann relates the following, as communicated to him by Linnæus: "Charles the XI., king of Sweden, having ruined several noble families by seizing on their property, and having, after that, made a journey to Torneo, he fell into a consumptive disorder, which no medicine could cure. One day he asked his physician, in a very earnest manner, what was the cause of his illness. The physician replied, 'Your majesty has been loaded with too many maledictions.' 'Yes,' returned the king, 'I wish to God that the reduction of the nobility's estates had not taken place, and that I had never undertaken a journey to Torneo.' After his death, his intestines were found to be full of small ulcers."

There has been great diversity of opinion as to the nature of these poisons. That prepared by Tofania appears to have been a clear insipid water, and the sale of aqua-fortis was for a long time forbidden in Rome, because it was considered the principal ingredient. This, however, is not probable. In Paris, the famous *poudre de succession* (also a secret poison), was at one time supposed to consist of diamond dust, pounded exceedingly fine; and, at another, to contain sugar of lead, as the chief ingredient. Haller was of this last opinion. In the casket of Sainte Croix were found sublimate, opium, regulus of antimony, vitriol, and a large quantity of poison ready prepared, the principal ingredients of which the physicians were not able to distinguish. Garelli, physician to Charles VI., king of the two Sicilies, at the time when Tofania was arrested, wrote to the celebrated Hoffman, that the *Aqua Tofania* was nothing else than crystallised arsenic, dissolved in a large quantity of water by decoction, with the addition (but for what purpose he knew not) of the herb *cymbalaria* (probably the *Antirrhinum cymbalaria*). And this information, he observes, was communicated to him by his imperial majesty himself, to whom the judicial procedure, confirmed by the confession of the criminal, was transmitted. But it was objected to this opinion, that it differed from the ordinary effects of arsenic, in never betraying itself by any particular action on the human body.

The Abbé Gagliani, on the other hand, asserts that it was a mixture of opium

The only case in which we can admit the action of poisons as in any manner approaching that ascribed to the deleterious agents used in former times, is when minute portions of the irritant poisons have been administered from time to time; or when individuals, through their occupations and employments, are daily exposed to an atmosphere containing small quantities of them. In this way the effects of disease may be mistaken for poisoning, and *vice versâ*. Their course often is, gradually to cause irreparable injury to the digestive and lymphatic systems, and, finally, to destroy life. In such instances, great caution in the examination of symptoms is necessary, and an extended inquiry should be made as to the agents that possibly may induce them.

Poisons may also be administered to several persons at once, as at an entertainment, and the symptoms that follow be so various as to render the case doubtful, were it not understood that such consequences are of frequent occurrence. I shall endeavour to illustrate this point by some cases.

In the month of May 1711, four individuals, viz. a priest, two females (one of whom was his sister-in-law), and another person, all in good health and on a journey, stopped at an inn to dine. They proceeded on their journey after taking this meal; but in a short time the priest was seized with such violent pain as to oblige him to dismount

and cantharides, and that the liquor obtained from its composition was as limpid as rock water, and without taste. Its effects are slow, and almost imperceptible. Beckmann appears to favour this idea, and suggests, that a similar poison is used in the east, under the name of *powst*, being water which had stood a night over the juice of poppies. It is given to princes whom it is wished to despatch privately, and produces loss of strength and understanding, so that they die in the end, torpid and insensible.

Dr. Duncan, jun., however, objects to the opinion of Gagliani, as perfectly inconsistent with the appearance and effects of the poison. The prevailing idea is that of Garelli.

Cellini, who lived during the 16th century, tells us, in his Autobiography, that poisoning was attempted on him with the diamond (not because they deemed it noxious, but from the particles irritating the stomach), and with corrosive sublimate.—Beckmann, vol. i. p. 54. Smith, p. 195. London Monthly Magazine, vol. xiv. p. 515. Metzger, pp. 386, 402. Supplement to Encyclopædia Britannica, art. *Aqua Tofania*, by Dr. Duncan, jun.

"It is not because we know less," says Dr. Duncan, "but because we know a great deal more than our forefathers, that the art of secret poisoning seems to be lost." In Turkey, it would appear from Dr. Oppenheim's narrative, that corrosive sublimate is often employed.—Medico-Chirurgical Review, vol. xxiii. p. 438. Mr. Madden (Travels, American edition, vol. i. pp. 33, 82), however, says that the poison used is tasteless, and on that account imagines it to be arsenic. He saw eight cases, while residing in Turkey, and in most of them, death ensued within twelve, and in all, within forty-eight hours. "The terrible science of poisons (says Sismondi) is the first branch of chemistry which is successfully cultivated by barbarous nations."—Fall of the Roman Empire, vol. i. p. 256.

Secret poisoning has even penetrated into the forests of our own country. "The celebrated chief, *Black Bird*, of the Omawhaws, gained great reputation as a medicine man; his adversaries fell rapidly before his potent spells. His medicine was arsenic, furnished him for this purpose by the villany of the traders."—Dr. James' account of Major Long's Expedition, vol. i. p. 226.

Those who are curious on the poisons of the ancients, I will refer to Adams on the ancient principles of Toxicology, in Edinburgh Medical and Surgical Journal, vol. xxxiii. p. 315; and Sir Henry Halford's Essay on the deaths of some illustrious persons of antiquity.

from his horse. Copious evacuations by vomiting and stool succeeded, and his illness increased so rapidly that it was found necessary to take him back to Cesenne, the place where they had dined. A physician was called in, who, conceiving the complaint to be only an ordinary colic, treated it with fomentations, glysters, purgatives, and anodynes. During this time, one of the females was seized with severe pain and weakness, accompanied with copious evacuations. The fourth person of the party also complained of pain and weight of the stomach; but, notwithstanding this, the physician had no suspicion of poison, since the other female was in perfect health, and the landlord protested that there could have been nothing noxious in his dishes. On the next day they were all somewhat better, and were enabled to arrive at a place near where Morgagni resided, for whom they immediately sent. This great physician, having learned the circumstances, immediately inquired whether there was not some dish on the table of which the female in good health had not eaten. He was answered in the affirmative, and it was ascertained to have been a large dish of rice, served up at first. He settled in his own mind, that there were poisonous materials in this dish; but the difficulty was, why the priest, who had eaten the least, should have suffered the most, while the female, who had eaten a larger quantity, was not so ill; and, finally, that the fourth person, who had eaten more than all the rest, had only some pain in his stomach. Was there not, said Morgagni, some cheese grated over this rice? They answered in the affirmative, and the priest, who had little or no appetite, ate scarcely any thing but the cheese; the female ate both cheese and rice, while the other person ate the rice with scarcely any cheese. Then, said Morgagni, the state of the case is, that the cheese was prepared with arsenic to kill rats, and, not having been laid away with sufficient care, it was served up for your rice, while you were hurrying the landlord for your dinner. This opinion was verified by the confession of the landlord himself, who, learning that the patients were out of danger, avowed that such was the cause of the accident.

At a banquet, numerously attended, a dish was brought in during the dessert, in which arsenic had been used instead of meal. Those of the guests who had eaten or drank but little died in a few hours; whilst those who had eaten considerably were saved by copious vomiting. Some lived for several years, and when examined after death, *the cicatrices of large ulcers were found in their stomachs.*

In another instance, a boy two years old, and two adult females, partook of some soup in which arsenic was mixed. The boy took only two spoonsful, but it was on an empty stomach; whilst the females, who had already eaten, took the remainder of it. They vomited copiously, and survived; whilst the other did not vomit, and died, and on dissection, his stomach was found ulcerated.*

From these, and several other cases related by Morgagni and Hoffman, Foderé draws the following conclusions: 1. In such instances, the physician should enter into the most minute details concerning

* Foderé, vol. iv. pp. 242, 244. These cases are quoted from Morgagni—*De causis et sedibus morborum*, epist. 59.

every thing that has passed at the meal. Inquire whether every one ate from all the dishes, and in what quantity; what kind of meats were set down, and what wines drunk. 2. That very different effects ensue from taking poison on an empty or on a full stomach; and hence Baccius, he says, recommends to those *who fear being poisoned at a banquet, first to eat and drink a considerable quantity.* This precaution was, doubtless, not an idle one in some of the capital cities of continental Europe, and one effect of it certainly is, that it protects the stomach to a certain degree from the activity of the poison, and also facilitates vomiting. The practice of mountebanks, who pretend to sell antidotes to arsenic, is said to be in conformity with this direction. They first fill the stomach with milk or oily fluids, and then swallow the arsenic in public. In secret, however, they shortly throw it up again, and sometimes it proves fatal when retained too long. 3. It may sometimes be necessary to inquire of what kind of dainties the poisoned persons were most fond, since murderers have sometimes taken advantage of a known partiality. 4. It is evidently no reason that a certain article of food or drink is not poisonous, because some individuals have taken it without inconvenience. We have already seen the difference between vomiting and not vomiting. The greater the quantity of poison taken, the more is there a hope of escaping; whilst those who feel no immediate ill effects, are often the earliest victims. Both descriptions of persons should be examined, and the matter vomited should be analysed, in order to detect the nature of the poison.*

It is a very difficult question to determine whether poisoning is the result of suicide or homicide. We can only form an opinion from moral considerations, and a notice of the following is recommended by Foderé: the previous state of mind of the deceased—whether he has been subject to delirium; also, if he has not met with losses—has been disappointed in his hopes, or is suffering under disgrace. Also, whether any of the persons with whom he lived or associated, had any interest in his death. The season of the year also deserves consideration. He observes, that suicides are most frequent during the period of the solstices and the equinoxes. We should also ascertain whether the patient, instead of complaining, remains quiet, seek solitude, and refuses the aid of medical men and of medicines. Any kind of writing left by the individual, to express his last wishes, as it is the most common, so it is also the most certain, proof of self-destruction. But finding a part of the poison in the room, or in his pockets, is evidently a very equivocal proof, since it may quite as easily be put there by others as by himself.†

It may sometimes happen that a false accusation of poisoning is brought, and that great illness is pretended. In such instances, the

* Foderé, vol. iv. pp. 240–248. Orfila's Toxicology, vol. ii. p. 548.

† Foderé, vol. iv. p. 248. Smith, p. 274. Metzger observes, "La seule présomption physique (of suicide) est la quantité considerable du poison englouti, dont le gout nauseabond eût certainement excité le vomissement, s'il eût été administré par une main etrangère. Les poisons vegetaux entrainent presque toujours l'idée d'imprudence, et excluent consequemment, dans le plus grand nombre des cas, celle de suicide; l'opium seul est communement mis avec connoissance de cause en usage."—P. 148.

complainer should be tested by the rules already laid down, and a long examination will scarcely ever be necessary in order to develope the deceit. I will state a single case in elucidation.

"Samuel Whalley was indicted at the York Spring Assizes (England), in 1821, for maliciously administering arsenic to Martha King, who was pregnant by him. The female swore that the prisoner, after twice trying, but in vain, to prevail on her to take drugs for the purpose of procuring abortion, sent her a present of tarts, of which she ate one and a half; that in half an hour she was seized with symptoms of poisoning from some irritant poison, and that she continued ill for some time after. Mr. Thackrah of Leeds found arsenic in the tarts that remained untouched, and likewise in some matter that was vomited in his presence, after the administration of an emetic, as well as in other vomited matters which were preserved for him between his first and second visits. Her appearance, however, did not correspond with the complaint that she made of her sufferings; her pulse and tongue were natural, and, on careful investigation, the following inconsistencies were detected. 1. She said she felt a coppery taste in the act of eating the tarts; a taste which arsenic certainly does not possess. 2. From the quantity of arsenic in the tarts which remained, she could not have taken above ten grains; while, even after repeated attacks of vomiting, the alleged matter subsequently preserved contained nearly fifteen grains. 3. The matter first vomited contained only one grain, while the matter alleged to have been vomited subsequently, contained fifteen grains. 4. The time at which these fifteen grains were alleged to have been vomited, was not until between two or three hours after the symptoms began, in which case the symptoms would before that time have been, in all probability, violent. The prisoner was acquitted, and the prosecutor and another woman who corroborated her deposition, afterwards admitted that they had entered into a conspiracy to impute the crime to him, because he had deserted her, on finding that she was too intimate with other persons."*

I will conclude this section with a brief notice of such diseases and their symptoms, as are most apt to be mistaken for the effects of poison. And first, of those that resemble the consequences of *irritant poisons*. Among them Dr. Christison enumerates the following: distension and rupture of the stomach; rupture of the duodenum, biliary ducts, uterus, or other organs in the abdomen; the effects of drinking cold water; bilious vomiting, and cholera; inflammation of the stomach; inflammation of the intestines; inflammation of the peritoneum, spontaneous perforation of the stomach; melæna, and hæmatemesis; colic, iliac passion, and obstructed intestines.

Independent of all these, idiosyncracy alone will produce alarming effects, which may be mistaken for the consequences of deleterious agents. Some individuals have an antipathy to a particular article of diet, and in some instances the bare seeing of it, and in others the eating of it, produces the most alarming consequences. Cheese and

* Christison, p. 92. Edinburgh Medical and Surgical Journal, vol. xxix. p. 19. The credit of detecting the conspiracy in this case is due to Mr. Thackrah and Mr. Walker.

various other articles have produced such effects. But the most striking cases of resemblance to the effects of poison, probably occur in those who, after being long accustomed to a particular species of food, for the first time use another kind. The town of Martigues, in France, is almost altogether inhabited by fishermen, who have lived on fish since their infancy. Foderé, during the first year of his residence there, often prescribed meat soups to his sick, but in every instance their administration was followed by violent nausea and vomiting. They confessed that it was the first time they had used any aliment prepared from meat.

Distension of the stomach from excessive gluttony may cause sudden death; and although it is immediately owing in many instances to congestive apoplexy, without any rupture of vessels, yet in some it would appear to be altogether independent of this. Thus, Wildberg mentions of a corpulent gentleman who died suddenly fifteen minutes after dinner; and, as he lived on bad terms with his wife, a suspicion arose that he had been poisoned. He fell asleep immediately after dinner, but in a few seconds awoke in great anguish, declared he was dying, and actually expired before the physician arrived. The stomach, on dissection, was found enormously distended with various articles of food, while the diaphragm was pushed high into the chest, from the great accumulation of contents. There was no particular congestion of the brain.* In these instances, as in many of the succeeding, though the symptoms be suspicious, the appearances on dissection will distinguish the cause.

Rupture of the stomach generally arises from over distension with efforts to vomit; or there may be some chronic disease which, when a particular exciting cause operates, induces this dreadful termination. In a case at Paris related by Lallemand, the coats of the body of the stomach were healthy, but the pylorus was indurated. *Rupture of the duodenum* is referred to at page 511. Death followed in a few hours, after violent pain, vomiting, cold extremities, and failing pulse. On dissection, the mucous coat of the duodenum was found much inflamed, and four inches and a half from the pylorus was a lacerated hole. *Rupture of the biliary ducts, uterus, &c.* from the violence and rapidity of their effects, may equally imitate the results of irritant poisons. A female in Scotland was supposed to be poisoned, in consequence of being suddenly seized at 2 P.M. with pain in the abdomen, vomiting and purging, and general sinking, and dying at 10. On inquiry, however, it was proved that she had taken nothing since breakfast, at 8 A.M.; and, also, that the pain commenced at the lower part of the abdomen. A fallopian conception was seen on examination, and from the rupture of this, death was produced. Sudden death from *drinking cold water* has been already noticed in a previous part of this volume. It is highly probable, that in some cases where life is prolonged, acute gastritis occurs, and, accordingly, after death, marks of inflammation will be discovered, but the appearances on dissection, as well as the phenomena in the more common instances, are sufficient to set us right as to the cause.

* Christison, p. 100.

Of bilious vomiting and cholera, it must be allowed that many of the symptoms are identical with those of irritant poison—such as the burning pain in the stomach and bowels, incessant vomiting and purging, and the irritation about the throat and rectum, cramps, extinction of the voice, smallness of the pulse, coldness of the extremities, &c. It is natural that this should be so, since the disease is mainly the same in both instances. Yet there are some circumstances which may aid in discriminating. In cholera, the sense of acridity in the throat and œsophagus does not precede the vomiting; in poisoning, it frequently does. The patient, also, in the latter case, often dwells on it, as the chief source of his sufferings, while this is seldom witnessed in cases of cholera. In cholera, the vomiting is never bloody, according to Christison, at least it is rare; while in poisoning, from several of the active and more common agents, it is not unfrequent.* As to the rapidity of the effects of each, though, generally speaking, the common cholera morbus is far from being so soon fatal as poisons, yet there have been cases in this country where death has succeeded in a few hours. The malignant cholera often exceeds irritant agents in the celerity of its fatal results, but I submit, whether its characters are not sufficiently marked to distinguish it from a case of poisoning.

The season of the year, and the prevailing epidemics, are also worthy of consideration. In some cases of poisoning, where the symptoms greatly resembled cholera, and where this was urged in explanation, it appeared that death had happened during mid-winter, a season when, at least with us, common cholera is unknown.

Acute inflammation of the stomach is comparatively a very rare disease, and although *inflammations of the intestines and of the peritoneum* are more common, yet their course is usually more protracted, and their discriminating symptoms equally marked with those for which they might be mistaken. So, also, with other affections of the bowels that I have mentioned. *Melæna* and *hæmatemesis* are characterised by the purging and vomiting of pure or altered blood, but beyond this, they have hardly a symptom in common with irritant poisoning.†

Spontaneous perforation of the stomach I shall consider in the next section. The obscurity of its symptoms, and the consequent necessity of establishing the nature of the case by dissection, will authorise a notice of it in that place.

On a review of the above diseases, it will be seen that, although some of the leading symptoms in most are similar to those produced by poisoning, yet a careful observer may, in a short time, discover

* Cyclopædia of Practical Medicine, vol. i. p. 381. art. *Cholera*, by Dr. Brown. See, also, a case of epidemic cholera mistaken for poisoning, but in which the analysis by Orfila was decisive, in shewing the absence of any poisonous substance.—Annales D'Hygiène, vol. ix. p. 405.

† In the above remarks on diseases, I have followed Christison, p. 100 to 116. For a case of peritonitis resembling poisoning, see Medico-Chirurgical Review, vol. iv. p. 970. Cholera morbus from the too free use of ices. Several cases of this occurred in 1826, in Paris, Lyons, and Rouen, and poisoning was suspected.—Bulletin des Sciences Médicales, vol. ix. p. 250.

some points of difference. The accumulation of these constitutes the history of the particular disease, and it is evidently incomplete, without a proper examination after death.

The principal disease, whose symptoms may be confounded with those of *narcotic poisoning*, is apoplexy. Among such as are common to each, are the more or less complete abolition of sense and motion, and the supervention of convulsions. Apoplexy has, however, some distinctive characters, which are thus enumerated by Dr. Christison. It usually has several premonitory symptoms; it attacks the old principally, although not exclusively; its subjects are generally corpulent and of full habit; it attacks very soon after a meal, and its symptoms begin abruptly. I need hardly say how inapplicable several of these distinctions are in cases of poisoning. Patients, also, cannot be roused from the profound sleep of apoplexy; they may, however, when shaken or loudly called, in instances of narcotism from opium, the most common of these poisons, until towards the fatal termination.

Epilepsy has also some characters in common with the effects of narcotics, but the history of the case, its chronic nature, the peculiarity of its paroxysms, and their length, all serve to distinguish it.*

2. *Signs of poison on the dead body.*

In many instances, the medical examiner is not called until the stage now about to be considered. The illness may have been sudden and rapid; it may have been difficult to procure medical aid, and thus the opportunity has been lost of comparing the symptoms with the appearances found on dissection. If such be the case, he should be guided solely by the phenomena that present themselves during the inspection.

I cannot better introduce my remarks on this branch of the subject, than by quoting two cases from Dr. Christison's Treatise on Toxicology. None better illustrate the necessity of medico-legal examination, in its most extended sense. The first is one that recently occurred to Dr. Wildberg of Rostock. He was desired to examine the body of a girl who died while her father was in the act of chastising her for stealing, and who was believed by all the by-standers, and by the father himself, to have died of the beating. Accordingly, he found the marks of many stripes on the arms, shoulders, and back; and under some of the marks, blood was extravasated in considerable quantity. But these injuries, though severe, did not appear to him adequate to account for death. He, therefore, proceeded to examine the cavities; and on opening the stomach, he found it very much inflamed and lined with a white powder, which proved, on analysis, to be arsenic. It turned out, that, on the theft being detected, the girl had taken arsenic for fear of her father's anger: that she vomited during the flogging, and died in slight convulsions.

Pyl is the reporter of the second case. A woman was found with

* Christison, pp. 578–589.

a wound in the left side of the breast, but the hæmorrhage, which never had been great, was soon suppressed. Notwithstanding, she died in a few hours. On dissection, it was found that the wound had penetrated the pericardium, but did not reach the heart; and although the fifth intercostal artery had been divided, hardly any blood was effused into the cavity of the chest. Coupling this fact with the trifling hæmorrhage during life, and the presence of vomiting and convulsions immediately before death, Pyl became satisfied that she had not died of the wound; and accordingly, the marks of corrosion in the mouth and throat, and of irritation in the stomach, with the subsequent discovery of the remains of some nitric acid in a glass in her room, proved that she had died of poison.*

In addition to the rules already laid down in a previous chapter, it is proper to observe, that the whole of the alimentary canal, from the mouth downward, must be particularly examined, and, after opening the abdomen, the liver should be raised, so as to view its concave surface, the gall-bladder, and a portion of the stomach. The spleen, pancreas, and mesentery, should also be noticed. Ligatures are then to be applied to the different portions of the alimentary tube, in the manner directed at page 489, and the parts included within them removed from the body. This precaution is absolutely necessary to prevent the loss of any fluids contained in the alimentary canal.

After being thus removed, it should be opened throughout its whole extent, and the fluids and solids contained in it should be collected in proper vessels. The whole internal surface must then be washed with distilled water, which must likewise be preserved. The lesions observed should be noted, and all the inflamed or gangrenous portions detached with a scalpel. If there be any perforations, the parts round the holes should be taken out and the solid portions preserved in alcohol. And it is highly important, in this case, previously to absorb, with a sponge, all the fluid contained in the abdomen, and afterwards to deposit it in proper receptacles for future analysis.†

This examination should be made in the presence of a magistrate, and every fact should be recorded by a secretary in the order of its notice.

The next subject of inquiry is, the class of poisons which the appearances on dissection seem to indicate. The irritant poisons generally produce inflammation of the first passages, and occasionally constrictions of the intestinal canal, perforations or preternatural softness of the interior coats. Gangrene and sphacelus are also enumerated as consequences, but they are certainly rare.

The inflammation varies as to extent and intensity. Sometimes it affects the mouth, œsophagus, and more particularly the stomach, and extends to the duodenum, while in others it reaches through the whole space of the digestive tube. Again, the membranes are sometimes of a clear red colour, without any trace of ulceration, sometimes of a

* Christison, pp. 53, 54.
† Orfila's Toxicology, vol. i. p. 72, vol. ii. p. 519.

cherry red, with longitudinal or transverse patches of a blackish colour, formed by extravasated blood between the coats. Ulcerations are observed in various parts, but particularly near the pylorus.

The effects of narcotic poisons are far from being marked or even peculiar. It is a common, but mistaken idea, that they induce a rapid tendency to putrefaction, that the countenance is red, swollen, or livid, that the extremities are flexible, that the blood is in a fluid state, and effused in various parts, and that the stomach and intestines are touched with sphacelus, without any inflammation. Some of these may, and do, occasionally occur, but they are far from being invariable in their appearance. Orfila denies the correctness of several from his own experiments. He has frequently observed, that putrefaction was not advanced more than usual at twenty-four, or even thirty-six hours after death; that the limbs were as stiff as those who had been poisoned by substances of another class, and that the blood was coagulated a short time after death. On dissection, no traces of inflammation were found by him in the digestive canal of animals killed by narcotics, and he attributes such appearances to the subsequent administration of substances capable of producing inflammation. The lungs, however, present almost constantly livid and even black spots, and their texture is more dense and less crepitating. The brain also often exhibits distention of its veins.*

Dr. Christison observes, that the morbid appearances left by them on the dead body, are commonly insignificant. "Sometimes, however, the veins of the brain are much gorged with blood, and the ventricles and membranes contain serosity. The blood appears to be sometimes altered in its nature, but these changes are by no means invariable, and are sometimes not remarked at all."†

As to the narcotico-acrid, it may be remarked, that there are some which are capable of exciting severe inflammation, accompanied occasionally with ulceration, while others do not inflame. The lungs, blood, brain, and other organs, present, in general, the same alterations as are induced by the narcotics.

The reader must not, however, suppose that the lesions now described are the invariable results of the respective kinds of poison; on the contrary, a great variety in this respect has been noticed. Thus, Marc, in a case of poisoning by arsenic, found the membranes of the stomach *thickened*, instead of *eroded*.‡ And what is still more extraordinary, there have been cases where the exhibition of acrid and corrosive poisons have left no marks of disease in the stomach or intestinal canal. Morgagni, Wepfer, and Brunner, mention instances of this nature; and Sauvages speaks of a person who died suddenly after a violent epileptic fit, from swallowing fifteen berries of the sumach. Ten were ejected by vomiting, and the remaining five were found in the stomach after death. Notwithstanding this, the stomach exhibited no marks of lesion, nor was any other part of the body diseased.

* Orfila's Toxicology, vol. ii. pp. 171, 522. † Christison, p. 578.
‡ Marc, p. 66.

Etmuller mentions the following remarkable occurrence. A young girl, having taken arsenic, vomited considerably during the night, and on the next morning was found dead. The skin was of a livid blue colour, but no appearances of disease could be found on dissection. There was no inflammation or gangrene present, yet in the stomach a white powder was observed, which, on being thrown on the coals, gave out a thick smoke with an arsenical odour. Powders containing a similar substance were found in the house, part of which was given to a dog, with fatal effects, and on dissection the stomach was found extensively inflamed. It is conjectured by the reporter, that the poison, having been taken on a full stomach, may have prevented its usual chemical action.*

It has been supposed, in explanation of these anomalies, that such poisons as are given in the form of powder, will more readily cause destructive effects on the stomach, than those which are soluble. We are, however, not in possession of sufficient facts to explain satisfactorily the great variety that is occasionally observed; and experiments, so far as they have proceeded, do not permit us to assign that as the general cause.†

I will here suggest, as a possible, much more than a probable occurrence, that the use of an innocent substance during life may cause appearances of a suspicious nature on dissection. The following case, from Foderé, will tend to illustrate this remark. A person at Chalons sur Marne, was just recovering from a severe sickness, and, during his convalescence, took a gentle laxative, after the operation of which he suddenly died. He was supposed to have been poisoned through the negligence of the apothecary, and, to ascertain this, the body was opened. The stomach and œsophagus were found red, and in some places livid, and resembling gangrene. Here the investigation stopped, and the patient was looked upon as evidently poisoned. M. Varnier, a physician at Chalons, knowing the exactness and prudence of the apothecary, felt, however, strong doubts concerning the cause of death, and, on reflection, determined that the convalescence had been only an insidious respite. But it was necessary to assign a reason for the colour of the œsophagus and stomach, and, having learnt that the deceased had been in the habitual use of a strong infusion of red poppies (*coquelicots*), for some time, the idea struck him that this might be the cause. To ascertain the fact, he gave a similar infusion to a dog, and on dissection, found that the organs above mentioned were precisely of the same colour as on the body of the person supposed to be poisoned. So deep indeed was it, that it resisted repeated ablutions.‡

The inference from this example is manifest—not to depend too much on a single phenomenon, in considering the question of poisoning, while at the same time, it illustrates the necessity of inquiring into the person's food and medicaments.

In the general remarks on poisons, it was mentioned that they

* Foderé, vol, iv. pp. 272, 273. † Orfila's Toxicology, vol. ii. p. 521.
‡ Foderé, vol. iv. p. 282.

might be introduced into the system by means of injection, and I repeat it at this time, for the purpose of enforcing the direction of examining the whole intestinal canal from the mouth to the rectum. If the noxious substance be thrown up in this manner, it will, of course, be in vain to look for its indications in the stomach or smaller intestines.

The wife of a receiver general of taxes in the department of Arreige, was attacked, some years since (in 1807), with a slight illness, which rapidly terminated in a severe and fatal one. On dissection, the intestines were found in a state of high inflammation. A servant girl was arrested on suspicion, and it appeared that she had mixed twenty-four grains of tartar emetic in the tisan or drink of her mistress, and afterwards had boiled an ounce of arsenic with the liquid prepared for an injection. Previous to her execution, she confessed, that not finding the tartar emetic sufficiently active, she administered the arsenic.*

But there is a more difficult case, somewhat connected with this point, which deserves the most deliberate investigation. It is the atrocious villany of introducing a poisonous substance after death, with the view of accusing an innocent person of the crime. Such an act is said to have been committed in Sweden, and it will readily occur, that if a corrosive substance be injected, it may produce a change sufficiently marked to lead the uninformed observer to the supposition that murder has been perpetrated.

So important a subject has not escaped the investigation of Orfila. He instituted experiments with corrosive substances on the dead bodies of men and dogs, and the result has established certain definite and fixed characters.† Several dogs were hung, and a short time after death a quantity of corrosive sublimate, in the form of powder, and in small fragments, was introduced into the rectum. On examination, the mucous coat of the intestine, near the anus, exhibited several folds of a clear rose colour, but immediately above them the rectum was of its natural colour; so that there was *a line of demarcation perfectly established between the parts to which the sublimate had been applied, and those which had not been in contact with it.* The same experiment, performed on a living dog, presented, on dissection, an intense redness, which extended eight inches, *gradually* diminishing in intensity, and left no distinct line of demarcation. Similar effects were produced with arsenic. Verdigris, however, left no trace of demarcation or ulceration on the rectum of the dead dog, while it corroded the living parts. The sulphuric and nitric acids produced no other effect than their chemical one, and the lesions that indicate reaction in the system, such as inflammation and redness, were absent. Dr. Tartra found that he could produce on the dead, as well as on the living, that yellow or orange colour which is the characteristic of nitric acid. The stomach was rendered rotten by it, but in all his experiments on the dead the

* Foderé, vol. iv. p. 266.

† He did not deem it necessary to experiment with the narcotics or narcotico-acrid, as the former do not produce any local lesion after death, and the latter only cause a slight degree of it.

striking distinction was wanting, viz., the presence of more or less inflammation. It could only commence on the living body. Lastly, Orfila ascertained that, when these poisons were introduced into the alimentary canal twenty-four hours after death, they no longer excited redness or inflammation, because life is entirely destroyed in the capillary vessels. It is only when they are applied an hour or two after death, that the inflammatory phenomena, accompanied *with the line of demarcation*, are capable of occurring.*

As to slow poisons, in the sense already applied to that name, we may remark, that their peculiarities are very difficult to be distinguished. Foderé enumerates a long list of appearances, such as obstruction of the lymphatics, emptiness of the blood-vessels, a contraction and shrivelling of the viscera and marasmus;† but later and more minute observers contradict these.‡

Prince Charles of Augustenberg, crown prince of Sweden, and the predecessor of Bernadotte in that station, fell dead from his horse on the 22d of May, 1810, while reviewing troops in Scania. His death, during that stormy period of public affairs, excited great attention, and an opinion soon spread abroad that he had been poisoned. The king ordered a judicial investigation, and it appeared that Dr. Rossi, the physician of the late prince, had, without any directions, proceeded to inspect the body twenty-four hours after death; that he had performed this operation with great negligence, omitting many things which the law prescribed, which the assisting physicians proposed, and which were essential to render it satisfactory; and, finally, that the coats of the stomach, instead of being preserved and submitted to chemical analysis, were, according to his own acknowledgment, thrown away. The royal tribunal adjudged him to be deprived of his appointment, and to be banished from the kingdom. This decision would not, of course, diminish the suspicion already excited; and among other physicians who were consulted on the case, M. Lodin, professor of medicine at Lynkoping, presented two memoirs, in which he stated it as his opinion that a *slow poison* of a vegetable nature, and probably analogous to the *aqua tofana*, had been administered to the prince, and that this had caused the apoplectic fit. His reasons were, 1. That the prince had always enjoyed good health previous to his arrival in Sweden, and indeed had not been ill, until after eating a cold pie at an inn in Illaby. He was shortly after seized with violent vomiting, while the rest of the company experienced no ill effects. 2. The prince was naturally very temperate. 3. Ever since his arrival in Sweden, he had experienced a loss of appetite, with colic and diarrhœa. And 4. That on dissection, the spleen was found of a black colour, and in a state of decomposition, and the liver indurated and dark-coloured, whilst during life he had experienced no symptoms corresponding to these appearances. Dr. Lodin confessed, however, that he was unacquainted with the effects that indicate the administration of such a slow

* Orfila's Toxicology, vol ii. pp. 535–547. Foderé, vol. iv. p. 285.
† Foderé, vol. iv. p. 268. ‡ Orfila's Toxicology, vol. i. p. 477.

poison, but thought that the previous symptoms were such as might be expected from it.

For the credit of the profession, this conjectural opinion met with decided reprobation from other medical men. It appeared that the prince had, for several days previous, been subject to giddiness and pain in the head, and that all the symptoms were readily referable to a simple case of apoplexy; that on the day of his death he had not taken any thing after he had breakfasted; and an *interval of nearly four hours elapsed after that, till he fell from his horse.* The appearances on dissection also shewed marks of long antecedent disease.*

In the conclusion of the last section, several diseases were mentioned that might be mistaken for the effects of poison. I shall now indicate certain circumstances which, if not properly understood, may lead to error in examining the dead body.

1. *The vascularity or redness of the human stomach after death,* from natural causes, should not be confounded with the effects of poisoning. We are indebted to Dr. Yelloly for first calling the attention of physicians to this appearance, and also to the difficulty of discriminating it from the effects of irritation. This distinguished physician examined the stomachs of twenty individuals, among which number were five criminals who were hanged, and in whom, therefore, the appearances of health were likely to be found. Not one of the whole number had any affection of the stomach while living. In all he observed a highly vascular state of the villous coat of the stomach in particular parts (as about the pylorus and cardia), with but two exceptions; in one of these no vascularity was observed, and in the other it was obscure. In the five executed criminals the vascularity amounted to a red or crimson hue. These appearances were distinct for a short time only after death, being most marked on the first day, and soon after, but at irregular periods, becoming more obscure. Dr. Yelloly infers, from these dissections, "that in the villous coat of the stomach, appearances of vascular fulness, whether florid or dark-coloured, in distinct vessels or in extravasations of different sizes, are not to be regarded as unequivocal marks of disease: they occur in every variety of degree and character, under every circumstance of previous indisposition, and in situations where the most healthy aspect of an organ might be fairly inferred; they are found in every part of the stomach, but principally in the posterior part of the great end, and in the lesser curvature; and they cover spaces of various extent, but are generally well defined, and terminate abruptly." †

MM. Rigot and Trousseau, and M. Billard, have pursued the investigation of this subject to a greater extent. The former have proved, by experiment, that various kinds of pseudo-morbid redness

* Foderé, vol. iii. p. 29; vol. iv. p. 236. Christison, p. 46. Edinburgh Annual Register, vol. iii. p. 345.

† See Dr. Yelloly's paper, "On the vascular appearance in the human stomach, *which is frequently mistaken for inflammation of that organ,*" in the Medico-Chirurgical Transactions, vol. iv. p. 371. See, also, Edinburgh Medical and Surgical Journal, vol. x. p. 236.

may be formed, which cannot be distinguished from the parallel varieties caused by inflammation; that these appearances are produced after death, and not until three, five, or eight hours after it; that they are to be found chiefly in the most depending parts of the stomach, and turns of the intestines: and that, after they have been formed, they may be made to shift their place, and appear where the membrane was previously healthy, by simply altering the position of the gut. M. Billard has described this redness through all its varied forms, and corroborates the fact of the extreme difficulty of distinguishing between the morbid and pseudo-morbid redness of the inner coat of the alimentary canal.*

In connexion with this, it is proper to caution the examiner not to mistake the discoloration that is produced on the coats of the stomach and intestines, after some time, from the proximity of the liver or spleen. This may be of a reddish, brownish, yellowish, or greenish, tint. Let the case also be remembered, which I have just quoted, of coloured fluids actually dying these parts.

Dr. Christison is disposed to consider an appearance mentioned under the head of irritant poisons, as always the result of irritation, if not the irritation from poison only. "It is the effusion under the villous coat of the stomach, and incorporation with its substance of dark brownish, or, as it were, charred blood; which is thus altered either by the chemical action of the poison, or by a vital process." Great care should hence be used in searching for this, and it should not be confounded with the phenomena of redness now explained. So, also, we should particularly notice whether any effusion of lymph be present. This is also a sign of inflammation.

2. *Ulcers or perforations of the stomach and intestines*, occurring after death, or as the result of disease, have been mistaken for the effects of irritant poisons. In the commencement of our knowledge respecting them, that phenomenon which is now styled a *gelatinising of the coats* particularly attracted attention. It has been otherwise called *digestion of the stomach after death*. Its nature was first developed by the illustrious John Hunter. He found repeatedly, on dissection, that the great end of the stomach was digested, and holes made in it. "To be sensible of this effect," says he, "nothing more is necessary than to compare the inner surface of the great end of the stomach with any other part of the inner surface: what is sound will appear soft, spongy, and granulated, and without distinct blood-vessels, opaque, and thick; while the other will appear thin, smooth, and more transparent, and the vessels will be seen ramifying in its substance, and, upon squeezing the blood which they contain from the larger branches into the smaller, it will be found to pass out at the digested

*.Christison, p. 119. See, also, the references at p. 494; also, a copious analysis of Billard on the healthy and diseased state of the alimentary mucous membrane, in Edinburgh Medical and Surgical Journal, vol. xxviii. p. 164. We have reason to hope for a valuable addition to our knowledge on this subject, through the investigations of Drs. Hodgkin and Roupell.—See Edinburgh New Philosophical Journal, vol. xvii. p. 442.

ends of the vessels, and appear like drops on the inner surface." Again, he observes, "that when the stomach is actually perforated, the edges of this opening appear to be half dissolved, very much like to that kind of dissolution which fleshy parts undergo when half dissolved in a living stomach, or when dissolved by a caustic alkali, viz. pulpy, tender, and ragged." Lastly, he remarks, that he found these appearances more frequent in those who had died a violent death. He relates two cases of this kind, in which the persons had died shortly after having their skulls fractured, and a third one where a man had been hung.

The cause of this appearance of the stomach is supposed by Mr. Hunter to be the action of the gastric juice on the coats of the stomach. And the reason why this effect is not produced during life, is, according to him, the constant resistance of the vital principle to its action. He also observes, that the power of the gastric juice is not confined to the stomach alone, since he has often noticed, that after it had dissolved the stomach in its usual place, the contents of the stomach would come in contact with the spleen and diaphragm, and partly dissolve the adjacent side of the spleen and diaphragm, so that the contents of the stomach were found in the cavity of the thorax, and had even affected the lungs in a small degree.*

Dr. Baillie's description of this phenomenon is as follows. "In looking upon the coats of the stomach at its great end, a small portion of them frequently appears to be thinner, more transparent, and feels somewhat more pulpy, than is usual; but these appearances are seldom very strongly marked. They arise from the action of the gastric juice resting on that part of the stomach in greater quantity than any where else, and dissolving a small portion of its coats. This is, therefore, not to be considered as a consequence of a disease, but as a natural effect arising from the action of the gastric juice, and the state of the stomach after death. When the gastric juice has been in considerable quantity, and of an active nature, the stomach has been dissolved quite through its substance at the great end, and its contents have been effused into the general cavity of the abdomen. In such cases, the neighbouring viscera are also partially dissolved. The instances, however, of so powerful a solution are rare, and have almost only occurred in persons who, while in good health, had died suddenly from accident."†

We shall, however, be mistaken, if we suppose that this occurrence is confined to such as expire suddenly, and in apparent health. Cases in great number have accumulated, of its being found in persons dying from diseases; and many French pathologists, indeed, are of opinion that it is always a morbid process, constituting a peculiar complaint. It has, however, been found present in persons dead from very opposite ones, and in which there did not exist, during life, a single sign of disorder in the stomach.

Perforations of the stomach, intestines, and, sometimes, the gullet,

* Hunter, in Philosophical Transactions, vol. lxii.
† Baillie's Morbid Anatomy, American edition, p. 75.

have also frequently been noticed as the result of ulceration or schirrus. In some melancholy instances, rupture takes place, and the sufferings of the patient, previous to death, are of the most severe nature.

The application of this subject, in legal medicine, is the distinction between the perforation induced by corrosive poisons and those which, as we have stated, are the result of other agents. The following are the views of Chaussier.

"The causes which produce erosions and perforations of the stomach are of two kinds; first, the destruction of a schirrous tumour, the progress of a cancerous ulcer; second, a morbid action of erosion, of ulceration which has commenced spontaneously at some point of the mucous lining of the stomach. The perforations of the first kind are not rare, but cannot easily be confounded with those which are the result of a caustic poison. Those of the second kind may be divided into acute and chronic; the first sometimes occurring in a very short space of time. The following are the characters given by M. Chaussier. 'The ulcerations vary in size, shape, and place; they occur particularly at the basis of the stomach, and the parts corresponding to the spleen and diaphragm. The contents of the organ are then sometimes effused into the abdomen or the thorax if the diaphragm be perforated, but most commonly there is no effusion, from the adhesion of the parts to those in the vicinity. If the adhesions be broken, a viscous, unctuous liquor, not fœtid, flows out; it has sometimes the odour of musk, is always brownish, and mixed with blackish flocculi, as though fine charcoal was added to a mucous serum. The edges are soft, fringed sometimes with a blackish line, more or less marked. Elsewhere, the stomach retains its ordinary shape and consistence; it presents no appearance of thickening or inflammation; the capillaries of its mucous membrane appear, however, more developed, particularly in the vicinity of the perforation; this last sometimes forms in a few hours in people in health; most frequently, after some days' illness, and when no cause of external violence or poison can be suspected.' When the perforation is the result of a caustic, irritating poison, its edges are of the same thickness as the organ; sometimes they are hard and callous; in the spontaneous perforation the edges are thin, and formed only by the peritoneal membrane, the two other coats of the stomach being more extensively destroyed than the serous one. In this case, too, the opening is not so irregular as in that which results from the action of a corrosive substance. The circumference of perforations caused by nitric acid is yellow, from the chemical action of this substance. In the case of strong sulphuric acid, it is black. *Almost always when the perforation is the effect of poison, the parts not perforated are more or less inflamed*, while traces of the same affection are found in the mouth, the pharynx, and the intestinal caual; on the other hand, *for the most part in the case of spontaneous perforation, the unperforated parts present no appearance of inflammation.* This last character is not, however, constant; for, as, on the one hand, perforations from poison are sometimes, though rarely, unattended by inflammation of the unperforated parts of the intestinal canal, so, on the other, spontaneous

perforations may be observed, in which there is inflammation of the stomach and intestines."*

Dr. Christison makes the following observations: "Passing now to the differences between these gelatinised perforations and the perforations caused by the corrosive poisons, it may, in the first instance, be observed, that the margin of a corroded aperture is commonly of a peculiar colour; for example, yellow with nitric acid, brown with sulphuric acid and the alkalis, orange with iodine. But a much better, probably an infallible criterion, and one of universal application, is the following. Either the person dies very soon after the poison is introduced, in which case vital action may not be excited in the stomach, or he lives long enough for the ordinary consequences of violent irritation to ensue. In the former case, as a large quantity of poison must have been taken, and much vomiting cannot have occured, part of the poison will be found in the stomach: in the latter case, the poison may have been all ejected, but, in consequence of the longer duration of life, deep vascularity or black extravasation must be produced round the hole, and sometimes, too, in other parts of the stomach; and these will at once distinguish the appearance from a spontaneous aperture. There is no doubt that the stomach may be perforated by the strong corrosives, and yet hardly any of the poison be found in the stomach after death. Thus, in a case by Mertzdorff, of poisoning by sulphuric acid, were life was prolonged for twelve hours, he could detect, by minute analysis, only $4\frac{1}{2}$ grains of the acid in the contents and tissue of the stomach. But then the hole was surrounded by signs of vital reaction, and so was the spleen upon which the aperture opened. Judging from what I have often seen in animals killed with oxalic acid, which is the most rapidly fatal of all the corrosives, so that little time is allowed for vital action, I should think that no poison can dissolve the stomach without unequivocal signs of violent irritation of the undissolved parts of the villous coat, which must secure an attentive observer from the mistake of confounding with such appearances the effects of spontaneous erosion. Spontaneous erosion is very generally united with unusual whiteness of the stomach, and there is never any material vascularity."†

* Quarterly Journal of Foreign Medicine and Surgery, vol. iii. p. 258.

† Christison, p. 128. The medical literature of this subject is so extensive, that I must content myself with a selection from the numerous authorities. Amongst others, the following are worthy of careful study.

Laisne. Considerations Médico-légales sur les Erosions et Perforations spontanées de l'Estomac.

Edinburgh Medico-Chirurgical Transactions, vol. i. p. 311; vol. ii. p. 331. Dr. Gairdner on Erosions of the Alimentary Canal.

Allan Burns on Digestion of the Stomach after Death.—Edinburgh Medical and Surgical Journal, vol. vi. p. 132.

Cyclopædia of Practical Medicine, articles, *Perforations of Viscera*, and *Softening of Organs*, by Dr. Carswall; also, the fifth fasciculus of the same author's Illustrations of the Elementary Forms of Disease, London, 1834; and his papers in vol. xxxiv. of the Edinburgh Medical and Surgical Journal.

Cyclopædia of Practical Medicine, art. *Organic Diseases of the Stomach*, by Dr. Houghton.

Although the intestines and gullet have been found perforated from natural causes, it is not probable that this can happen from corrosive poisons. Indeed, Dr. Christison states, that he has not met with a single case of either in the course of his reading. As it respects the intestines, the poison will be either expelled in sufficient quantity from the stomach, by vomiting, to prevent it, or the pylorus contracts and prevents the passage of every poison that is sufficiently concentrated to corrode. In the gullet the poison cannot remain a sufficient time to complete this alteration. It must either pass to the stomach or be rejected.

I shall conclude this chapter with a few general remarks on the chemical examination, and the mode of treatment in cases of poisoning.

Chemical examination. I have already given directions as to the preservation of the stomach and intestines, and their contents, and the mode of pursuing experiments for the purpose of detecting noxious substances. Under each individual poison the most certain tests, so far as they are known, will be mentioned. And I will add, that it is in these directions that modern medical jurisprudence so much exceeds ancient forms. Nothing can be stronger proof, nothing will convict

Cruvelhier's Anatomie Pathologique, Nos. 4 and 10, *Ramollissement gélatiniforme.*

Orfila's Exhumations Juridiques, vol. ii. p. 216.

Dr. Abercrombie on Ulcerations of the Stomach, in Edinburgh Medical and Surgical Journal, vol. xxi.; and in his work on Diseases of the Stomach.

Analysis of Andral's Clinique Médicale, in Edinburgh Medical and Surgical Journal, vol. xxiii. p. 161; and also his Pathological Anatomy.

Copland's Dictionary, art. *Lesions of the Digestive Canal.*

Dictionnaire des Sciences Médicales, art. *Perforation*, by Percy and Laurent.

Cooke's Morgagni, vol. ii. p. 26.

Louis on Softening.—Medico-Chirurgical Review, vol. vi. p. 173.

Dr. Ebermayer on Perforation.—American Journal of Medical Sciences, vol. iii. p. 452; vol. iv. p. 215.

Broussais' Physiology.

Of cases, I will only refer to the following:

Dr. Haviland. Annals of Philosophy, N. S. vol. iv. p. 292.

Mr. Want. Eclectic Repertory, vol. v. p. 495.

Dr. Pascalis. New York Medical Repository, vol. xviii. p. 287.

Dr. Cheeseman. American Medical Recorder, vol. iv. p. 151.

Dr. Segalas. Quarterly Journal of Foreign Medicine and Surgery, vol. ii. p. 328.

Dr. Peter. Ibid. vol. v. p. 297.

Dr. J. B. Beck. New York Medical and Physical Journal, vol. ii. p. 455.

Dr. A. L. Pierson. New England Journal, vol. xv. p. 134.

Dr. Rawson, in American Journal of Medical Sciences, vol. vi. p. 391.

See also Edinburgh Medical and Surgical Journal, vol. xix. pp. 483, 652; vol. xxvi. pp. 290, 451; vol. xxxvi. p. 445.

Medico-Chirurgical Review, vol. viii. p. 516; vol. x. pp. 240, 494; vol. xiii. p. 464; vol. xiv. p. 334; vol. xv. p. 530; vol. xxiii. p. 333.

American Journal of Medical Sciences, vol. vii. p. 522.

Dr. M'Cormac, in Lancet, N. S. vol. ix. p. 475.

Dr. Elliotson. London Medical Gazette, vol. ix. p. 379; vol. xii. p. 513.

Dr. Drake, in Western Journal of Medical and Physical Sciences, vol. vii. p. 508.

Of rupture of the stomach consequent on ulceration, &c. cases are given by Dr. Crampton and Mr. Travers, Medico-Chirurgical Transactions, vol. viii. p. 228; by Dr. Elliotson, Ibid. vol. xiii; by Dr. Crampton, Transactions of the King's and Queen's College of Physicians in Ireland, vol. i. p. 1.

the criminal in a more satisfactory manner, than the discovery of the poison in the body of the deceased, and the subsequent detection of it by chemical tests.

In a number of cases the search may be unsuccessful, but we must not, therefore, conclude that poison has not been the cause of death. It may have been all discharged by vomiting and purging. Murder is frequently attempted by administering large doses of poison, and in some individuals these produce copious vomitings, which, indeed, is often assisted by the deceased drinking copiously. Hence the chance of finding the poison is diminished, as it may have been rejected. Again, it may have all been absorbed. This has repeatedly occurred in cases where opium or laudanum has been known with certainty to have been taken, and yet no traces of it could be found. Some poisons also are decomposed. We shall see that this is the case with corrosive sublimate, lunar caustic, &c.

In all these cases, however, there is an additional investigation to be pursued, which may prove satisfactory. Although the poison is not present in a fluid or solid state in the contents of the stomach, yet it may exist in the tissues themselves; and hence, in repeated instances of late years, it has been detected by boiling down the stomach and intestines and experimenting on the fluids thus obtained.

How far putrefaction or decay of the body renders the detection of poison impossible, has been satisfactorily answered by the experiments of Orfila and Lesueur. They placed the following poisons, sulphuric and nitric acids, arsenic, corrosive sublimate, tartar emetic, sugar of lead, protomuriate of tin, blue vitriol, verdigris, lunar caustic, muriate of gold, acetate of morphia, muriate of brucia, acetate of strychnia, hydrocyanic acid, opium, and cantharides, in the dead body, and allowed them to remain for some time.

They found that the acids became neutralised by the ammonia disengaged during the decay of animal matter; that by the action of the animal matter, the salts of mercury, antimony, copper, tin, gold, silver, and likewise the salts of the vegetable alkaloids, undergo chemical decomposition, in consequence of which the bases become less soluble in water, or altogether insoluble; that acids may be detected after several years' interment, not always, however, in the free state; that the bases of the decomposed metallic salts may also be found after interment for several years; that arsenic, opium, and cantharides, undergo little change after a long interval of time, and are scarcely more difficult to discover in decayed than in recent animal mixtures; but that hydrocyanic acid disappears very soon, so as to be undistinguishable in the course of a few days.*

General outline of treatment in cases of poisoning. On this subject I must necessarily be brief; yet a few directions for the recovery of

* Christison, p. 58. Orfila's Exhumations Juridiques, vol. ii. p. 265. A detailed account of these experiments is given in the Edinburgh Medical and Surgical Journal, vol. xxxi. p. 224, and American Journal of Medical Sciences, vol. iii. p. 226.

persons labouring under this grievous infliction, can scarcely be here misplaced.

The great object, in all cases where it is practicable, is to administer antidotes; and of these the chemical are the most striking and satisfactory in their operation. We are altogether indebted to modern observers, and to Orfila in particular, for most of these. Thus, the virtues of albumen as an antidote for corrosive sublimate and verdigris — of bark, for tartar emetic — of the alkaline sulphates, for sugar of lead — of the alkaline and earthly chlorides, for liver of sulphur — of ammonia and chlorine, for prussic acid, — have been pointed out.

For some of the divisions of poisons, however, antidotes are not to be found; and the grand indication, as indeed in all cases, is to remove the poison as soon as possible, by exciting the action of the stomach to discharge them, or by the application of mechanical means. For the former, emetics are the most efficient; and among the latter may be named the stomach-pump. In other places I will speak of its history, and mention instances in which it has been found useful. At present, I will only add that, unfortunately, it is not always applicable. The poison sometimes acts too rapidly, and, on other occasions, is too destructive to parts, to permit its use. Still it is often valuable; but it requires caution and experience, so that additional injury be not inflicted through its employment.

In cases of external poisoning, Sir David Barry has of late years revived the application of cupping-glasses to the part where the poison has been introduced, and in several cases it has proved useful. It prevents the absorption of the poison, and may, by abstracting blood from the wound, also withdraw the poison.*

Another mode, proposed for the same object, is the application of a ligature between the injured part and the trunk, so as to check the circulation. Bouillaud has shewn the efficacy of this in several experiments, while Verniere has combined venesection with it. The veins between the wound and ligature are open, and the blood which has passed through or near the poisoned part, is thus discharged.†

* On this subject, and Sir David Barry's Experiments in particular, see London Medical Repository, vol. xxv. p. 176. Edinburgh Medical and Surgical Journal, vol. xxv. p. 462; vol. xxvii. p. 200.

Medico-Chirurgical Review, vol. ix. p. 313.

Dr. Pennock's Experiments on the modus operandi of cupping-glasses, in arresting and preventing the effects of poisoned wounds, in American Journal of Medical Sciences, vol. ii. p. ix. Dr. Pennock inclines in favour of *increased pressure* as the cause of their efficacy.

Dr. Rodrigues' Experiments on ditto, American Journal of Medical Sciences, vol. ii. p. 307.

† Bouillaud, Edinburgh Medical and Surgical Journal, vol. xxviii. p. 227. Medico-Chirurgical Review, vol. x. p. 232. Bulletin des Sciences Médicales, vol. xi. p. 118. Verniere, Journal des Progres, vol. iii. p. 121. Edinburgh Medical and Surgical Journal, vol. xxix. p. 450. Medico-Chirurgical Review, vol xiv. p. 248.

A curious paper, on the Statistics of Poisoning in France, has been recently published in the Journal de Chimie Médicale, by Chevallier and Boys de Loury. The following is a brief abstract of it.

In seven years (from 1824 to 1832), 273 individuals have been accused of

CHAPTER XVII.

IRRITANT POISONS.

Division of irritant poisons into six orders. 1. The ACIDS, and their bases. Sulphuric acid—its effects on man—appearances on dissection—chemical proofs—whether the last should be deemed indispensable for conviction—medico-legal cases—treatment. Nitric acid—effects—Tartra's arrangement of them—appearances on dissection—tests—antidotes. Muriatic acid. Acetic acid—case of poisoning with it. Oxalic acid—symptoms—appearances on dissection—tests—antidotes. Phosphorus—effects—appearances on dissection—phosphorous acid. Iodine—effects—tests—treatment; hydriodate of potash—effects—tests. Bromine—hydrobromate of potash—tests. 2. The ALKALIS, and their salts. Potash; subcarbonate of potash—effects—appearances on dissection—antidote; nitrate of potash—effects—treatment. Soda. Ammonia—hydrochlorate of ammonia. Quicklime—oxymuriate of lime. Hydrogenated sulphuret of potash (liver of sulphur)—poisonous effects—antidote. Sulphuret of soda.

IRRITANT poisons are divided by Dr. Christison into five orders or groups, as follow: the acids, and their bases; the alkalis, and their salts; the metallic compounds; the vegetable and animal irritants; and the mechanical irritants. To these I will add, the acrid gases.

In pursuing this arrangement, we shall consider, under the FIRST ORDER, the following substances:—

Sulphuric acid,
Nitric acid,
Muriatic acid,
Acetic acid,
Oxalic acid,
Phosphorus,
Iodine,
Hydriodate of potash,
Bromine,
Hydrobromate of potash.

poisoning; of these, 171 were acquitted, and 102 condemned. The substances employed, were, in 93 cases, as follows:—

54	cases, arsenic,	1	case, tartar emetic,
7	— verdigris,	1	— opium,
5	— cantharides,	1	— acetate of lead,
5	— corrosive sublimate,	1	— white lead,
4	— nux vomica,	1	— sulphuric acid,
3	— fly-powder,	1	— sulphate of zinc,
2	— nitric acid,	1	— mercurial ointment,
1	— sulphuret of arsenic,	5	— unknown.

In 31 cases, the poison was given in 34 instances in soup; 8 in milk; 7 in flour; 7 in wine; 8 in bread; 5 in pastry; 4 in chocolate; 4 in medicine; 2 in coffee; 2 in an unmixed state.—London Medical Gazette, vol. xvi. p. 114. Lancet, N. S. vol. xvi. p. 33.

And under the SECOND ORDER:

Potash,
Subcarbonate of potash,
Nitrate of potash,
Soda,
Ammonia,
Muriate of ammonia,
Quicklime,
Oxymuriate of lime,
Liver of sulphur,
Sulphuret of soda.

I. *The Acids.*

SULPHURIC ACID (oil of vitriol). That this substance should sometimes be the cause of death, may readily be conjectured; but it requires some acquaintance with human folly and wickedness, to believe that it could be thought of as the instrument of suicide, and even of murder. Such is, however, too certainly the fact.*

The following are some cases illustrative of its effects:—

Joseph Parangue, a soldier, about the end of January 1798, between seven and eight in the morning, swallowed, by mistake, a glass of sulphuric acid, imagining it to be brandy. He drank it off at once, with his head back, and poured it from a distance into his mouth. By this means, he did not discover his mistake until he drew his breath. He was instantly conveyed to the hospital, and Dr. Desgranges being at hand, immediately saw him. Excessive vomiting, convulsive agitations of the muscles of the face, violent cramp in the stomach, and an acrid burning heat in the throat and œsophagus, were present. The body was icy cold; the pulse small, concentrated and irregular; and the breathing difficult. The carbonate of magnesia suspended in water

* In 1808, a female was tried and convicted at Edinburgh, for the murder of her natural child, aged eighteen months, by pouring sulphuric acid down its throat. —Edinburgh Annual Register, vol. 1. part 2, p. 4.

In 1819, another at Exeter (England), also for poisoning her child.—Gordon Smith on Medical Evidence, p. 218.

In 1817, a female was tried in this State, for poisoning an illegitimate child.

In 1824, Richard Overfield was condemned and executed at Shrewsbury (England), for the murder of his infant child, three months old.—Edinburgh Medical and Surgical Journal, vol. xxii. p. 122.

In 1828, a man was convicted at Strasburg, for attempting to poison his wife.—Ibid. vol. xxxiv. p. 213.

In 1830, a Mrs. Humphrey, at Aberdeen, was convicted and executed, for murdering her husband. A full account of the trial is given by Dr. Christison, in ibid. vol. xxxv. p. 298.

In 1831, a stepfather at Manchester, for the murder of his child. Case related by Dr. Sinclair, ibid. vol. xxxvi. p. 99.

Its fatal wilful administration is thus not only a capital offence by the laws of all civilised countries, but its external application, so as to do some serious injury, is, by a special statute in Scotland, made punishable by death. This enactment originated in the quarrels between masters and workmen in Glasgow, regarding the rate of wages; and the crime became so frequent as to render a law necessary. The clause is as follows: "If any person shall wilfully, maliciously, and unlawfully throw at, or otherwise apply to, any of his majesty's subjects, any sulphuric acid or other corrosive substance, calculated by external application, to burn or injure the human frame, with intent in so doing, or by means thereof, to murder, maim, or disfigure, or disable such subject, or with intent to do some other grievous bodily harm," and if such intent is accomplished, the person convicted shall suffer death. Of course, throwing the acid so as to injure or destroy the dress merely, would not be capital. Under this act a female (Macmillan) was convicted in 1828. I shall notice this case hereafter.

was administered with considerable relief; and although vomiting returned once, yet by the continuance of this remedy, the anxiety and pain diminished, the pulse rose, and a genial heat was diffused over the body. The antiphlogistic regimen and diluents were subsequently required to remove the consequences of this potation. The whole of the mouth and throat was found, on the subsequent day, excoriated and covered with eschars; the epiglottis swelled; and on the fourth day, a slough from the uvula almost threatened suffocation. This gradually came away, and he finally recovered, but a painful sensibility of the throat and stomach remained for a length of time, especially when he ate hastily, or used food that was indigestible.*

A female swallowed some for the purpose of destroying herself, and in four hours thereafter was brought to the Hotel Dieu. Pain, coldness of the skin, constipation, and inquietude, were present, with copious and repeated vomitings of a deep blue coloured and glairy fluid. Proper remedies were given, but the symptoms increased in severity. On the second day, the face appeared greatly deranged, the cold on the surface increased, the pulse became insensible in the wrists and carotids; the breath was extremely fœtid; a few drops of very high-coloured urine escaped from time to time, and the disquietude and agitation were extreme. She could not bear any kind of covering, and the region of the stomach was exquisitely sensible to the slightest touch. On the fourth day, she was incapable of resting a single instant in the same position, and rose up, for the purpose of going to a cold place. Death finally relieved her on the fifth day, and she preserved her reason to the last.†

In one instance, quoted from Tulpius, a miliary eruption appeared over the whole body, in addition to the ordinary symptoms.

Its effects on an infant are illustrated by an instance that occurred to Dr. Bateman. A mother, by mistake, administered about a teaspoonful to her child, aged two and a half years. This was at half-past four P.M. She immediately excited vomiting by putting her finger in the child's throat, and the matter brought up resembled coffee grounds. It seemed to suffer little pain, except when vomiting, which occasioned crying, and it died easily, and almost unperceived, at nine the same evening.‡

* Orfila's Toxicology, vol. i. p. 315. Foderé, vol. iv. p. 96.

† Ibid. p. 320, quoted from Tartra.

‡ Edinburgh Medical and Surgical Journal, vol. x. p. 257. In addition to the above, I will refer to such cases as I have noted.

London Medical Repository, vol. xiv. p. 160. Two cases, from a German Journal, one of suicide, and the other accidental. The former died in a few hours; the latter survived two months.

Chapman's Journal, vol. viii. p. 218. A chronic case, which ended in a stricture of the œsophagus. After two years' suffering, the patient died of hunger. This is quoted from the *Bulletin de la Société Médicale d'Emulation.*

London Medical Repository, vol. xxvii. p. 550. Death in fifteen days. Case by Dr. Lebidois. *Archives Générales.*

Littel's Journal of Foreign Medicine, vol. i. p. 313, by Dr. Robert. Death in sixty-eight days. This is also a French case.

London Medical Gazette, vol. xi. p. 813; by Dupuytren. Died in seven hours.

Ibid. vol. xiv. p. 30; by Louis, at Hospital de la Pitie. Survived two months.

Edinburgh Medical and Surgical Journal, vol. xxxvi. p. 99; by Dr. Sinclair. Survived fifty-five hours.

These cases (particularly the first and second), give a full view of the symptoms ordinarily observed, and it is, therefore, not necessary to repeat them.

An extraordinary case of voluntary injection of sulphuric acid into the vagina, for the purpose of inducing abortion, is said to have lately happened in France. The result was, extensive inflammation and a complete obliteration of the vagina. When delivery came on, the cæsarean operation was required, but both mother and child perished.*

Appearances on dissection. In the case of a female, related by Tartra, the abdominal viscera were for the most part œdematous, and the coats of the duodenum in several points nearly dissolved. The stomach externally shewed great distention, was of a dark colour, and exhibited several spots indicative of deep disorganisation. The mucous membrane of the œsophagus was burnt, blackish, and partly detached. The stomach contained a dark and very fœtid fluid, similar to what she had vomited, and it was much thickened in some points, and corroded in others. The internal coat was entirely dissolved, and reduced to a state of mucus throughout the greatest part of its extent. The pylorus presented the most decided marks of disorganisation; its coats were black and puffed up, and almost closed the orifice. The duodenum and jejunum were partly destroyed and burnt, and attacked with sphacelus, and the whole of the intestinal canal partook more or less of the injury.

In Dr. Bateman's case, the omentum was seen converted into a black pulpy mass, but still possessing sufficient tenacity to retain the food which had escaped from the stomach. There was also in the omentum a small quantity of dark-coloured fluid, similar to what had been vomited. In the stomach, there was an erosion or aperture about three inches in diameter, bordered by thickened edges of a dark-brown cinder-like appearance. The œsophagus, with the exception of a slight purple blush, shewed no marks of disease. There was an appearance of inflammation towards the cardia, but none towards the pylorus. The intestines were free from inflammation, although they were strongly marked with transverse corrugated rings.

In the other cases referred to, the appearances varied with the length of time that the patient survived after taking the poison. When some months had elapsed, the stomach was sometimes seen extremely contracted, and its membranes thickened. Indeed, all the results of severe and long-continued inflammation have occurred, not only in this

Midland Medical and Surgical Reporter, vol. i. p. 340; by Mr. Hebb. Died in a few hours.

Dr. Roupell, Illustration 5. Death in twelve hours.

Cases of recovery. Edinburgh Medical and Surgical Journal, vol. xxvi. p. 221. (from Horne's Journal). A female, aged 19. A tetanic affection continued for some days, and the lining membrane of the mouth was separated and discharged.

New York Medical and Physical Journal, vol. vii. p. 563; by Dr. Stewart.

London Medical Gazette, vol. iii. p. 253; by Mr. Orr.

Ibid. vol. iii. p. 667.

Ibid. vol. xiv. p. 438; by Dr. Wilson. Was alive at the end of six months.

London Medical Quarterly Review, vol. iv. p. 119; quoted from Dr. Rust.

* Lancet, N. S. vol. viii. p. 35.

part, but in the œsophagus, throat, &c. Any peculiarities that have sometimes been noticed, will be mentioned under the head of nitric acid, as the effects of both are in many respects similar.

Professor Carus relates the following remarkable circumstance. A woman at the completion of the full time of utero-gestation, poisoned herself with concentrated sulphuric acid. She concealed the deed till the instant of her death, when the last efforts of nature were employed in the expulsion of the child. On dissection, the acid was found in the cavity of the pleura of the fœtus, in that of the peritoneum, in the heart, the bladder, and even the water of the amnios.*

Effects on animals. It would certainly seem unnecessary to ascertain the effects of the injection of sulphuric acid into the veins, since, so far as I can ascertain, no practical purpose is to be gained by it.† Orfila has, however, instituted some experiments in this way. It caused instant death, by coagulating the blood. When introduced into the stomach, it killed by the inflammation and disorganisation of that organ; and when applied to the skin, by the burn that it produced, or the suppuration of which it was the consequence.

The other acids (nitric, muriatic, phosphoric, fluoric, &c.), acted in a similar manner. It will, therefore, not be necessary to notice this head again, unless there is something peculiar to be mentioned.

Chemical proofs. If there are any instances of poisoning, in which the appearances found on dissection are to be deemed of greater weight than the chemical proofs, it is in the case of poisoning by the mineral acids. Their effects are so striking and so little liable to be mistaken for natural appearances, that a doubt can hardly arise.‡ The necessity of relying on these is increased by the difficulty of satisfactorily detecting the presence of the acid in all cases. I shall mention the tests recommended by Professor Christison and others, and then state some medico-legal cases that have occurred in England and France.

When concentrated, its peculiar appearance, its corrosive power, its action on litmus, and the heat induced by the addition of water, serve to distingiush it.

When diluted, add *pure* nitric acid, and subsequently a solution of the nitrate of barytes. A heavy white precipitate, consisting of sulphate of barytes, falls down. This may be collected, filtered, and dried, and then mixed with a little charcoal powder and exposed to heat in a platinum spoon. Sulphuret of barium is thus formed. If we add water to this, and afterwards a little muriatic acid, and then present over the mixture a bit of white paper, moistened with acetate

* Bulletin des Sciences Médicales, vol. xiii. p. 72.

† And particularly as Fracassiti performed the same experiments, with similar results, one hundred and fifty years ago. See Philosophical Transactions, vol. ii. p. 490.

‡ "Thus," says Dr. Christison, "what fallacy can intervene to render the following opinion doubtful? There were vesicles and brown streaks on the lips, neck, and shoulders, similar to the effects of burning; almost total separation of the lining membrane of the mouth, throat, epiglottis, and gullet; perforation of the stomach, with a margin half an inch wide, which was extensively charred and surrounded by a red areola. From these appearances alone, Mertzdorff declared that the child must have been poisoned by sulphuric acid."—Christison, p. 164.

or nitrate of lead, the sulphuretted hydrogen from the decomposed sulphuret, will blacken the paper.

When mixed with animal and vegetable matter. If it be required to analyse the *stains on clothes*, we should first ascertain whether any sourness be present. This is found to continue for a length of time after the acid has been applied. Then cut out the stained spots, boil them in distilled water, test the acidity of the fluid by litmus, and afterwards apply nitric acid and nitrate of barytes, as above directed. If there are indications of sulphuric acid, the next question is, whether this is free or combined with a base in the form of a neutral salt.

In analysing the contents of the stomach, many sources of fallacy arise from the combination of the acid with its contents, or with portions of the animal membrane. It is known that free acids, as the muriatic and acetic, exist in the stomach; and the difficulty of discrimination is thus greatly increased. Instead, therefore, of quoting in detail the process of Dr. Christison, for ascertaining whether the acid is combined with a base, or, in other words, whether a sulphate has been the cause, I will content myself with referring to his work, and will only recommend, that if the appearances on dissection, in combination with the tests of the presence of sulphuric acid, in some one or other form, in the stomach, do not suffice to indicate poisoning by it, not to rely on any additional experiments. I am justified in this advice, I apprehend, from the observations of Christison, Devergié, and Orfila.*

What testimony has been considered sufficient for conviction, will be seen by a review of some trials. In Overfield's case, the child, three months old, was in perfect health at 8, A.M. Between 11 and 12 o'clock, the mother was heard to scream; and a witness, on entering the house, found the infant in great agony. It was immediately taken to the surgeon. The lips were white and shrivelled, and had small blisters on them. The child's clothes, made of dyed cotton, had some red spots on them, and the surgeon on applying his lips to these, found an extremely acid taste. It died at 3, P.M. The inside of the mouth and the gullet were blistered, and their inner lining corroded. So, also, the great curvature of the stomach, which resembled wet brown paper. A pint of bloody fluid was obtained, and which was found to contain sulphuric acid. Overfield was a workman in a carpet manufactory, and had access to the factory stores of sulphuric acid. He was convicted and executed.†

Mrs. Macmillan, at Edinburgh, threw some sulphuric acid over Archibald Campbell, on the 17th of October, 1827. The skin on the left side of the face was partially removed. The left eye-ball was injured, and both eyelids inflamed and swollen. The skin of the inside of the lips was white and swollen, as was also the back of the left hand. Campbell was brought to the infirmary in great pain, which was relieved by proper applications. Soon, however, the pain in the eye extended to the head; venesection, &c. proved of little avail; and the

* Christison, p. 143. Devergié in Annales d'Hygiène, vol. ii. p. 213. Orfila in ibid. vol. x. p. 126. Lancet, N. S. vol. vii. p. 132.

† Edinburgh Medical and Surgical Journal, vol. xxii. p. 322.

cornea burst. To this followed inflammation of the vein in which he had been bled, severe fever, and symptoms of pulmonary inflammation. He died on the 30th.

On dissection, there were found marks of inflammation in the veins, lungs, and pleura, with serous effusion.

Mrs. Macmillan was indicted under the recent Scotch statute. A hat, stock, and sleeve of a coat, injured by the acid, were examined by Drs. Christison and Turner. Portions of each, after being divided into small fragments, were boiled with distilled water. The filtered fluid had an acid taste, reddened litmus, and yielded, with acetate of barytes, a copious brownish precipitate, which was rendered white by nitric acid. This precipitate, when dried, was mixed with a little charcoal and heated. On adding muriatic acid, sulphuretted hydrogen was emitted, which blackened a paper dipped in acetate of lead.

Mrs. Macmillan was convicted, but as this was the first case under the new act, she was only condemned to perpetual banishment.*

Mrs. Humphrey, a butcher's wife, at Aberdeen, was tried there for murdering her husband, by pouring sulphuric acid down his throat while asleep. The circumstantial evidence was very strong, that she alone could have given it to him. He was in a state of intoxication on going to bed, and after some hours, the servant who had gone to see him, at the request of her mistress, found him complaining of burning in his throat, and he said that he awoke suddenly with these symptoms. Frothing and difficulty in swallowing and speaking followed. On attempting to take some milk, it returned curdled. When seen by a surgeon, all the marks of the action of a corrosive substance were present. He continued to labour under its effects, gradually sinking, and finally died in 47 hours from the commencement of his illness. On dissection, two brownish marks were seen at the corners of his mouth, and the gums and part of the inside of the lips were of an almost milky whiteness. The back part of the tongue had lost its investing membrane, and was of a red colour, while its fore part was covered with a whitish brown crust. The pharynx had a similar appearance. The membrane covering the epiglottis was ash-coloured, much thickened, and, in some places, detached. The stomach was overspread with numerous erosions and ulcerations. It contained about three ounces of a thick, reddish liquid, but no sulphuric acid could be detected in it, nor in that obtained from the intestines. But pieces of a blanket, a bed cover, a sheet, and a shirt, used or worn by the deceased on the night of his illness, all presented various stains and corroded spots, and, on the application of tests, exhibited marks of the presence of sulphuric acid. Other portions were sent to Dr. Christison, who examined them seven weeks after the man's illness commenced, and corroborated the opinion of the physicians of Aberdeen. The female was convicted, and before execution confessed her guilt.†

In a French case of an infant poisoned by oil of vitriol, parts of the clothes and other articles on which the acid had fallen, were treated

* Edinburgh Medical and Surgical Journal, vol. xxxi. p. 229. Syme's Justiciary Reports, p. 289.

† Edinburgh Medical and Surgical Journal, vol. xxxv. pp. 298-316.

with water, and then tested with the hydrochlorate (muriate) of barytes, and they gave abundant precipitates. A portion of the skin, of the lower lip, and of the tongue, when washed in water, made it distinctly acid. So, also, the matters vomited, when treated with distilled waters and filtered, gave a precipitate with muriate of barytes; but neither the liquid contained in the stomach, nor portions of the stomach itself, gave any marked indications. The examiners (Guersent, Chevallier, Barruel, and Denis), notwithstanding, gave it as their opinion, that the child had been poisoned by sulphuric acid.*

In a recent examination of the stomach of a suicide, with its contents, by Devergié and Taufflier, they experienced the difficulties already indicated, of establishing the presence of free sulphuric acid by processes now in use, and, as a substitute, employed the *iodic acid* in the following manner: the stomach having being boiled in distilled water, was now heated to redness in a glass vessel, in order to produce decomposition, and to the neck of this vessel was attached a receiver, containing a solution of ammonia. In order to ascertain whether this fluid held any sulphite of ammonia, a few drops of a solution of iodic acid, to which starch had already been added (and a drop of hydrochloric acid to neutralise the ammonia), were poured into it. The mixture turned immediately of a blue colour. This result proved to us, say the reporters, that a certain portion of sulphuric acid was present in the receiver, and that the experiment had changed the sulphite into the sulphate of ammonia, the oxygen of the iodic acid being given off to it, while the iodine thus rendered free, gives its characteristic effect on starch. On pursuing the experiment with various portions of the suspected fluid, the compound procured was treated with barytes, and gave its white precipitate. The iodate of barytes was decomposed by heat, while the residue, after the usual manipulations, was found to be sulphate of barium.†

Treatment. Water, containing calcined magnesia in suspension, must be instantly administered; or, if this cannot be procured, chalk and water, or soap and water. The caustic must thus be neutralised, or the patient is lost. In an emergency, Dr. Christison advises, that the lime from a white-washed apartment be taken, and beat down into a thin paste with water, and thus given. Milk or mild diluents, are also proper at this time. The subsequent treatment must depend on the degree of inflammation present.

Nitric acid. We are indebted to Dr. Tartra of Paris for an able and comprehensive essay on this substance as a poison; and from the extracts given by Orfila, and a most instructive analysis contained in the Edinburgh Medical and Surgical Journal, I have taken the following particulars.‡

* Annales d'Hygiène, vol. iv. p. 205. A case, in which a large quantity of sulphuric acid was added to coffee, for the purpose of poisoning a man and his wife, is stated by Barruel, in ibid. vol. ix. p. 392. He applied the test already recommended.

† Annales d'Hygiène, vol. xiii. p. 427.

‡ Orfila's Toxicology, vol. i. pp. 329–360; vol. ii. p. 560. Edinburgh Medical and Surgical Journal, vol. ix. p. 369. Review of "*Traité de l'empoisonnement par l'acide nitrique*, par A. E. Tartra, médecin, Paris, 1802." I have subsequently obtained the work itself, but find nothing to add.

Dr. Tartra arranges the cases of poisoning by nitric acid, into four classes. 1. When the death is speedy, for it is never sudden; it commonly takes place from the primary effects in about twenty-four hours, varying from six to forty-eight hours. 2. When it proves fatal from its secondary effects, at various distances of time, from fifteen days to some years. 3. When death does not take place, but the recovery is imperfect. 4. When a perfect cure is sooner or later obtained.

1. The following example will give a tolerable idea of the progress of the symptoms in the first case. A man driven by distress to commit suicide, under the greatest agitation of mind, and upon an empty stomach, swallowed, at a draught, two ounces of concentrated nitric acid. Instantly he was seized with the most excruciating pains and agitations, and could not lie in bed, but rolled himself upon the floor. Vomiting came on, accompanied by general sensation of coldness, especially in the extremities. Every time he vomited, the matter effervesced upon the pavement. He got a solution of soap and oil. In two hours he was brought to the hospital; and, upon the road, he frequently vomited, and stopped to drink. On his arrival, he got emollient drinks, especially linseed tea, in great abundance. He was in continual agitation, and his countenance very much altered; he vomited every instant a blackish glairy matter; he opened his mouth easily, and his tongue was white, with a tinge of yellow; he had acute pains in his mouth, along the œsophagus, and in his stomach; his belly, slightly tense, could not bear the slightest pressure, it so excessively augmented his pains. The surface of his body was cold; his pulse small, concentrated, and frequent; he had hiccup, and his respiration was laborious. His symptoms increased; he uttered sighs and lamentations; his limbs became icy; a cold sweat covered his whole body; his pulse was almost imperceptible, and the pain was constant. Still he could rise, and make continual and useless efforts to quench his thirst, and satisfy his urgent desire to make water and go to stool. He continued in this state during the night. The matter vomited became more clear, and of a yellow colour. He at last made a few drops of urine. The shocking appearance of his body already resembled that of a corpse; but he retained his senses, and was speaking when he expired, nineteen hours after swallowing the acid.

The burning heat and pains which are commonly the immediate effects of nitric acid when swallowed, present striking contrasts. In general, they are not in proportion to the quantity or strength of the acid swallowed. Often, persons who have taken only a small dose, are seized with the most excruciating and dreadful pains; while some of those who have swallowed a great quantity, two or three ounces for example, have had scarcely any suffering, but remained very tranquil. In the first case, the patients either recover, or survive a long time; in the second, speedy death is almost always the consequence. Thus, a young man of twenty died in twenty hours, without any agitation or signs of acute pain. On opening the body, the highest degree of disorganisation appeared—perforations of the stomach, and great effusion of its contents into the abdomen.

A woman said she had taken nitric acid, but she seemed so little

affected by it, that many thought she was imposing on them. There was no agitation, no pain or vomiting; but the smallness of the pulse, lassitude, and prostration of strength, rather indicated a typhus fever. Next day she died; and, on examining the body, there was found to be the greatest degree of disorganisation that nitric acid is capable of producing; perforation of the stomach, gangrenous spots, effusion into the abdomen, marked corrosion of all the viscera, and general yellow colour.

But when the acid, from deficient quantity or strength, only acts on the mucous membranes, then it does not always prove fatal; but the pains are excessive, the colic dreadful. In the one case, the sensibility seems to be annihilated: in the other, excited in the highest degree. Here, as on many other occasions, the pain is to a certain degree proportionate to the severity of the affection, but after a certain point it seems rather to be in an inverse ratio.

Out of fifty-six cases, death from the primary effects took place in nineteen.

2. The second variety of the progress and termination of poisoning by nitric acid, exhibits, at first, the same phenomena as the preceding. But less alarming symptoms succeed by degrees, anxiety, irregular fever, dryness of the skin, spasmodic constriction of the extremities, wandering vague pains, deep and difficult inspirations, dryness of the tongue and throat, excessive thirst, deep pain in the region of the stomach, habitual tension of the abdomen, obstinate costiveness, vomiting less frequent, a kind of copious salivation, uneasiness in the throat from the imperfect detachment of the flakes of the membrane lining it, portions of it still partially adhering, frequently floating in the pharynx, and disturbing both respiration and deglutition.

The pulse is often miserable, and the slow fever has no remission; the cold continues over the surface of the body, and there are irregular fits of shivering occasionally. Every kind of food, solid or liquid, is vomited. Milk alone seems to agree with the stomach. After some time, the inner membrane of the alimentary canal detaches itself in portions, which are discharged by vomiting, with floods of frothy and intolerably fœtid saliva. Membranous flakes, swelled, rotten, and often of a very great size, are frequently pulled out of the mouth. This state lasts, in some cases, only about a fortnight, generally several months, and occasionally for years. But these persons uniformly fall into complete marasmus, as the digestive organs are totally deranged, and, before death, they are often reduced to a skeleton.

This variety occurred in *seven* of the *twenty-nine* cases now first described by Dr. Tartra, and he accounts plausibly enough for its having been seldom observed before, by supposing that when persons who had swallowed nitric acid had got the better of the primary symptoms, they were lost sight of, and the subsequent affection was not imputed to the proper cause.

Such in general is the progress, when patients die of the secondary symptoms; but in the case of a female it was considerably different, as well as the appearances on dissection. The constipation was not very great; the expectoration did not last long, and the vomiting was rare;

but a fixed pain at the bottom of the thorax, accompanied by difficulty of breathing and spitting of blood, deceived the medical attendants who were not acquainted with the fact of her having drunk nitric acid. She was treated as if for pectoral complaints, and died in about sixty days after having swallowed the poison.

In this case alone, the body was not remarkably emaciated. The stomach was only a little contracted, and adhered in several places, especially to the liver and spleen. It contained a mass of solid blood, of a dark red colour, the size of a fist, moulded to the shape of the stomach, and covered by a very fine membrane, which seemed to be either the mucous membrane detached from the stomach, in several places, or perhaps a membrane of new formation. The intestinal canal, in this case, was of the usual size. Death seemed to have taken place before the gradual consumption had wasted the body.

3. The third variety of termination is in imperfect recovery. This is also very frequent, and is characterised by the same train of symptoms with what we have now described, but very inferior in degree. The exfoliation of the œsophagus and stomach either takes place but once or only a few times. A slow and progressive amendment insures the safety of the patient. But there still remains some complaint: obscure pains in the throat, and especially in the epigastric region; habitual constipation, occasional vomiting, and increased sensibility of the stomach, so that that organ can only support light nourishment and bland liquors. In short, they continue invalids during the rest of their lives; they are subject to repeated and even habitual indispositions, and sometimes to pain and insupportable heat of the stomach. But they are able to follow their occupations, and long survive their poisoning. Dr. Tartra has met with *eight* examples of this termination of the disease, in fifty-six cases.

4. The total disappearance of the symptoms produced by swallowing nitric acid, or complete and absolute recovery without leaving any consequences, is the last variety of termination. Of fifty-six cases, the recovery seemed to be complete in *twenty-one*.

One or two circumstances additional may be added, on the authority of Dr. Christison. The marks on the lips, skin, &c. where the acid has touched, are at first white, but shortly become, if from nitric acid, yellowish, and if from sulphuric, brownish. Again, there are, undoubtedly, some cases of poisoning, where the injury is confined to the gullet and neighbouring parts. Dysphagia has thus happened for a time; and inflammation and spasm of the glottis and larynx may occur, and cause a fatal result, without any affection of the stomach. Instances are quoted where the morbid appearances were confined to the above parts, and the stomach was healthy, and yet no doubt existed of the poisoning.*

Appearances on dissection. When the patients die of the primary effects of nitric acid, the external appearance of the body presents no alteration; every part is sound and natural, and presents, in a certain degree, the firmness and freshness of life. The epidermis of the mar-

* Christison, pp. 154, 157.

gin of the lips has commonly an orange colour, more or less deep. It seems burnt, and separates very easily. Sometimes yellow spots are discovered on the hands and other parts of the body, caused by the contact of nitric acid. A yellow fluid, in some cases very abundant, flows from the mouth and nostrils, and the belly is considerably distended with air.

The alimentary canal is remarkably affected. All the internal membrane of the mouth is burnt, and has sometimes a white, but more commonly a yellow colour. It is separated in some places, and adheres in others. The teeth are often loose, and have a very marked yellow colour at their crown. The mucous membrane of the pharynx exhibits the same change, or is in a state of inflammation of a dirty red colour. The whole extent of the œsophagus is lined with a dense mass of a fine yellow colour, dry on its surface, unctuous and greasy to the touch, and which seems to be formed both of the mucous membrane, altered in a particular manner, and of the albumen contained in the viscid fluid which exudes from the membrane of the œsophagus, solidified by the nitric acid.* This lining adheres in very few points, and is easily detached from the other membranes of the œsophagus, which are brown and bloodshot.

When the stomach is not perforated, it has commonly a considerable size. Externally, its membranes are slightly and partially inflamed, but very much towards the pylorus, and beginning of the duodenum. Its colour is faded, livid, of a yellowish green, with large gangrenous spots. It adheres every where to the neighbouring parts, the diaphragm, liver, spleen, and transverse arch of the colon, by means of concrete lymphatic exudation. Its sides, which are thin and yellow in some places, and thick and black in others, exhibit networks of dilated blood-vessels, filled with black coagulated blood. Often there are several points of the stomach dissolved, and ready to burst with the slightest touch. It contains a great quantity of gas, which has a particular smell, resembling that of bitter almonds. Most commonly, it also contains a great quantity of yellow matter, having the consistence of pap, in which there are flocculi, or small masses resembling tallow, which, however, may be the cheesy part of the milk drunk by the patient, decomposed in the stomach. Its sides are coated internally with a thick grained paste, of a yellowish green colour, composed, according to all appearance, of the internal membrane, disorganised and dissolved, and of coagulated albumen. Almost always the substance of the stomach is swelled in some places, and deeply marked with black, without being dissolved. This effect is most remarkable at the great end, into which the acid seems to fall by its weight. The rugæ of the stomach are very brown, and are reduced to mucilage. They are easily removed by the finger from the nervous coat, which,

* Dr. Arnott, from a dissection made by him at the Middlesex Hospital, supposes that the yellow membrane found in the œsophagus, is not the product of inflammation, but its cuticular covering changed by the direct action of the acid. In his case, the larynx had a thin delicate layer of lymph, the result of inflammation. The patient survived thirty-six hours.—London Medical Gazette, vol. xii. p. 219. Dr. Roupell gives a drawing of this case.

by reason of its whiteness, often appears, in a great measure, sound. The small end is affected with many deep spots of gangrene, and the pylorus is much contracted.

The duodenum internally, especially at its two curvatures, presents the same kind of change as the stomach. Its sides, as well as those of the jejunum, are marked with yellow, slightly greenish. They are also lined with a very thick orange crust, and the villous membrane is dissolved and destroyed. These phenomena have less intensity in proportion as the part is more distant from the stomach.

The surface of all the abdominal viscera is commonly very much inflamed. The peritoneum is thickened, hard, of a dirty red, covered with albuminous layers, which unite, by numerous adhesions, all the viscera, and especially the folds of the intestines, as it were into a single mass.

The thoracic surface of the diaphragm, and of the inferior lobes of the lungs, is covered with a very solid layer of albumen, of a whitish colour.

A bloody liquid is effused into the abdomen, and there is also a small quantity in the chest.*

The urinary bladder contains no urine, although the patients have not discharged any. The large intestines are usually filled with very hard fæces.

In most cases where the stomach is perforated, its bulk is very small, in other respects it is the same. The holes commonly occur in the large and small extremities: their form is circular, and their edges thin and as if dissolved. We then find in the abdomen an enormous effusion of a thick yellow liquid, containing many white flocculi, and resembling the fluid with which the stomach is filled, when it is not perforated. The greatest distention always accompanies this state of the belly. The alteration and disorganisation are carried to the highest degree. The surface of the abdominal viscera seems to have suffered the direct action of very dilute nitric acid. It is greasy and unctuous to the touch, and almost every where spotted with yellow.

The appearances upon dissection of those who die of the secondary effects, are entirely different from those now described. It would be difficult to find an example of greater emaciation, more advanced consumption, or disgusting form. Nothing is equal to the degree of withering, drying up, and decrepitude of the whole organs. Their colour is faded; the internal cavities do not contain the usual serum; the cellular and muscular systems are almost annihilated; the bones become dry, as in persons of advanced age, and break with wonderful facility. But these changes are general and secondary, and depend upon local organic derangement of the alimentary tube. The stomach

* The blood in the heart and large vessels has been several times seen forming a firm black clot. And this, according to Dr. Christison, is not the effect of the poison, but its healthy state differing thus from what is observed from other poisons. Dr. Hertwig is said to have performed numerous experiments with the mineral acids, and also the carbonic, acetic, and tartaric, on animals and birds, and the effect of all, except the nitric, is to give a dark colour to the blood within the arteries and veins.—American Journal of Medical Sciences, vol. xi. p. 501.

and whole intestinal canal are contracted to an extremely small size, so that they could be contained in the hollow of the hand. The intestines are not larger than the little finger, sometimes not exceeding a thick writing quill. Their coats are very thick, their cavity almost obliterated, and containing only a little mucosity. In general, all the parts touched by the poison are contracted, and as if obliterated. The stomach, which often resembles a portion of a small intestine, appears sound externally, and only presents some adhesions to the diaphragm, liver, and spleen; internally, the most remarkable change is the contraction of the pylorus, the passage through which is not larger than a lentil, or even scarcely admits a probe; and the membranes of the stomach itself are so thickened and compacted around it, that they have lost all their natural suppleness.

On the internal surface there are irregular spots, or rather smooth and red places, which seem to be covered with a regenerated mucous membrane, less villous than that which has been destroyed by the action of the acid. These cicatrices are especially large and numerous in the great end of the stomach and around the circumference of the pylorus. There are also commonly some at the cardia, as well as in the lower half, and even the whole of the œsophagus and pharynx. The adhesions of the stomach with the neighbouring parts are sometimes simple, but most commonly they are very remarkable. Viewed from the inside of the stomach, they form irregular circular depressions, where the whole thickness of the coat is evidently wanting; so that in attempting to destroy these adhesions, we find that there are in fact so many holes through the substance of the stomach, which are plugged up by the adhesion of the neighbouring viscera.

Chemical proofs. When concentrated, its odour is peculiar. It acts also on copper, lead, or tin, disengaging nitric oxide gas, which is converted into nitrous acid gas, on coming in contact with the atmosphere. Another striking test, is morphia; this is changed, in a few seconds, to an orange colour, and soon forms a bright yellow solution.†

When diluted, the following is recommended by Dr. O'Shaughnessy. After evaporation to dryness, the residue is to be put in a small tube and heated for a second or two with a drop of sulphuric acid. A crystal of morphia is then to be dropped into the mass, and moved round the edges of it, or in the moisture on the tube above. If any nitric acid be present the morphia will take its orange colour.†

Process for stains. Boil the substance stained, in distilled water several times in succession; ascertain its acidity, and then render it feebly alkaline, by adding a few drops of a diluted solution of caustic potash. Evaporate this to dryness. The residuum must be treated with sulphuric acid, as in the former case, and brought in contact with morphia.

* Dr. O'Shaughnessy, Lancet, N. S. vol. vi. p. 330.

† Ibid. Dr. Liebig's test of the sulphate of indigo has been shewn by O'Shaughnessy to be altogether fallacious. Several other acids, besides four or five salts, equally possess the power of discolorising it. — Ibid. pp. 330, 452; and also vol. x. p. 302.

Process for compound mixtures, as in the contents of the stomach. Neutralise them with potash, and then filter and evaporate. Crystals of nitrate of potash will be formed, which may be decomposed by sulphuric acid. But often the quantity of acid present is not sufficient to produce this result. In this instance, Dr. O'Shaughnessy recommends a slow process of filtration through a loosely twisted cord of filtering paper, about eight inches long. The drops that pass out should be received in a proper vessel, and the whole covered with a bell-glass to prevent evaporation. In a day or two they will probably be so pure as to yield, by evaporation, crystals of nitre; which when decomposed by sulphuric acid, will allow the morphia to produce its effect. If this process be not effectual to remove all organic matters, Dr. Christison directs that acetate of silver be added to the product of evaporation. This throws down hydrochloric acid, and with it several organic principles. The residue may be filtered and evaporated, and treated as above.*

In order to discriminate between the nature of the yellow spots that are observed in the intestinal tube, and which are equally the result of nitric acid, iodine, and the bile, Barruel directs that a weak solution of caustic potash be applied to them. If owing to bile, there will be no change; if to iodine, the spot immediately disappears, and the tissue returns to its natural colour; but if to nitric acid, the colour will become stronger, and of an orange yellow.†

Antidotes. The same substances that were recommended in noticing sulphuric acid, are proper in this case. Chalk, magnesia, or soap and water, should be immediately used. If, however, any form of lime has been given as the immediate antidote, it may be well to remember, that the nitrate of lime is hardly in itself innocuous, and it is hence necessary to follow its use with draughts of broth or milk containing the phosphate of soda in solution. An insoluble phosphate of lime is thus produced.

The alkaline carbonates are not to be used, being themselves possessed of corrosive properties.‡

Muriatic (*Hydrochloric*) acid. I believe there is no case on record, of this acid proving poisonous to man. There can, however, be no doubt of its corrosive properties.

The tests are thus given by Dr. Christison. In its concentrated state, it is known by its yellow fumes, and its peculiar odour. Bring a rod dipped in ammonia, near another dipped in the acid, and a white vapour will arise. When diluted, add nitrate of silver, and a dense white precipitate, the chloride of silver, is produced. This latter salt is distinguished from all other white salts of silver, by drying and heating it in a tube. It fuses; but, unlike the others, remains undecomposed at a red heat. Again, the other white insoluble salts of silver, which are dissolved by ammonia, are soluble in an excess of nitric acid;

* Christison, pp. 144–150. Lancet, N. S. vol. vi. p. 840; vol. vii. p. 610.

† Annales d'Hygiène, vol. i. p. 278. A French case of supposed poisoning by nitric acid, is given in Edinburgh Medical and Surgical Journal, vol. xxxiv. p. 212.

‡ Christison, p. 165. Lancet, N. S. vol. vii. p. 836.

but the chloride, if treated in the same way, is not redissolved by an excess of nitric acid.*

There is an inherent difficulty, however, in proving poisoning with this acid by chemical tests, since it has been found as a natural or diseased product in the stomach by several very accurate chemists.

Acetic acid. This substance, in its concentrated form, has been found to be a poison. An ounce of pyroligneous vinegar, or acid, when given to a dog, whose œsophagus was tied, caused death in five, seven, or nine hours, preceded by efforts to vomit, great suffering, and weakness. An ounce of the concentrated acid, occasioned death in an hour and a quarter. On dissection, in all these cases, the stomach contained brownish black blood; the villous coat was blackish, and the subjacent tissue injected. Erosions and even perforations were not uncommon when the strong acid was used.†

Even common vinegar in large quantities, was found destructive to dogs, when vomiting was prevented.

A medico-legal case is related by Orfila. A female, aged 19, died in one of the streets in Paris. All the information that could be obtained concerning her, was, that she appeard as one drunk; moaned incessently, but passed on, after asking her way. Shortly after, she was found lying in agony, and, after strong convulsions, died. On dissection, the mucous membrane of the tongue and œsophagus was seen of a leathery consistence, wrinkled and brown. The stomach contained eight ounces of a fluid which effervesced. Its mucous membrane was no where destroyed, but some red or dark spots were seen near to the pylorus, and many of its small glands were hardened. Coagulated blood was found in the submucous cellular tissue.

The fluid found in the stomach was filtered, and a small quantity of carbonate of lime added to it; but no effervescence followed, although a test-paper was slightly reddened. Nitrate of silver and muriate of barytes, each demonstrated the presence of the muriatic and sulphuric acids, or their salts.

The fluid was now put in a retort, with a receiver attached, and the retort immersed in a concentrated solution of muriate of lime. This last was heated to boiling, and the fluid in the retort was by this means evaporated to dryness, without any charring of the organic matter. The fluid distilled into the receiver, was now tested for sulphuric and muriatic acids; and, they being absent, carbonate of potash was added to neutralisation. This was then evaporated to dryness; sulphuric acid was added, and, by redistilling, a notable quantity of strong and pure acetic was procured.‡

In its pure state, acetic acid is known by its odour, and its forming, with potash, a deliquescent salt.

The antidote, according to Orfila, is magnesia.

Oxalic acid. Numerous deaths have occurred in England within a few years from the administration of this substance. It was generally taken in an accidental manner, having been mistaken for the sulphate

* Christison, p. 151. Lancet, N. S. vol. vii. p. 193.
† Annales D'Hygiène, vol. vi. p. 159. ‡ Ibid.

of magnesia, a salt which it resembles in external character. The facility of the occurrence of these accidents is increased from the circumstance, that it is frequently applied to several domestic purposes, such as the cleaning of leather, and the removal of iron-mould and ink-spots. There are not, however, wanting instances in which this substance has been wilfully taken to destroy life.

The cases substantiating the deleterious effects of oxalic acid, are contained in the leading periodical publications of the day; and from a comparison of these I am enabled to present the following account of its effects.*

When the solution is strong (and this is usually the case from its being mistaken for Epsom salts) its corrosive nature is such as to excoriate the mouth in a violent manner. A young man purchased some for the purpose of committing suicide, but its extreme pungency made him hesitate in swallowing it while it was yet in his mouth; his life was thus preserved; but a most dreadful excoriation of the tongue, mouth, and gums, was the consequence.† So, also, in Mr. Fraser's case, the tongue was greatly swollen, and had the appearance of being scalded. I do not, however, find any notice of this in the other cases, probably because the solution was diluted, or (which is more likely) taken down at a single swallow.

Death ensued with great rapidity—in forty minutes in one case, and in ten minutes in two others. A few hours (prolonged in Mr. Hebb's and Dr. Arrowsmith's to thirteen) is generally the term. The patient under the care of Mr. Fraser, however, survived several days, and finally died of the secondary effects. As this case is somewhat peculiar, I shall notice it particularly hereafter.

The earliest symptom, in the absence of the one mentioned above, is burning pain in the stomach; and this occurs early, if the dose be large; but, if it be small, some hours may elapse. Excessive vomiting

* The most elaborate and valuable article on this subject, is a paper on poisoning by oxalic acid, published by Professor Christison and Dr. Coindet, in the Edinburgh Medical and Surgical Journal, vol. xix. p. 163. Its effects on animals, and the tests for its detection, are fully considered. Besides this, the following cases have been published:

1. Case by Mr. Royston, London Medical Repository, vol. i. p. 382. This was the first, and it occurred in 1814.
2. By Mr. Roberts, ibid. vol. iii. 380.
3. By Mr. George Johnson, ibid. vol. vi. p. 474.
4. By Mr. Williams, ibid. vol. xi. p. 20.
5. By Dr. Smith, ibid. vol. xii. p. 18.
6, 7. Two cases in Edinburgh Medical and Surgical Journal, vol. xiii. p. 249.
8. By Mr. Fraser, ibid. vol. xiv. p. 607.
9. Case of Michael Dillon, in Cooper's Tracts, p. 449, from a London paper.
10. Case by Mr. Hebb, London Medical Repository, vol. xxii. p. 475.
11. By Mr. Mollan, Dublin Hospital Reports, vol. ii. p. 329.
12. A case at St George's Hospital, Lancet, N.S. vol. i. p. 447.
13. A case communicated to Dr. Christison by Dr. Arrowsmith of Coventry.

Dr. Christison also refers to Dr. Percy's Inaugural Dissertation, for additional cases.

Nearly all of these (with, I believe, only two exceptions) proved fatal. There are several cases of recovery, which I shall presently mention.

† London Medical Repository, vol. vii. p. 526.

of a dark-coloured or sanguinolent fluid soon follows, and commonly continues until near death. There are, however, exceptions to this. Some have not vomited at all; and Dr. Christison observes, that this is most apt to happen when the poison has been taken much diluted.

When life is prolonged for a few hours, pain in the bowels and purging follow, and the fæces are mixed with blood. In Mr. Hebb's case there was an involuntary discharge.

Along with these, there is a sunken countenance, and the pulse is almost imperceptible at the wrist, indicating the nearness of death.

In Dr. Arrowsmith's case, two peculiar symptoms occurred. One was a deep-red, mottled appearance of the skin in circular patches; and the other, the poisoning and death of leeches applied to the stomach. This was six hours after the poison had been taken; and although healthy, and fastening immediately, "yet they did not seem to fill; and on touching one, it felt hard, and immediately fell off motionless and dead. The others were all in the same state; they had all bitten, and the marks were conspicuous; but they had drawn scarcely any blood."*

In the case related by Mr. Fraser, an individual took half an ounce of oxalic acid in solution, instead of salts. He instantly became conscious of the mistake, from perceiving the acid taste. Pain and vomiting ensued, and although they were mitigated, in some degree, by alkaline remedies, yet they recurred with violence. Spasms, impeded respiration, and general numbness, were complained of; the pulse was scarcely perceptible at the wrists or temples; the extremities were cold, and the matter vomited became tinged with blood: after a short time he brought up a large quantity of blood. Diluents were freely administered, together with anodynes, and his situation gradually became more tolerable. Numbness, however, occasionally occurred, and was relieved by warm applications, and a drink of sago and wine. On the second day, vomiting, retching, spasms, and singultus supervened; the pulse was nearly 100, and feeble; and numbness and chillness of the feet were present. A repetition of previous remedies gradually moderated these; but the hiccup continued for several days. On the sixth day he felt himself so well as, contrary to directions, to ride out in a gig. After this, debility came on gradually; an eruption appeared over the whole body, and hiccup was occasionally present. He retained his senses until the day before his death, and complained often on swallowing any article which was not perfectly bland. He expired fourteen days after taking the poison, in a state of perfect exhaustion.

Some cases of recovery are referred to in the note below.† In all

* Christison, p. 198.

† Dr. Scott of Cupar, Fife. Dose, a wine-glass of the solution, containing a drachm of the acid.—Edinburgh Medical and Surgical Journal, vol. xxiv. p. 67.

Professor Syme. Two drachms in solution.—Ibid. vol. xliv. p. 27.

A case at Guy's Hospital. Half an ounce—suicide. Vomiting occurred soon, but the stomach-pump was immediately used, and magnesia exhibited.—London Medical Gazette, vol. v. p. 704.

A case at the Worcester Infirmary (England). Half an ounce by mistake; cured by chalk, castor oil, &c.—Midland Medical and Surgical Reporter, vol. iii. p. 152.

Case by Dr. Tolefree of New York. A quarter of an ounce by mistake. Emetics.—Boston Medical and Surgical Journal, vol. xii. p. 158.

these, great irritation and pain in the stomach, and sometimes, also, in the throat, were constant and early symptoms; spontaneous vomiting is only mentioned in two instances: but in several, more or less of gastric irritation remained, which required laxatives to remove it.

Appearances on dissection. These indicate the presence of a powerful acid. In Mr. Royston's case, where the subject was a female, who died in forty minutes, the villous coat of the stomach was injected with blood, and florid over its whole surface; patches of an extraordinary intensity were also noticed. In other cases this coat was entirely corroded, and, indeed, the stomach perforated, so that its contents had escaped into the cavity of the abdomen. The œsophagus of one individual was so injured, that its cuticular coat peeled off with the slightest effort.*

The intestines sometimes partook in the inflammation and contraction, and at other times not; but the viscera of the thorax and the brain, do not appear to have been diseased in those cases where their examination is noticed.

In Mr. Hebb's case, the mucous membrane of the throat and gullet appeared as if it had been scalded, and could be easily separated. The stomach contained a pint of thick dark-coloured fluid, owing to the blood in it: its inner coat was pulpy, in many points black, and in others highly inflamed. The same was seen in the intestines. The lining membrane of the trachea and lungs was also very red.

In the instance reported by Mr. Fraser, on dissection, the stomach and a small portion of the intestines presented the marks of inflammation; the villous coat was completely destroyed; and this abrasion extended upwards throughout the whole of the œsophagus, exposing the muscular coat. In some parts the villous coat seemed entire, but, on examination, it was found to be soft, and easily rubbed off with the finger or sponge. The muscular coat of the stomach and œsophagus was much thickened, highly injected, and exhibited a dark gangrenous appearance. No perforation of the stomach was observable.

The small intestines exhibited similar appearances, but partially, and in a lighter degree. The other viscera were healthy.

It is remarkable that there is one fatal case of a girl dying in *thirty minutes* after swallowing an ounce, in which there were no morbid appearances whatever to be seen in any part of the alimentary canal.†

Effect on animals. On this point, we have the experiments of Dr. A. T. Thomson, and those of Drs. Christison and Coindet. The former gentleman produced death in a very few minutes, by introducing from ten grains to half a drachm into the stomachs of rabbits and dogs. Convulsive movements generally preceded the fatal termination, and, on dissection, the stomach was found very rotten, diaphanous, and pulpy to the touch, and its blood-vessels enlarged and very black. The mucus contained in it was coagulated. The lungs were inflamed, and the blood found in the lungs, heart, abdomen, and the frothy fluid

* "A quantity of a dark-coloured fluid, resembling coffee-grounds, and probably consisting of extravasated blood altered by the poison, was generally found in the stomach."—Christison and Coindet.

† London Medical Repository, vol. iii. p. 360.

found in the bronchial cells, shewed traces of an acid. The œsophagus and pharynx were healthy.*

In the experiments of Christison and Coindet, the œsophagus was tied in every instance, and the violence of the efforts to vomit was directly in proportion to the quantity of the poison. Death, however, always succeeded after a short interval. On dissection, the stomach was found filled with the dark-coloured fluid already noticed, when speaking of the examinations of the human subject, and which is evidently extravasated blood acted on by the acid. The internal membrane of the stomach was always of a deep cherry-red colour, and generally streaked with lines of black, granular extravasation. The degree of corrosion induced, appears to depend on the strength of the acid.

When portions of a dead stomach were submitted to the action of a saturated solution, the mucous epidermis separated, and appeared thickened and brittle. After some hours, the villous coat was also acted upon, and in two days it was brittle and easily scraped off, and the other tunics were softened, swollen, and translucent. It thus evidently exerts a powerful chemical action on the organs concerned.

These observers also noticed, that a small quantity of acid, when diluted, destroys an animal much sooner than when concentrated, and on dissection, no unnatural appearance whatever could be detected in the stomach, excepting a slight cineritious tint of the mucous epidermis.

The result drawn from their numerous experiments is, that oxalic acid, in most circumstances, acts through the medium of absorption. They could not, however, detect its presence in any of the fluids.†

Dr. Roupell, in his experiments on dogs with this acid, has confirmed the above results.‡ The stomach, on dissection, had the hour-glass contraction.

Tests. Oxalic acid might be mistaken for two other vegetable acids, the tartaric and citric acids, but Drs. Christison and Coindet have shewn that these can be given to animals in large quantities without any inconvenient result.§ From a similarity in the external appearance, it has most commonly been confounded with sulphate of magnesia, and hence many fatal mistakes have happened.

(*a.*) Taste the suspected substance; if it be oxalic acid, it is very sour; if Epsom salts, very bitter and saline.

(*b.*) Pour some water over the suspected crystals; if it be oxalic acid, its particles explode with a sharp, crackling sound, and disperse in every direction.

(*c.*) A little writing ink dropped on the crystal will become reddish brown, forming oxalate of iron. Epsom salts are not changed.‖

(*d.*) Litmus and blue sugar-loaf paper are reddened by the acid.

(*e.*) Ammonia, if the solution of the acid be sufficiently concen-

* London Medical Repository, vol. iii. p. 383.
† Edinburgh Medical and Surgical Journal, vol. xix. pp. 163–186.
‡ Illustrations of the effects of poisons, with drawings.
§ Edinburgh Medical and Surgical Journal, vol. xix. pp. 185, 337.
‖ Quarterly Journal of Foreign Medicine and Surgery, vol. v. p. 152.

trated, will produce a radiated crystallisation, as the oxalate of ammonia formed is much more soluble than the acid itself. Dr. O'Shaughnessy states that this property distinguishes it from every other acid.*

The following tests we owe to the suggestions of Drs. Christison and Coindet, and they may be used on all suspected fluids found in the stomach, or vomited.

(*f.*) Decolorise the fluid, if necessary, with chlorine. The hydrochlorate of lime, if the solution contains oxalic acid or oxalate of lime, will throw down an insoluble oxalate of lime. But it also precipitates with the carbonates, sulphates, phosphates, &c. This, then, is to be distinguished by the following experiments: the nitric acid will not take up the sulphate of lime, but a few drops of it dissolve the oxalate. The hydrochloric (muriatic) acid will not dissolve the oxalate, unless in very large quantity, while two or three drops will take up the carbonate, phosphate, tartrate, or citrate.

(*g.*) Decolorise as before, and add sulphate of copper. It precipitates oxalic acid, bluish-white; and the oxalates, pale-blue. The only objection to this is, that it precipitates the carbonates, and throws down the phosphoric acid, whether free or combined. The muriatic acid must be here again used as above.

(*h.*) Nitrate of silver gives a heavy white precipitate, with oxalic acid, and still better with the oxalates; and this precipitate, when dried and heated over a candle, becomes brown on the edge, then of a sudden fulminates faintly, and is all dispersed in white fumes. This is deemed a very delicate test, as, from a quarter of a grain dissolved in 4000 parts of water, the experiments procured enough of the powder to shew its fulmination twice.

These tests are very little influenced by the presence of such animal matter as may exist in the suspected fluid, after boiling and filtration. The chief animal principle then present is gelatine, and neither the hydrochlorate of lime, sulphate of copper, or nitrate of silver, precipitate it alone. They, therefore, and especially the two first, will not be affected by its presence; but when it occurs in a very large proportion, it suspends the action of nitrate of silver.

As, however, magnesia and chalk are the proper antidotes for oxalic acid, it is possible their oxalates may be formed, and the proofs of the poison must be sought for, either in the solid contents of the stomach, or the solid matter vomited. In such cases, the following are the directions of Dr. Christison.

If they have been given, let the mixture remain at rest for some time. Then pour off the supernatant fluid, which, if acid, may be tested as above. Dissolve the mass that remains in pure water, to a sufficiently thin consistence; add to this one twentieth of its weight of carbonate of potash, and boil it gently for two hours. The result of this will be an oxalate of potash in solution. Filter, then render it faintly acidulous with nitric acid, then filter again, and render it faintly alkaline with carbonate of potash. Filter a third time. The object in these repeated operations is to throw down the animal matter.

* Dr. O'Shaughnessy, Lancet, N. S., vol. vii. p. 196.

A solution of acetate of lead must now be added as long as any precipitate is formed, and this should be washed and dried. Then rub it carefully with a little water in a mortar, and transmit through it a current of sulphuretted hydrogen for four hours. Filter and boil the sulphuret of lead that has been thus produced. The oxalic acid will be set free, and is found in the solution tolerably pure.

Dr. Christison was enabled, by this process, to detect one grain of oxalic acid, mixed with a decoction of an ounce of beef and six ounces of water.

Oxalate of lime has recently been found, by M. Henry of Paris, in the root of rhubarb. If, therefore, that salt should be detected, it may be necessary to inquire whether rhubarb has been recently administered.*

Antidotes. Death is generally so sudden in these cases, that but little can be done. Emetics, however, should be immediately given, but not to be aided in the usual way with warm diluents, since dilution accelerates the operation of the poison.

We owe to Dr. Thomson the recommendation of the use of a mixture of chalk and water, to be given as soon as possible. Oxalate of lime will thus be formed in the stomach.† Magnesia is advisable, and the solution of the bicarbonate, invented by Dr. Murray of Belfast, is particularly commended, as it precipitates the acid itself, and all its soluble combinations.‡ Both of these substances (chalk and magnesia) have been given with striking advantage.

The alkalis should not be given, as Christison and Coindet found death to follow in animals from the exhibition of the oxalates of potash and ammonia in a few minutes. "They do not corrode; they hardly irritate, but they produce tetanus and coma, like the diluted acid."§

Should the patient be so fortunate as to recover from the immediate effects, the proper means for removing gastric irritation are needed. Stimulants may subsequently be necessary.

Phosphorus, when dissolved in oil and injected into the jugular vein, instantly produced copious exhalations of phosphorous acid. The respiration was difficult and panting, a considerable quantity of a bloody serosity was thrown up, and death followed in twenty minutes after the injection. The lungs, on dissection, exhibited several livid and dense portions; the stomach was natural, and the left ventricle of the heart contained blood as black and fluid as that which filled the right.

When phosphorus is introduced in small lumps into the stomach, it does not at first induce any remarkable effect, but the animal falls gradually into a state of depression and dies. The stomach is much inflamed, and contains a thick greenish fluid. In an experiment where

* Christison, p. 188, &c. Lancet, N. S., vol. vii. pp. 196, 197.

† London Medical Repository, vol. iii. p. 388. A case where it proved useful is given in ibid. vol. xii. p. 18.

‡ Lancet, N. S. vol. x. p. 836.

§ Christison, p. 200. There is an article very common in our druggists' shops, under the name of *parliament or lemon drops*, which, I apprehend, are sometimes made with oxalic acid and sugar.

our author administered one hundred and forty grains in small lumps to a dog, one hundred and twenty-seven only were found after death, in various parts of the intestines. The action of this substance is infinitely more violent, when it is introduced into the stomach in a state of solution with oil. Fumes of phosphorous acid were exhaled from the lungs, and the subject seemed to suffer exquisite torture. It then lay immovable, but about six minutes before it expired, general and violent convulsions occurred. The stomach was corroded in three places, and the mucous membrane, where it had not been perforated, was reduced to a stringy kind of pulp. The lungs were red, distended with blood, and did not crepitate.*

Cases of its fatal effects on man are, also, not wanting. The following is related by Dr. Worbe.

On the 24th of April, 1824, a young man took half a grain, mixed with hot water. Finding no bad effects, he took a grain and a half in the same vehicle at a single dose. He breakfasted almost immediately, and experienced no bad symptom, until about five o'clock, when he had no sooner swallowed some food than he complained of violent pains in the stomach and abdomen. Incessant vomiting followed with diarrhœa. Remedies were resorted to with little effect. An extreme tenderness of the abdomen remained, and he gradually sunk until the twelfth day, when he died.†

M. Dieffenbach, chemist at Biel, took first one grain of phosphorus, and finally increased it to three grains. The result of this last experiment was violent pain, which in a few days was followed by vomiting a greenish matter of a garlic-like smell. The irritation of the stomach could not be allayed. Convulsions and a paralysis of the left arm succeeded, and he died on the twelfth day.‡

The *appearances on dissection*, in M. Worbe's case, were a yellow skin, with occasional livid spots, the lungs gorged with blood, the muscular coat of the stomach inflamed, but the internal ones not, except at the two orifices, where there were slate-coloured patches. All the intestines were tympanitic. In another case, by Dr. Flachsland, the external coat of the stomach was red, and the villous one presented marks of inflammation. So, also, did the same coat of the duodenum, and the kidneys and spleen were inflamed.§

Treatment.—As inflammation is evidently the consequence of the exhibition of phosphorus, we should, of course, use the appropriate remedies for removing it. An emetic must be premised, to remove, if possible, the poisonous ingredient, and water containing magnesia in a

* Orfila's Toxicology, vol. i. p. 405, &c. Dr. T. Thomson states, that if phosphorus be allowed to stand in water for some time, it will render that fluid poisonous to animals who drink it.—Annals of Philosophy, vol. xvi. p. 232.

† Edinburgh Medical and Surgical Journal, vol. xxviii. p. 228.

‡ Lancet, N. S. vol. iv. p. 357. Other fatal cases are given by Lobstein in his work on Phosphorus. New York Medical and Physical Journal, vol. iv. p. 413, and by Weickhard, quoted in Hooper's Medical Dictionary. I am aware that the experiments of Chabert have induced some to suppose that phosphorus is innocuous. I doubt, however, whether they would be willing to swallow and *retain* the quantities he took.

§ Christison, p. 169.

state or suspension is also advised, as tending to fill the stomach with fluid, and at the same time neutralising the acid that is forming.

Phosphorous acid, according to Dr. Hunefeld, produced, in the dose of a drachm, difficult breathing, bloody vomiting, convulsions, and death in twelve hours, in a rabbit. The villous coat of the stomach was brownish-red near the cardia alone. There was no smell of phosphorus, but the urine contained phosphoric acid.*

Iodine. Orfila was the first who performed any experiments with this substance. He found that dogs, if they vomited freely, survived, although they had taken a drachm and upwards of it, but when this did not occur, or if the œsophagus was tied, it invariably proved fatal, after exciting violent efforts to vomit, hiccup, thirst, quick pulse, and great depression. The mucous membrane of the stomach was always found corroded and ulcerated, but the lungs and other organs were natural.

Our author was able in some cases to detect the iodine in the matter vomited and passed by stool. On drying and exposing it to heat, the violet-coloured vapour appeared.

A drachm and twelve grains were sprinkled on a wound on the back of a dog. The skin immediately grew yellow, and in three days an eschar formed, leaving the subjacent parts highly inflamed. The animal, however, recovered.

Our author next ascertained the effect of iodine on the human subject. He himself took two grains fasting, but they only excited an abominable taste, and nausea. The next morning, he took four grains. He was immediately sensible of constriction and heat in the throat, which continued a quarter of an hour, and he soon vomited yellow liquid matter, in which iodine was readily discovered. Two days after he took six grains, which instantly excited heat and constriction of the throat, nausea, irritation, salivation, and pain of the stomach, and, in ten minutes, copious bilious vomitings and slight colic pains, which yielded to two emollient enemata, after having continued an hour. The pulse rose from 70 to 90, and was fuller. The next day he felt only a slight fatigue.†

Shortly after, or about this time, iodine came extensively into use for the treatment of bronchocele. It was, undoubtedly, given in too large doses, and the effects, as stated by Coindet, were rapid emaciation, severe pains in the orbits and eyes, with great defect of vision; neuralgic pains in various parts of the body, palpitation of the heart, and, not unfrequently, inflammation of some of the organs. In females, a rapid diminution of the size of the breasts (and this continuing permanent) was early noticed.‡

Fatal cases are not wanting. In these severe vomiting and purging were a common occurrence. Dr. Zink, a Swiss physician, relates two instances of death from its incautious use. In one there was diarrhœa,

* Edinburgh Medical and Surgical Journal, vol. xxxvi. p. 461.

† Orfila's Toxicology, vol. i. p. 490.

‡ Medico-Chirurgical Review, vol. iii. p. 757. Review of Brera and Coindet on Iodine. See, also, the Review of Gairdner's work, in ibid. vol. v. p. 104.

priapism, tremors of the whole body, and palpitation. The body was not opened. In the other, it was, and a violent inflammation of the stomach and intestines was found.*

In an instance where two drachms and a half of iodine were taken for the purpose of suicide, a sense of burning from the throat to the stomach was soon perceived, and nausea and acute pain followed. In an hour, vomiting of a yellowish fluid, having the taste of iodine, ensued. This was promoted by the use of warm water, while the attendant symptoms were counteracted by enemata and gum-water. Through these means the patient recovered.†

Tests.—When in a solid state, iodine may be detected by its peculiar odour, the violent fumes it forms when heated, and the fine *blue* colour it produces with a solution of starch.

When dissolved in water or solutions of neutral salts, it communicates a yellowish or reddish-brown colour to the fluid. This is destroyed by sulphuretted hydrogen. "In the colourless fluid thus formed, if treated with a drop or two of sulphuric acid, or in the original brown fluid without sulphuric acid, a cold solution of starch produces a fine blue colour and precipitate, which, if the solution be sufficiently diluted, disappear on boiling, reappear on sudden cooling, and are removed permanently by a stream of sulphuretted hydrogen."‡ This, says Dr. Christison, is a very delicate and characteristic system of tests.

If mixed with organic substances, the difficulty of detection is increased, from the fact that it often undergoes important changes in the alimentary canal. It is converted, in some instances, into hydriodic acid, and in others, the mixture may be so dark, as to prevent the characteristic action of the starch.§ Dr. Christison recommends the following process for such a mixture. Add water, if necessary, and filter. If it be but little or not at all coloured, test it with the cold solution of starch. If the blue colour appears, and this disappears on

* Anderson's Journal, vol. ii. p. 148. Edinburgh Medical and Surgical Journal, vol. xxiii. p. 225.

† Case by Dessaigne, Littel's Journal of Foreign Medicine, vol. i. p. 569, from Journal de Chimie Médicale. I must not leave the notice of the effects of iodine, without mentioning that Dr. Rivers of Tennessee has stated two cases in which it appears to have produced barrenness. A lady who married at seventeen, suffered under goitre, but for the first three years had a child annually. Iodine was now exhibited for the disease, which it partially diminished, and it also affected the breasts. Eight years have elapsed, and she has not not been pregnant again. Other similar cases are said to have occurred.—American Journal of Medical Sciences, vol. viii. p. 546.

‡ Christison, p. 170. Stromeyer advises that *nitric* acid be added to the suspected liquid. I may also mention the process of Baup. Having added nitric acid to the liquid, he suspends above its surface a moistened paper sprinkled with starch. The vessel containing these is then closed, and allowed to stand at rest for some hours. If iodine be present, the starch will become blue. This is said to be a very minute test, and Berzelius recommends it, inasmuch as the matters precipitated in the solution by the acid, cannot act on the starch, or produce a colour that might be mistaken for it.—Berzelius's Chimie, vol. i. p. 305.

§ Dr. O'Shaughnessy, in Lancet, N. S. vol. vi. p. 633. Another difficulty mentioned by him is the ready formation in the alimentary canal of a compound, consisting of iodine and albumen, totally insoluble in alcohol, and nearly so in water.

boiling, and return again on cooling, there is no doubt of the existence of iodine. But if the filtered mixture is too deep coloured to permit the action of the starch, then agitate both solid and fluid parts with a third of their volume of ether, and after the ethereal solution has risen to the surface, remove it, and test it with the solution of starch.*

Iodine has been detected by Cantu in the sweat, urine, saliva, and milk, of persons, who have taken it; and Bennerscheidt, a German chemist, has found it in the blood drawn from the veins. He detected it in the crassamentum, but not in the serum.†

Dr. O'Shaughnessy detected it in the urine of a dog poisoned, in forty minutes, and occasionally after that as late as the fifth day, when the animal died. He found it also in the saliva. In these experiments, it was always in the form of hydriodic acid, having been changed to this in the alimentary canal.‡

Treatment. If this substance has been taken in large quantities, the first indication, of course, is to obviate its consequences by means of emetics. The subsequent effects, which are commonly those of inflammation, must be combated by the appropriate means. In smaller doses, but where, unfortunately, this substance appears to accumulate in the system, before it manifests its powerful results, a long and patient course of antiphlogistic and soothing treatment is often necessary.

Hydriodate of potash. This substance, in large doses, according to the experiments of Devergié, acts as an irritant on animals. Two drachms, in an ounce of water, killed a dog in three days, with violent vomiting; and black extravasated spots and ulcers were found in the stomach. Injected into the jugular vein in the dose of four grains, it produced tetanus and death in a minute and a half.

I can only find a single case of poisoning in the human subject. A drachm and a half of the solution of hydriodate of potash were taken for the purpose of committing suicide. The symptoms were immediate distress, nausea, and burning, and acute pain at the stomach. In an hour vomiting ensued, with great suffering and vertigo. By the use of warm water, however, enemata, and mucilages, the patient recovered.§

Tests. The importance of understanding these is greatly increased from the fact already mentioned, of the probability of the conversion of iodine into hydriodic acid in the stomach. A little of the fluid, therefore, after filtration, should be mixed with the solution of starch, as above directed, and *a few drops of sulphuric acid* be then added. The blue tint will appear, if there be an appreciable quantity of hydriodic acid present. Acetate of lead throws down a fine yellow precipitate, the iodide of lead; muriate of platina, a dark brown one, the iodide of platina; and corrosive sublimate, a fine carmine red, the periodide of mercury.‖

But in compound mixtures hardly any of these will answer, and

* Christison, p. 171.

† North American Medical and Surgical Journal, vol. vii. p. 432.

‡ Lancet, N. S. vol. vii. p. 613.

§ Medical Recorder, vol. xiv. p. 371, from Archives Générales for February 1828.

‖ Christison, p. 176.

particularly not if, as is so common at present, the hydriodate be adulterated. The only one among them that Dr. O'Shaughnessy deems deserving of confidence, is the muriate of platina; and he therefore recommends in all cases, along with it, the use of the starch test. The process which he advises is as follows. Make first a trial experiment to ascertain whether any *free* iodine be present. If no blue colour is produced, boil the mixture and filter. Neutralise, if necessary, with caustic potash, and reacidulate with acetic acid. A few drops of muriate of platina may now be added, and if hydriodic acid be present, there will be either a dark-red precipitate, or the fluid will be changed of a port-wine colour. Agitate it now with an ounce of ether, which dissolves the iodide of platina, and separates it from the other fluids, swimming on their surface. Remove this by a suction tube, evaporate to dryness, heat the iodide of platina by a spirit-lamp in a small glass tube, and the iodine will exhibit its characteristic violet vapours.*

Dr. Christison has, however, found difficulty in producing the characteristic action of the muriate of platina. The process advised by him is this. If the starch test will not act, transmit, through the whole of the contents, sulphuretted hydrogen, to convert any free iodine into hydriodic acid. "Drive off the excess of gas, supersaturate with a considerable excess of potash, filter and evaporate to dryness. Char the residue at a low red heat in a covered crucible, pulverise the charcoally mass, and exhaust with water." This solution will probably act with starch and sulphuric acid; but if it does not, evaporate to dryness, and dissolve the residuum in alcohol. This solution contains hydriodate of potash, and on being evaporated to dryness, a residuum is left, on which, when dissolved in water, the starch and sulphuric acid will act.†

I find a test recommended, on the authority of Balard, which may probably render these processes unneccessary. It is to mix the suspected fluid with starch, sulphuric acid, and fluid chlorine. If necessary, agitate this compound. In a short time, if left at rest, the starch acquires a distinct violet colour. One part of hydriodate of potash was dissolved in two of distilled water; this was largely diluted, and the other substances then added in very small quantities. In fourteen hours the starch became slightly coloured, and in twenty-four hours it had a marked violet hue.‡ Dr. Anthony T. Thomson has recently advised the use of chlorine *gas* instead of *fluid* chlorine, and without any sulphuric acid. His method is to mix a small quantity of the solution of starch with the fluid to be tested, and then pour on the surface of the liquid some chlorine gas. A blue film at once appears and gradually pervades the whole, if any hydriodate be present. This, also, proves to be a very minute test.§

* Lancet, N. S. vol. vi. p. 637; vol. vii. p. 612.

† Christison, p. 177. It must not be forgotten, that in suspected cases we are to look for iodine or its salts in the urine, blood, or saliva, as well as in the contents of the stomach.

‡ Brande's Journal, N. S. vol. vii. p. 200. Reid's Chemistry, 2d edition, p. 205. Dr. Reid says that this is the best method of detecting minute portions of iodine in solution.

§ London and Edinburgh Philosophical Magazine, vol. iv. p. 467.

Bromine. This substance, according to the experiments of Barthez, Butske, and Dieffenbach, is an active poison. When ten or twelve grains were dissolved in water, and injected into the jugular vein of a dog, they caused immediate death, preceded by a single tetanic convulsion, and, on dissection, the heart was seen gorged with clotted blood. In small doses, it produced restlessness, difficult breathing, dilated pupil, and sneezing. When introduced into the stomach to the amount of from 40 to 60 drops, the symptoms were similar to the last, accompanied with violent vomiting. After some hours this would abate, and then, without any striking symptoms except languor, death ensued in four or five days. The villous coat of the stomach was found ulcerated. Dr. Butske, in his experiments, found it to act more rapidly, and death was induced in a day.

The *hydrobromate of potash*, in doses of half a drachm, did not appear to act as a poison; but two drachms, retained in the stomach by tying the gullet, occasioned death in three days, with symptoms of irritant poisoning.

From the observations of Barthez, it appears probable that bromine is converted very shortly into hydrobromic acid in the stomach, resembling iodine in this respect.

The tests of bromine, when pure, are its colour, its orange fumes, and its suffocating vapour. When mixed, Barthez advises that it be subjected to the action of chlorine, which will produce a fine orange colour; or, if this does not answer, treat the solid matter with caustic potash, filter, and add what passes through to the former fluid, evaporate to dryness and char, and then act on the residue with distilled water. The solution contains hydrobromate of potash, and is, therefore, turned orange-red by chlorine.*

II. *The Alkalis, Alkaline Salts, and Lime.*

Pure potash, when externally applied, is well known to act as a powerful caustic. On injecting a solution of it into the jugular, it produces sudden death; and, on dissection, the blood is found coagulated. When swallowed by an animal, it corrodes the stomach, and inflames its mucous membrane.

The *subcarbonate of potash* (salt of tartar) is also a poison of considerable activity. A dog to whom two drachms were administered, died in fifteen minutes; and Plenc mentions a case where a patient in good health took an ounce, which produced violent vomiting and gastritis. Life was, however, preserved.† There are, however, fatal instances on record.

A small boy took, by mistake, about three ounces of a strong solution. When Mr. Dewar saw him, an hour afterwards, the tongue, gums, and fauces, appeared as if seared with a hot iron, while the inside of the cheeks was highly inflamed. Vomiting occurred incessantly, and remedies had no effect. He died in twelve hours. On dissection, the

* Christison, p. 180. North American Medical and Surgical Journal, vol. viii. 432.

† Orfila's Toxicology, vol. i. p. 380.

mucous membrane of the pharynx and œsophagus was seen totally disorganised, and blood was universally extravasated between the muscular and pulpy mucous coats. The stomach was generally inflamed, and its mucous coat destroyed in two places. Clotted blood covered these injured parts.*

The following cases will illustrate its more chronic effects.

Two females, of the age of sixteen and twelve, each took, by mistake, half an ounce of subcarbonate of potash. Violent sickness immediately ensued, but the error was not discovered until two hours and a half afterwards. The vomiting and sickness scarcely ever ceased entirely with the elder; and she also experienced pain in the epigastric region. Leeches were applied, and various curative means, but with little success. The vomiting, though occasionally checked, yet returned with violence, and she died in about two months after taking it. The other suffered under sickness for three days, and it then ceased. She appeared to grow better; but, in a few weeks, the sickness returned, and she was confined to her bed. Death ensued about three weeks after that of her sister.

The appearances of disease were similar in both, although most striking in the eldest. The stomach was much thickened, and the villous coat was almost wholly destroyed; what remained was in a state of high inflammation. The pylorus, in one, was much ulcerated, and, in the other, contracted and gangrenous. The intestines were gangrenous, and adhered together by thin threads of coagulable lymph. The omentum in the youngest was almost totally destroyed, and the glands of the mesentery for the most part absorbed. The liver, in both, was of a dark green hue, in consequence of the transfusion of bile, and the gall-bladder was distended with it, probably from the circumstance that the biliary ducts were found almost obliterated.

Both these females had previously been in delicate health.†

The peculiar styptic and urinous taste—a severe heat in the throat—retchings—vomitings of an alkaline matter, which commonly effervesces with acids—copious alvine evacuations and pain, are among the leading symptoms produced by this substance.

Orfila suggests that this alkali, of all the corrosive poisons, is that which most frequently perforates the stomach. It also causes inflammation of the different coats of this viscus, and of the intestines.

Antidote. Vinegar and lemon-juice are the most valuable remedies for this purpose; and their use should be aided by mucilaginous drinks.

Dr. Chereau has published two cases of poisoning with carbonate of potash, in which large quantities of sweet-oil proved signally useful. It

* Dewar, in Edinburgh Medical and Surgical Journal, vol. xxx. p. 309.

† London Medical Repository, vol. vii. p. 118. Mr. Dewar mentions a case where the immediate effects were counteracted, but, in four or five days, sloughs began to separate from the lining membrane of the mouth, throat, and gullet. This ended in stricture, and, after many alternations of apparent recovery and illness, caused death from starvation in four months.—Edinburgh Medical and Surgical Journal, vol. xxx. p. 310. Dr. Christison quotes a parallel case from Sir Charles Bell, where the swallowing of soap-lees was the cause.

excited vomiting; and he imagines that it unites chemically with the potash in the stomach. Several pounds are, however, required.*

Nitrate of potash. (Nitre, salt-petre.) This salt, in large doses, acts as a corrosive poison, and cases illustrative of this effect are mentioned by various writers. An individual, labouring under a fever, took, by mistake, an ounce and a half of nitrate of potash. In a short time, severe anguish, with a sense of internal cold, supervened: and fainting and syncope followed. He died in less than ten hours.†

A female took an ounce and a half by mistake. It excited vomiting and purging, with violent pain in the bowels. The extremities were cold, while a burning sensation was experienced in the stomach; the pulse was almost imperceptible, and she died in sixty hours after taking the salt. On dissection, the stomach was found red, and scattered over with blackish spots, and in the centre was a small hole, which perforated it. The intestinal canal was reddish.‡

In a third case, related by M. Laflize, an ounce produced similar effects, and death in three hours. The stomach was very highly inflamed, and its mucous coat detached in several places; the external coat was of a deep red, and some brown spots were observed on it.§

There are, however, some instances where patients have recovered, after taking large doses. A pregnant female, by mistake, took two ounces, which immediately excited vomiting; first of the contents of the stomach, and then of blood. As soon as the alarm was taken, warm water and mucilaginous drinks (gum-arabic, linseed-tea, &c.) were exhibited. Burning pains at the stomach, however, supervened; the pulse sunk, and a cold, clammy sweat broke out. The vomiting recurred frequently with violence. From this she was gradually relieved; but the pains in the abdomen continued for a longer time; and, when convalescent, and ten days after the taking of the salt, she was seized with a nervous affection, greatly resembling chorea. Twitchings of the muscles, and involuntary motions, were present to an alarming degree; and they continued for two months. They gradually left her, and she was at last happily delivered.‖

Effect on animals. Five drachms and a half given to a dog caused vomiting; but on the day following he ate well and experienced no

* London Medical Repository, vol. xx. p. 440.

† Quoted from Comparetti. Orfila's Toxicology, vol. ii. p. 87.

‡ Case by Souville. Ibid.

§ See Foderé, vol. iv. p. 82. Metzger (p. 385) and Belloc (p. 141) refer to several cases where nitre has proved poisonous. Another fatal instance occurred in the vicinity of this city, in the person of a gentleman aged 75. He mistook it for Glauber's salts. Death followed in half an hour.

‖ Case by Mr. Butter, in Edinburgh Medical and Surgical Journal, vol. xiv. p. 34. This gentleman observes, that he is not aware of any case on record where a patient has taken and recovered from so large a dose of nitre. There is, however, another in the Memoirs of the Medical Society of London, related by Dr. Falconer, vol. iii. p. 527. The individual (a blacksmith) took two ounces, and his symptoms were similar to those already detailed, except that he vomited blood to the amount of a quart. He was ill for many months afterwards, and was not dismissed cured from the hospital until nearly a year after the accident. Other cases of recovery are cited by Orfila. See, also, Gordon Smith, 2d edition, p. 151. London Medical Repository, vol. xxii. p. 213.

remarkable symptoms. But when the œsophagus was tied, and the salt introduced into the stomach, it excited vertigo, pain, slight convulsions, insensibility, weakness, and death. The mucous membrane of the stomach was inflamed, and scattered over with black spots. The lungs were natural.

When nitre, in powder, was applied to a wound on the back of a dog, it produced no effect. But an application of it to an incision near the femoro-tibial articulation, produced gangrene after some days, and the animal died.*

For its chemical detection the same process must be followed as was recommended for nitric acid, omitting, however, the neutralisation with potash.

The most proper treatment may be inferred from the narratives given above. Vomiting should be induced; and the stomach-pump has been successfully used in some instances—doubtless as well from its dilution of the nitre, as its discharge. The consequent effects often call for the antiphlogistic treatment.†

The action of *soda* is precisely similar to that of potash, as is also the mode of treatment necessary to counteract its effects.

Ammonia, in its liquid state, is extremely caustic and pungent. When injected into the veins, it produces a stiffness, resembling tetanus, and violent convulsions. These were soon followed by death. When introduced into the stomach, fatal effects also ensued, and the mucous membrane of the stomach was found of a red colour throughout a part of its extent, but no ulceration or perforation was present.

Cases are mentioned where fluid ammonia caused death in the human subject within the space of a few minutes.‡ Orfila adds a caution against its too free use with persons who have fainted. If inspired too long, the vapour inflames the throat and lungs, and destroys the individual.§ The phial containing it should only be passed from time to time under the nose.

Vinegar is here, also, the proper antidote; although, from the rapid

* Orfila's Toxicology, vol. ii. p. 84.

† Whether *alum* (supersulphate of alumine and potash), in large doses, is a poison, has been elaborately investigated by Orfila in Annales d'Hygiène, vol. i. p. 235; vol. iii. p. 181. He is decidedly of the opinion that it is not.

‡ Orfila's Toxicology, vol. i. p. 387.

§ Orfila's Directions, p. 44. Nysten has related such an instance. A case confirming this statement is mentioned in the Edinburgh Medical and Surgical Journal, vol. xiv. p. 642. "A patient was recovering from a severe attack of fever; during convalescence he was, without any evident cause, seized with convulsions apparently of the epileptic kind, which became more and more frequent, and ultimately were so severe as to cause great apprehension of a fatal result. In order to rouse him from the stupor succeeding one of these fits, an attendant most imprudently held aqua ammoniæ to his nose, with such unwearied but destructive benevolence, that suffocation had almost resulted. As it was, dyspnœa, with severe pain in the throat, immediately succeeded, and death took place forty-eight hours afterwards. In the actual condition of the patient, there was little else than death to be expected, yet there is equally little room to doubt that the fatal event was hastened by this unhappy ministration."

Baron Percy mentions the death of the son of an apothecary, from the breaking of a bottle of ammonia, notwithstanding the immediate application of remedies.—Quoted by Dr. Wood in American Cyclopædia of Practical Medicine, vol. i. p. 363.

action of the alkali, means are generally required in addition to this, to counteract the inflammation that frequently occurs.

Hydrochlorate of ammonia (muriate of ammonia, sal ammoniac) is poisonous when taken into the stomach, or applied in large quantities to wounds. It causes vomiting, convulsions, pain in the bowels, and death. Dr. Smith applied it to the cellular texture of the thigh of dogs: vomiting ensued, with great weakness, which increased until death. The mucous membrane of the stomach presented several gangrenous ulcerations, and was generally inflamed; the whole digestive canal contained a blackish fluid, and the rectum was inflamed. In another instance, the mucous membrane was found in a state of putridity.* Dr. Arnold, in his experiments with it, found convulsions, deep respiration, and contracted pupils, with tetanic spasms, to precede death.†

Quicklime was introduced into the stomach of a small dog, to the extent of a drachm and a half in powder. It caused vomiting, and the discharge of much saliva, with some pain: he, however, recovered on the next day. Three days thereafter, three drachms were administered. Vomiting and dejection ensued, and he died in three days, without having experienced either vertigo, convulsive motions, or paralysis. The mouth, fauces, and œsophagus, wre slightly inflamed, and the mucous membrane of the stomach was inflamed throughout its whole extent; the intestines and lungs were natural.

Quicklime is thus evidently not a very powerful poison, but it may, notwithstanding, prove destructive to life when swallowed. A child fell with her face on a quantity of slacked lime, and a particle of it got into the windpipe. The result was inflammation of the lungs, sloughing of the trachea, and death.‡

A case of poisoning by the *oxymuriate of lime* (bleaching liquor), in an infant, is related. A small quantity only was given.§

Treatment.—Vomiting should be excited by warm water or irritating the throat, and the nervous or inflammatory symptoms are then to be counteracted by the means already noticed.

Hydrogenated sulphuret of potash (liver of sulphur). This substance, which formerly was deemed an antidote of arsenic and corrosive sublimate, has been ascertained to be one of the most powerful of the corrosive poisons. A French countess swallowed, by mistake, some of it, which was intended for the preparation of a bath, and she expired in a few minutes.‖

* Orfila's Toxicology, vol. ii. p. 469.

† Bulletin des Sciences Médicales, vol. ix. p. 182.

‡ London Medical and Physical Journal, vol. xlvi. p. 552. Dr. Christison refers to another fatal case.

§ Ibid. p. 517.

‖ Orfila's Directions, p. 68. Probably this is the same case which is quoted from Dr. Montgarny's Essai de Toxicologie, in the London Medical Repository, vol. x. p. 511. "A lady, suffering from pyrosis, died in a few minutes after having swallowed a few mouthfuls of an aqueous solution of the sulphuret of potash. The fatal event was preceded by faintness, convulsions, and the issue of a yellowish froth from the mouth. On dissection, the stomach was found very much contracted; its internal membrane lined with sulphur, and of a brightish red colour; and its capillary system, in some points, minutely injected. The duodenum was red and

In a case related by Dr. Chantourelle, where four drachms were taken, so rapid and abundant was the disengagement of sulphuretted hydrogen, that the patient died from asphyxia.*

In those where life was saved with difficulty, the symptoms were, burning pain in the throat and stomach; frequent vomiting, at first sulphureous, and then bloody; purging; inflammation of the stomach. The dose, in one fatal case, was three drachms.†

When introduced into the stomach of animals, whose œsophagus had been tied, it produced violent attempts to vomit, hurried respiration, panting, tetanic convulsions, and death. The stomach was found much inflamed, and covered over with yellowish-white spots; the duodenum and jejunum were inflamed; the lungs were partially gorged, and the left ventricle contained black blood. Vomiting was excited when the œsophagus was not tied.

When injected in solution into the jugular, it produced immediate tetanus, from which, in one instance, the animal quickly recovered, and in another he perished. The blood in the heart was fluid, and in the left ventricle, of a deep red.

The deduction drawn by Orfila from his experiments with this substance is, that the corrosion excited by it is slighter in proportion as the dose is stronger, and the nervous phenomena will then be much more severe.

Liver of sulphur is decomposed by the acids, and sulphuretted hydrogen is given out. Corrosive sublimate, acetate of lead, nitrate of bismuth, and the salts of copper, all yield a black precipitate on the addition of a few drops of this substance; tartar emetic, an orange yellow one; and arsenious acid, applied to a small quantity, a white precipitate—to a large quantity, a yellow one.

Antidote.—Vinegar was formerly recommended, but Dr. Chantourelle has found most benefit from the administration of chloride of sodium (common salt) in frequent doses. This decomposes the sulphuretted hydrogen, "whose rapid disengagement would seem to be the cause of death in the quickly fatal cases."

Sulphuret of soda, in the dose of half an ounce, produced gastritis, which was successfully combated by the usual means. In larger quantities it would probably prove fatal.

inflamed, particularly towards its duodenal extremity. The superior portion of the small intestine, in about a fourth of its extent, presented the same appearances. The membrane of the mouth, pharynx, and bronchiæ, was whitish and coloured, but displayed no change of structure. The lungs were soft, not crepitous, and gorged with black, livid, and very fluid blood."

* Alcock on the Chlorurets, p. 115. † Christison, p. 222.

CHAPTER XVIII.

IRRITANT POISONS (*continued*).

3. METALLIC COMPOUNDS. ARSENIC. *White oxide of arsenic.* Modes in which it may prove poisonous. Internally. (*a.*) Its exhibition by the mouth — symptoms — classification of these; when the patient dies between twenty-four hours and two or three days; when he dies in a few hours; when life is prolonged some days, or he survives. How small a quantity will induce death. (*b.*) By injection into the vagina or rectum. Externally. (*a.*) Applied to a wound or ulcer, or to the skin. (*b.*) By inhaling its vapours. Appearances on dissection — in the second variety of symptoms — in the first variety. Whether poisoning by arsenic delays or accelerates the progress of putrefaction. Cases. Effects on animals. Introduction of arsenic after death. Chemical proofs — specific gravity — solubility — taste — effects of heat. Tests of arsenic, in the solid state; in solution; when mixed with organic fluids and solids, and with the contents and tissues of the stomach. Medico-legal cases. Discovery of arsenic many years after death. How far the symptoms only are a proof of the administration of arsenic. Antidotes and mode of treatment. Medical police. *Black oxide of arsenic*, or fly powder — poisonous effects. *Arsenites. Arsenic acid. Arseniates. Sulphurets of arsenic* — effects — medico-legal cases — tests. *Arseniuretted hydrogen.* MERCURY. *Corrosive sublimate.* Effects. Internally, (*a.*) by the mouth — symptoms; (*b.*) by injection. Externally, applied to a wound or ulcer, or to the skin. Appearances on dissection. Effect on animals. Tests, in the solid state — fluid state — organic mixtures; the changes that it undergoes in the stomach. Medico-legal cases. Whether ptyalism is capable of a complete remission. Antidotes. *Red precipitate* and *red oxide of mercury. Nitrate* — cases. *Mercurial vapours*, and mercury in a state of minute division — cases. ANTIMONY. *Tartar emetic.* Symptoms — appearances on dissection — effect on animals — tests — antidotes. *Oxide. Muriate. Antimonial wine.* COPPER. *Metallic copper* — its ready oxidation. *Oxide* and *carbonate. Verdigris. Sulphate.* Symptoms — appearances on dissection — effect on animals — tests — antidotes. ZINC. *Sulphate.* Symptoms — appearances on dissection — tests. Whether metallic zinc is a proper article for domestic utensils. TIN. *Hydrochlorate* — effects — tests — antidotes. SILVER. *Nitrate* — effects — tests — antidote. *Fulminating silver.* GOLD. *Nitro-muriate* — tests. *Fulminating gold.* PLATINA. *Nitro-muriate.* BISMUTH. *Nitrate* — effects — tests — antidotes. IRON. *Sulphate. Muriate.* LEAD. *Acetate* — symptoms — effects on animals — doubts as to its poisonous qualities. *Carbonate* — symptoms — cases. *Litharge* and *red lead* — effects. *Muriate.* Action of air and water on lead; articles of food or drink contaminated with lead; earthen vessels glazed with lead; action of vinegar, apples, milk on them. Adulteration of wines, cider, rum, cheese, sugar. *Saturnine emanations* — symptoms. Chemical proofs of the presence of lead. Antidotes. CHROME. *Chromate of potash* — symptoms — appearances on dissection — antidote. MOLYBDENUM. TUNGSTEN. TELLURIUM. TITANIUM. OSMIUM. IRIDIUM. RHODIUM. PALLADIUM. NICKEL. COBALT. URANIUM. CERIUM. MANGANESE. CADMIUM. BARYTES, and its salts — effects — tests — antidotes.

IN the present chapter, the poisonous metallic compounds will be considered; and of these, the first and most important is

ARSENIC.

WHITE OXIDE OF ARSENIC. This substance, commonly known under the name of *arsenic*, is, according to chemical nomenclature, *arsenious acid*, or the *white oxide of arsenic;* and it has received these apparently incompatible names, from the fact that though more analogous to the oxides, yet it possesses some of the properties of an acid. It is usually obtained by roasting cobalt ores, which contain a notable proportion of arsenic. The vapours arising during the process of making zaffre, are condensed in a large chamber, and potash is added to them; the mixture is then sublimed, and the white oxide is obtained, leaving potash with sulphur. This employment is a dangerous, and in a short time, fatal one; and accordingly, convicts whose punishment would otherwise be death are condemned to it.*

The principal chemical characters of this substance will be noticed under the head of *chemical proofs*.

Arsenic may be poisonous, whether internally or externally exhibited. 1. *Internally*, by the mouth passing into the stomach, or by being injected into the vagina or rectum. 2. *Externally*, by being applied to a wound or ulcer, or by inhaling its vapours.

INTERNALLY, (*a.*) Its exhibition by the mouth.

In the previous edition, I adopted a classification of the effects of this poison, as proposed by Hahnemann. He divides them into three degrees: When death follows the exhibition of the poison within twenty-four hours, it constitutes the first degree; and when later than twenty-four hours, the second; and when the case, though attended with dangerous symptoms, does not terminate fatally, it belongs to the third class.†

This arrangement, though very useful in increasing our knowledge of the complicated symptoms arising from the taking of arsenic, must, at the present period, give place to one more consonant with the advancing state of information. I shall accordingly follow that which was proposed in the Edinburgh Medical and Surgical Journal some years since, and which is used by the author in his subsequent work.‡ The cases are divided into three classes: 1. When the person dies between twenty-four hours and two or three days; 2. When he expires in five, six, or ten hours, or at farthest within the first day; 3. Where life is prolonged six, eight, or ten days, or is saved altogether, but after some illness.§

* Gordon's Inaugural Dissertation, p. 4. See a notice of this production in the Edinburgh Medical and Surgical Journal, vol. xi. p. 134. The dangerous nature of the vapours arising from the roasting of cobalt ores, appears to have been early known. They were considered so hurtful to the miners, that a prayer was formerly offered up in the German church, that God would preserve miners from cobalt and spirits. — (Beckmann, vol. ii. p. 263.)

† Edinburgh Medical and Surgical Journal, vol. vii. p. 86.

‡ Edinburgh Medical and Surgical Journal, vol. xxi. p. 424. Christison, p. 270.

§ Dr. Christison has arranged the numerous cases on record, according to this division, and selected their symptoms as given in the text. I will only add brief notices of American and recent European cases, for the purposes of confirmation or exception. My main aim in preparing the present article on arsenic, is to condense and simplify the subject. The discussions on it have been so voluminous, that there

1. The first case, or *where death ensues betwixt twenty-four hours and two or three days*, is the most common of all. The earliest symptom is sickness or faintness, and this often occurs within a few minutes after the poison is swallowed. But in a majority of instances, it does not happen for half an hour.* Pain in the region of the stomach succeeds, and this, most commonly, is of a burning kind, and much aggravated by pressure. Violent fits of vomiting and retching come on, with a dryness, heat, and tightness in the throat, creating an incessant desire for drink. Hoarseness and difficulty of speech are commonly combined with these. The matter vomited is greenish or yellowish, but sometimes it is streaked or mixed with blood, particularly if the case be protracted beyond a day.

It must, however, be understood, that the affection of the throat, as above described, is not always present, while again it is sometimes so severe as to be attended with fits of suffocation and convulsive vomiting at the sight of fluids.

Diarrhœa generally, but not always, follows, or in its place are ineffectual attempts, and the abdomen is tense and tender, and sometimes also swollen. When the diarrhœa is severe, the rectum is commonly excoriated.† Burning heat is felt at the part, and this pain will extend along the whole course of the alimentary canal. Even the mouth and lips are inflamed, and present dark specks or blisters. The lungs are also affected in these instances. Shortness of breath, tightness across the chest, and in a few cases actual inflammation, have been the result.

There is a frequent painful and difficult micturition, and the genital organs in both sexes are painful and swollen. In one case there was a suppression of urine for several days.

When the symptoms of irritation in the alimentary canal have subsided for some hours, convulsive motions often occur; such as tremors and twitches of the trunk, or the whole body; cramps of the legs and arms are also common. The pulse is feeble and rapid; the skin cold; clammy sweats break out, and the feet and hands are livid.

is not only danger of confusing it to the learner, but, from the discrepancies of opinion, the lawyer may urge, as I have known to be done, that there is nothing settled on it. We shall, however, find that this, in all the leading and important points, is not the case.

* Several cases are quoted by Dr. Christison, in which the intervention of sleep appears to have delayed the appearance of this symptom for two, three, or even five hours.

† Occasionally, bloody purging is also observed. Dr. Merewether, of Kentucky, gives an instance, where a female, aged sixty-four, took about forty-five grains of arsenic in biscuit. The early symptoms do not differ from those described in the text. There was, however, obstinate constipation, with bloody discharges of acrid mucus from the mouth and nose, probably from the violence of the vomiting. Œdema, with purple blotches on various parts of the body, succeeded, and the patient laboured under intense suffering until the ninth day, when immense discharges of blood from the intestines and delirium preceded the fatal termination. The son of this female partook of the meal, and probably took double the quantity of poison. He was seized with vomiting and purging, and the usual symptoms, and gradually recovered. In both instances, soreness and swelling of the eyelids were present. (Transylvania Journal, vol. ii. p. 233.)

The countenance betrays great anxiety; the eyes are red and sparkling; the tongue and mouth parched, and sometimes little white ulcers break out on the velum and palate.

Delirium sometimes accompanies the advanced stage, and stupor also is not unfrequent. Death, in general, comes on calmly, but is sometimes preceded by a paroxysm of convulsions.

In most cases, the above symptoms are more or less uniformly observed, but there are some peculiarities and varieties, which must also be stated.

Eruptions, either petechial or miliary, are not unfrequent in those who survive several days, but they are more generally seen in chronic cases. Swelling of the body, but particularly around the eyes, has also been noticed. Pain and vomiting are sometimes wanting, and even on pressure the former has not been recognized. Again, the pulse has occasionally been found very slow, not more than forty beats in a minute.

If death be somewhat retarded, there is not unfrequently a remission of all the distressing symptoms, and the patient is then in a dozing stupor. This usually happens about the second day, but it is merely temporary, and the symptoms return speedily with equal or increased violence.

It must be remembered that many cases are on record, where this train of symptoms is followed by death in a few hours, from three to six, and yet the indications of irritation of the alimentary canal have been perfectly well marked during life, and verified by dissection after death.

2. The second variety of poisoning includes those cases in *which death ensues in five or six hours, or a little more,* at a period too early for inflammation to be always properly developed, and accordingly the symptoms are by no means so striking as in the first variety. On animals, the effects were almost narcotic, as we shall see when noticing the experiments of Mr. Brodie; but in man, they are far from being so distinctly marked.

In some instances of this kind, vomiting occurs at the usual period after taking the poison, but it seldom continues. The most uniform effect is extreme fainting, amounting at times to deliquium. Occasionally there is some stupor, or rather oppression, and often slight convulsions. The pain at the pit of the stomach is slight, and seldom accompanied with the other signs of internal inflammation.

This variety of poisoning has been only observed under the three following circumstances: When the dose of the poison was large; when it was in little masses; or when it was in a state of solution.

Dr. Christison quotes nine cases of this variety, and they sufficiently prove that arsenic does not always, in fatal cases, produce violent and well-marked symptoms.*

* Among these are the following: —

New-York Medical and Philosophical Journal, vol. iii. p. 6. By Dr. J. Augustine Smith. This was a case of suicide. The individual swallowed an ounce at once, and vomited once or twice, and complained of some heat and pain in his stomach

3. *The third variety is when life is prolonged six, eight, or ten days, or even is saved, after some illness.* Here the early symptoms are the same as those of the first or inflmmatory variety, but the subsequent ones are referable to nervous irritation. They generally come on when the former begin to recede, yet they sometimes make their appearance while the symptoms of inflammation are still violent. They vary in different individuals from coma, to an imperfect palsy of the arms and legs, and between these extremes are observed epileptic fits or tetanus. Thus, in Dr. Roget's case, after recovery from the ordinary effects, the patient was seized with epileptic fits on the sixth day, and they returned occasionally until the nineteenth.* In Mr. Turner's family, supposed to be poisoned by Eliza Fenning, twitches, numbness, and epileptic fits occurred in different individuals. Pyl mentions a case, where tetanus was present; and partial palsy of the extremities has been noticed by De Haen, Mr. Murray of Alford, Professor Bernt, Dr. Falconer, and others.†

Among the occasional results when life is saved, are irritability of the stomach, attended with constant vomiting of food — loss of the hair and desquamation of the cuticle.

Soreness and inflammation of the eyes are frequently mentioned as occurring.‡

and bowels, but "his sufferings were inconsiderable." He died in *eighteen* hours, and the stomach was very slightly inflamed.

Edinburgh Medico-Chirurgical Transactions, vol. ii. p. 298. By Dr. Christison. Death in five hours.

Orfila's Toxicologié, 3d edit. vol. i. p. 384. By Dr. Laborde. A female swallowed arsenic in lumps. She did not appear to suffer any pain; vomited when drink was given to her, but without uneasiness, and in five hours after taking it became drowsy, and then remained calm for four hours, when she expired with agony. On dissection, a clot of blood was found in the stomach.

Ibid. vol. i. p. 387. Case communicated to Orfila by Dr. Missa. The individual took three drachms of arsenic at 8 A. M., and then went about among his friends for two hours telling them what he had done, and bidding them adieu. He was then prevailed upon to take emetics, which operated freely. At one o'clock he was seized with pain and burning in the stomach, feeble pulse, cold sweats, and died in four hours after. See also Morgagni's case, quoted at p. 661.

I may add to these Dr. Gould's case (Boston Medical Magazine, vol. i. p. 273.), fatal in seventeen hours, from taking half an ounce on an empty stomach. The only peculiarity here was, that watery discharges, and nearly involuntary, were constantly occurring. He shrunk when pressure was made on the abdomen, but made no complaint, and gave no other indications of suffering. He died quietly, and without convulsions.

* Medico-Chirurgical Transactions, vol. ii. p. 134.

† Edinburgh Medical and Surgical Journal, vol. xviii. p. 167. Memoirs of the Medical Society of London, vol. ii. p. 224. Bedingfield's Compendium, p. 115. Dr. Dunnel, New York Medical and Physical Journal, vol. ix. p. 114.

‡ Dr. Ramsay of South Carolina saw twelve cases in one family, who were all poisoned from putting arsenic into soup. They were seized *immediately* after eating it. Vomiting occurred in all. The bowels were affected in some, while in others they were torpid. In one person, a female aged fifty, painful micturition, black and offensive stools, and pain about the rectum were present; and during the night there was a free menstrual discharge, although that evacuation had ceased five years previous. None of them died. Swelling of the face, eyelids, and joints of the

How small a quantity of arsenic will cause death? In the previous edition, I mentioned that *two grains* were deemed sufficient. This was stated on the authority of Hahnemann. Dr. Christison remarks, that the smallest actual fatal dose that he has found recorded is 4½ grains. The subject was a child four years old, and death occurred in six hours. Renault, however, destroyed a large dog by a single grain in solution, in four hours; while the same quantity, dissolved in wine, produced severe effects in several persons, although it was taken after dinner.* These circumstances are a sufficient warrant for allowing the above statement to remain.

(*b.*) *By injection into the vagina or rectum.* This is fatal in the same way as already described, but the inflammation affects the intestines more than the stomach.

A female in 1799, in the Department de l'Ourthe, in France, aged forty, died after a short illness, which was accompanied by a considerable tumefaction of the genitals, by uterine hæmorrhages, vomiting, and abundant purgation. This woman confided to two of her neighbours that her illness was occasioned by powdered arsenic, which her husband, *in concubito*, had himself insinuated into the parts. The body was examined by the proper officers. They declared that they found the vulva and vagina in a state of gangrene—the abdomen much distended with air, and the intestines inflamed and gangrenous. The culprit was arrested, convicted, and executed.†

Another case happened in Finland in 1786, and is related by Dr. Mangor of Copenhagen. Here arsenic was mixed with flour, and introduced up the vagina. Three wives in succession were poisoned in this manner. With the third, the crime was perpetrated at 7 A. M., and at 3 P. M. she was seized with shivering and coldness of the body, and at the same time a burning heat of the vagina. Her sufferings were intense; she became delirious at 11 P. M., and died at midnight. The only means used for recovery was the repeated injection of milk. On dissection, the labia were found tumid and red, the vagina gaping and flaccid; and although this part had been repeatedly washed by the injections, yet grains of arsenic were found adhering to it. The os uteri was gangrenous, the duodenum inflamed, the stomach natural, and the lungs quite livid. The other parts were all healthy. The blood was fluid throughout the body.‡

fingers, were secondary symptoms in several of the children. (American Journal of Medical Sciences, vol. xv. p. 259.) See also Dr. Elliotson's Lectures, London Med. Gaz. vol. x. p. 6.

* Edinburgh Medical and Surgical Journal, vol. xxxiii. p. 67.

† London Medical Repository, vol. ix. p. 246.

‡ Gordon's Dissertation. Davis's Obstetric Medicine, p. 132. Christison, p. 292. It is also mentioned, that the Copenhagen College of Medicine, when this case was referred to them, and when some doubted the possibility of this mode of poisoning, made some experiments by introducing arsenic into the vagina of mares. It produced inflammation, tumefaction, and death. On dissection, the genital parts were found grangrenous, and there was an effusion of bloody serum in the abdomen, with traces of inflammation in the stomach, intestines, lungs, aorta, thoracic duct, &c. (London Medical Repository, vol. ix. p. 246, from the *Journal de Medicine.*)

As to the effect of injecting arsenic into the rectum, a case is cited at page 678.

In one experiment on a dog, forty-eight grains of arsenious acid, in the form of powder and fragments, were introduced into the rectum. He shortly after passed the whole of it by stool. Two days after, the same quantity, but pulverized, was introduced. This produced loss of appetite and dejection, and he died in eight days. The parts round the anus were excoriated, and the integuments detached, so that there was an ulcer of some extent. The mucous membrane of the intestines near the anus was of a greenish grey, and above it of a bright red, for the space of six or seven inches; but in ascending upwards, it gradually diminished in intensity.*

EXTERNALLY, (*a.*) *Applied to a wound or ulcer, or even to the skin.*

Of this there are some instructive cases on record. Dr. Desgranges relates the following: A chambermaid had been so imprudent as to rub her head with an ointment containing a portion of arsenic, for the purpose of destroying vermin. Her head was perfectly sound, without the least scratch. But in six or seven days after, it began to swell; the ears, which were twice their natural size, became covered with scabs, as were also several parts of the head; all the glands of the jaw and neck rapidly enlarged; the face was tumefied, and almost erysipelatous. Her pulse was hard, tense, and febrile; the tongue parched and the skin dry. To these were added excruciating pain and a sensation of great neat. Vertigo, fainting, cardialgia, occasional vomiting, thirst, ardor urinæ, constipation, trembling of the limbs, and delirium were also present. Dr. Desgranges treated the complaint as an inflammatory disease, and in a day or two after the body, and especially the hands and feet, were covered with a considerable eruption of small pimples, with white heads like millet. This eruption in time dried up and desquamated, and she finally recovered, but during her convalescence the hair fell off.†

Belloc has recorded a similar instance. A female aged fifty-six, in good health, but of a delicate constitution, had the imprudence to wash her body with a solution of arsenic in water, to cure the itch. Her body swelled prodigiously, and she was covered with an erysipelatous eruption. She dragged out a painful existence for two years, but during life was always afflicted with a trembling of the limbs.‡

Roux amputated the schirrous breast of a girl of eighteen. The wound did well; but while rapidly closing, an ulceration, accompanied with slight darting pains, made its appearance in the centre. He applied the *arsenical paste*, as it is called in France, and of which arsenious acid is the basis. The day after she was seized with violent colic, and experienced some vomiting. Two days afterwards she died in violent convulsions. The body, which was covered with large ecchymoses, quickly putrefied; and on opening it, the internal surface

* Orfila's Toxicology, vol. ii. p. 541.
† Foderé, vol. iv. p. 123.
‡ Belloc, p. 121.

of the stomach, and a great part of the intestinal canal, were found in a state of inflammation, and sprinkled over with black spots.*

Dr. Hosack also relates an instance, in which a palsy of the muscles of the neck and right arm was occasioned by its application to an encysted tumour.†

There can be no doubt that the various quack preparations used both in England, France, and this country, for the cure of cancer, and which have arsenic for their base, have in many cases proved destructive to the patients. Certainly government ought to interdict their application, except in the hands of regular practitioners.‡

During the period of the plague of London, amulets of arsenic were worn suspended over the region of the heart, as a preservative against infection. Even this proved dangerous, and Dr. Mead severely reprehends it.

(*b.*) *By inhaling its vapours.*

I have already adverted to the effects produced on the miners in Germany, and will now mention those caused in the copper smelting works of Cornwall and Wales, in consequence of that metal in its crude state being mixed with arsenic. Dr. Paris states, that in their vicinity, "horses and cows commonly loose their hoofs, and the latter are often seen in the neighbouring pastures crawling on their knees, and not unfrequently suffering from a cancerous affection in their rumps; whilst the milch cows, in addition to these miseries, are soon deprived of their milk. The men employed in these works are more healthy than we could *à priori* have supposed possible; but the antidote on which they rely with confidence, whenever they are infected with more than an ordinary portion of arsenical vapour, is *sweet oil*,

* Orfila's Toxicology, vol. i. p. 124. There are, however, exceptions to these injurious and fatal effects. In some instances no bad consequences are produced, and the result of the application of arsenic is merely the formation of an eschar. For this difference two causes have been assigned. One is the relative quantity employed, a small portion being most readily absorbed, and producing constitutional disease, while a large quantity quickly destroys the organisation of parts, and prevents absorption. Another has been pointed out by Harles. He observes that arsenic "may be applied with safety to the abraded skin, to common ulcers, to wounded surfaces, and to malignant glandular ulcers, even when highly irritable, provided the part be not recently wounded so as to pour out blood." Here the poison is applied to an open-mouthed vessel, and the effect, as we shall see when stating the result of experiments on animals, is rapid and destructive. (Christison, p. 290.)

† American Medical and Philosophical Register, vol. iii. p. 389. Another fatal case, from its application to a tumour, at the angle of the jaw, is given by Dr. Hoit, New York Medical and Physical Journal, vol. iii. p. 375.

‡ In France, the *pate arsenicale* is used. It consists of cinnabar 70 parts, sanguis draconis 22, and arsenious acid 8, made into paste at the time of applying it. In England, *Plunkett's ointment*, made of arsenious acid, sulphur, and the powdered leaves of the ranunculus flammula and cotula fœtida; and *Davidson's remedy for cancer* — arsenious acid and powdered hemlock. (Paris's Pharmacologia, p. 209.) In the United States, *Davison's cancer plaster* — some preparation of arsenic. As far back as the time of Haller, cases are related of death ensuing from the external application of arsenic to cancers and ill-conditioned ulcers. (Edinburgh Medical and Surgical Journal, vol. xiv. p. 643.) A fatal case is mentioned in Annales D'Hygiene, vol. ii. p. 459.

and an annual sum is allowed by the proprietors, in order that it may be constantly supplied."

It deserves notice, he adds, that the smelters are occasionally affected with a cancerous disease in the scrotum, similar to that which infests chimney sweepers.*

The effects of the vapours of arsenic in the laboratory are no less marked. "Whilst Tachenius (says Van Swieten) endeavoured to fix the arsenic by repeated sublimations, the vessels being open, he inspired a very sweet air, but in half an hour felt the consequence of his imprudence. He not only breathed with difficulty, but suffered convulsions in all the members of his body, and passed bloody urine with great pain."† Dr. Gordon mentions the following as occurring to himself. Whilst subliming arsenic, the vessel broke from the heat, and on removing it hastily from the fire, he inhaled a small quantity. A sense of pain and tightness about the præcordia was immediately felt, with a difficulty of breathing and violent cough. The pulse was not changed, but weaker and quicker than natural. On the next day, all the symptoms were gone except the cough, nausea, and anorexy. These were removed by a cathartic.‡

Appearances on dissection. These are generally found to vary with the length of time that the patient survives. If death ensues within a few hours, no opportunity is allowed for the developement of local inflammation, and its marks are accordingly absent.

In this, then, the *second variety*, described under the head of symptoms, the most marked character is the absence of diseased appearances. In the cases there quoted, hardly any thing beyond a slight local redness of the villous coat of the stomach was noticed. In Dr. Smith's case, there was merely redness at the pyloric end. In Dr. Gould's nothing was seen but two or three red patches near the cardiac extremity. Particles of arsenic were, notwithstanding, picked from the mucous coat.

It must, however, be distinctly understood, that although this absence of morbid appearances is most common in those who die within a few hours, yet there are many instances of that description in which the marks of inflammation are distinctly developed, and this will generally be indicated by the violence of the symptoms during life.

In a case related by Mr. Hebb, where death ensued in four hours, the internal coat of the stomach was much attenuated, and exceedingly vascular, while underneath it was a number of specks of extravasated blood. The peritoneal coat also was inflamed.§

The appearances observed in the *first variety*, or where life is prolonged till the second day or later, are as follows:—

Redness of the throat and œsophagus. This has been found in animals, and in a few cases in man. In one instance, the tongue was inflamed and thickened.

The inner coat of the stomach is very commonly inflamed, its peri-

* Paris's Pharmacologia, p. 209. † Gordon, p. 15. ‡ Ibid. p. 16.
§ Midland Medical and Surgical Reporter, vol. i. p. 334.

tuneal one but seldom. Corrugation of the stomach is a common appearance. In several instances, the villous coat has been found black from effusion of altered blood into its texture. "When the colour is brownish black or grayish black, and not merely reddish black, when the inner membrane is elevated into firm knots or ridges by the effusion, and the black spots are surrounded by vascularity or other signs of reaction, these appearances strongly indicate violent irritation."* They are probably not imitated by any pseudo-morbid phenomenon. The villous coat is also often unusually soft, brittle, and easily separable by the nail; but this is not by any means constant. It has been seen thickened, raised, and corrugated, owing in several instances to the effusion of blood under it.

Erosion, or perforation of the coats of the stomach, is only an occasional occurrence. It is hardly to be looked for, according to Dr. Christison, unless the patient survives nearly two days. The change that is designated by these terms, is, strictly speaking, either an ulceration, in which the little cavities have an irregular shape, and are surrounded by a red areola and a margin of firm tissue, or an actual gelatinizing or softening.

It is highly probable, that observers must have been mistaken in supposing that sloughing or gangrene of the coats of the stomach is ever a consequence of this poison. The black extravasated patches on the villous coat resemble it in every thing but the feize. According to Mr. Brodie, a preparation in John Hunter's museum, designed to show a slough of the villous coat caused by arsenic, proves to be nothing else than an adhering clot.†

The mucous secretion of the stomach is almost always greatly increased in quantity. It is either thin and glairy, or solid, as if coagulated; and in the latter case it presents itself under the varieties of a uniform attached pedicle, or of loose shreds floating among the contents. Sometimes the matter effused is true coagulable lymph. Blood, or a bloody fluid, is not an uncommon appearance.

In many instances, solid arsenic has been found adhering to the coats of the stomach, either in loose particles, or enveloped in coagulated mucus, or in little clots of blood, or wrapped up in the more solid parts of the contents, and this, too, in spite of long-continued and violent vomiting.‡ In four cases, that have come under the notice of Dr. Christison, the arsenic had a brilliant yellowness on its surface, owing to its conversion in the stomach into the sulphuret. For our

* Christison, p. 302. † Ibid. p. 305.

‡ The following remarkable case is cited by Dr. Horner (Pathological Anatomy, p. 297.), from Laennec:—"A girl, in a moment of violent grief, swallowed an ounce of arsenic, but escaped very unexpectedly from its effects. The following year, being in a similar state of mind, she took it again and died. On dissection, the effects of the recent dose on the stomach were very obvious; and besides these, a cyst was found, which seemed just detached from the vicinity of the pylorus, where the traces of its adhesion were still perceptible. This cyst contained an ounce of arsenic crystallised, and had the consistence of a false membrane. It was supposed to have been formed around the arsenic by the sudden inflammation which followed the first dose, and that the patient owed her preservation to its enveloping the poison."

knowledge of this curious fact we are altogether indebted to that gentleman. In all, the oxide, as well as the sulphuret, was present. The presence of sulphuretted hydrogen in the stomach is doubtless the cause of this conversion.*

In the intestines, redness of their coats is not uncommon, but ulceration is only a rare occurrence. The duodenum has sometimes been found affected in a similar manner to the stomach, with its inner coat dark red, pulpy and thickened, and portions of it wanting. Beyond the duodenum, there are seldom any distinct marks of inflammation observed until we reach the rectum.† Drs. Baillie and Male have each seen it inflamed, excoriated, and ulcerated.

Redness of the pleura, and even inflammation of the lungs, are not uncommon consequences of the taking of arsenic. Instances are given by Pyl and Henke, in which the lungs were in the highest state of congestion and inflammation, so that when cut into nothing but clotted blood could be seen in their cellular structure.

In a case examined by Orfila at Paris, and where death ensued in forty-eight hours from eating poisoned sausages, the left cavities of the heart were of a mottled red hue; and in the ventricle, especially on its columnæ, were many small crimson specks which penetrated to the muscular part. The right cavities had a deep reddish black tint, and the ventricle of that side contained specks like those in the other, but more faint. Orfila adds, that he had previously noticed the same appearances in animals.‡

The external organs of generation, in both sexes, have been found distended and black; and in one case, occurring to Bachmann, those parts in a female were surrounded by gangrene. §

The blood, according to Mr. Brodie, is commonly fluid in animals killed by arsenic, and this is confirmed by other observers. Harles, on the authority of Wepfer, Sproegel, and Jaeger, says it is black, semi-gelatinous, and sometimes pultaceous. It has, however, been found coagulated in animals dead from this poison, by Dr. Campbell and others. On the human subject, the observations are very few and very discordant. Thus, of three cases where it was noticed, in one it was black and coagulated; in another, black and fluid; and in the third, florid and fluid.

The exterior appearance of the body varies with the length of the illness: if protracted, we may expect earlier and more extensive

* Christison, p. 307.

† The colon has, however, been found remarkably contracted in several instances. See Houlston, London Medical Gazette, vol. xiv. p. 712. Dr. Booth, ibid. p. 62.

‡ London Medical Repository, vol. xx. p. 349. Mr. Cooke observed an appearance of deep redness, almost as if extravasation had taken place, beneath the internal lining of the right ventricle, in an individual who survived five hours after taking arsenic, and who, during that time, suffered much from pain and vomiting. The inner surface of the aorta, for about an inch from its commencement, was not only of a deep red colour, but spots of lymph adhered to it. (Cooke's Morgagni, vol. ii. p. 587.)

§ The kidneys are sometimes highly vascular, and the bladder contracted and empty.

lividity, and there are also some cases where œdema is distinctly manifested.

It is a curious problem, *whether arsenic delays or accelerates the progress of putrefaction*, in bodies poisoned with it. Formerly it was the universal opinion that the process proceeded more rapidly in consequence of this. At the present day, however, its known antiseptic qualities when applied to animal substances, and the investigation of some remarkable medico-legal cases, have induced a different belief. Dr. Christison has made the English public acquainted with these. They occurred in Germany, and were previously only published in the language of that country.

The first occasion on which this property of arsenic was brought into public notice, was about the beginning of the present century, in the course of the trial of the Widow Ursinus. Previous to this, Dr. Welper, then medical inspector at Berlin, having remarked that the body of a person poisoned with arsenic remained quite fresh for a whole week in summer, attended carefully to this subject at every opportunity, and invariably, he says, found that the body resisted putrefaction. In 1803, he was engaged in investigating the case of the female above named. Having been discovered in an attempt to poison her servant, suspicions arose concerning the previous sudden death of three persons in her family; her husband, a young officer her paramour, and an aunt from whom she derived an inheritance. They had all died in mysterious circumstances, and the lady had been their nurse. Dr. Welper disinterred the bodies of the husband and aunt, which had been buried, the former two years and a half before at Berlin, the latter six months afterwards at Charlottenberg, and he found them not putrid, but dried up. No arsenic could be detected.

At the request of Dr. Welper, similar experiments were made on animals by Dr. Klanck, and with results strikingly conformable. Dogs poisoned with arsenic were buried in a damp cellar, and their bodies sometimes exposed to its air; yet at the end of three years, they continued dry and undecaying.

Another trial arose in Bavaria, from the following circumstances: A lady near Bayreuth died after five days' illness, under symptoms of violent general irritation of the alimentary canal. In a short time suspicions were excited, and the supposed criminal was implicated so far as to be also suspected of having poisoned two other persons. The bodies of the three individuals were accordingly disinterred — one of them five months, another six months, and the third fourteen months after death. In all of them, the external parts were not putrid, but hard, cheesy, or adipocirous; in the two last, the stomach and intestines were so entire as to allow of their being tied, taken out, cut up, and handled; and in one, a sloughy spot was found in the region of the pylorus. Arsenic was detected in two of the bodies, by Rose's process of analysis.*

Several other instances, both in man and animals, are cited by Dr.

* Noticed under the head of Tests. This case (which is quoted from Bachmann), and the preceding, are taken from Christison, p. 312. &c.

Christison; and I shall have occasion to revert to the subject when speaking of the detection of the poison by chemical tests, in bodies interred for a length of time.

But this preservation of the animal textures does not occur in all cases of poisoning with arsenic; and it therefore becomes a question why bodies sometimes run rapidly into putrefaction, while at other times its progress is thus either delayed or prevented. The diversity is supposed by Dr. Christison to be owing, in the former instance, to the discharge of most or all of the arsenic by vomiting; and he suggests that this circumstance, in consequence of the unnatural supply of moisture, and the incipient disorganization, may even induce an earlier decay of the stomach than of other parts. It is also probable that the place of burial, the nature of the soil, and the condition of the air, exercise a material influence.

Effects on animals. This subject deserves consideration, from the aid it may afford in determining on the nature of the symptoms and morbid appearances in the human system. Several able observers and experimentalists have directed their attention to it.

Dr. Jaeger, of Stuttgard, examined the effects of this substance on all classes of organized bodies, vegetable and animal; and most of his experiments were made with a solution of the white oxide in water, in the proportion of one to sixteen. He found it a general and quick poison for plants at every period of their life, with the exception perhaps of a few of the simplest forms of vegetable existence. Their various parts died in succession, as the particles of the poison reached them. In animals, death was preceded in every instance, from the infusory animalculæ up to man, by inordinate motions; and the secretion of lymph was increased most remarkably from the mucous membranes. Frequent fluid stools took place in all classes of animals; in those in which mucus is secreted on the surface, it was remarkably increased, and crabs ejected a great deal of froth from the bronchial openings. The power of voluntary motion, and susceptibility for external stimuli, decreased; the respiration of those animals which breathe by lungs became difficult and laborious, and warm-blooded animals experienced extraordinary thirst. In birds and mammalia, frequent and violent vomiting took place, and commonly was the commencement of the scene to which convulsions put an end. Rabbits, however, which ruminate, did not vomit.

Arsenic exerted the most powerful effects when it was injected into the veins, or applied to a bleeding wound*; next, when it was intro-

* There can be no doubt of the truth of this statement. Dr. Gordon quotes the following experiments, given to him by his friend Dr. Campbell, which prove how *small* a quantity *externally* applied is sufficient to destroy life. Five drops of a saturated solution of the white oxide of arsenic were placed in a wound in the neck of a young cat. The animal was seized with vomiting, and died in four days. The stomach internally was much inflamed near the pylorus, and the small intestines were also greatly inflamed, both internally and externally. In another instance, two drops of *arsenic acid* (the effects of which only differ in being more powerful and rapid) were put on the head of a cat, and she was dead in twenty-four hours. Vomiting took place, and the stomach and œsophagus were inflamed. (Gordon, p. 19.) It is also confirmed by Mr. Brodie's experiments.

duced into the stomach, but less so when it was injected into the large intestines, which have fewer absorbing vessels. Applied to the sound skin, and to a wounded muscle, if dry, it seldom produced any effect; and animals covered with scales or shells, did not suffer at all from the external application of arsenic. Applied directly to the nerves, it was inert. Lastly, he found that animals were never killed more certainly or quickly by arsenic than when it was injected into the abdomen; but upon this he lays no stress, as the same effect was produced by most infusions.

In whatever way the arsenic was applied, Dr. Jaeger observed after death no change upon the skin. The gullet, and in birds the crops also, exhibited generally a slight redness; and further down, purple-red stripes, more numerous in the vicinity of the cardia, which, as well as the stomach itself, in animals having a soft villous coat to their stomachs, was sometimes of a uniform purple-red colour, and sometimes spotted with it. The muscular stomach of graminivorous birds, however, showed no appearance of redness; and in the aponeurotic portion of the stomach of a horse poisoned by arsenic, there were no traces of inflammation, which was otherwise general. The villous coat of the stomach is almost always softened, and as if macerated, and also somewhat swollen; and in general it can be easily torn, or rubbed off in pieces with the finger, from the coat beneath it. The inflammatory redness is not seated in the villous coat, which remains perfectly white, but in the nervous coat, which is remarkably red, and exhibits every where purple-red warts or eminences. The author, however, often saw this separation of the villous from the nervous coat, without any inflammatory redness of the latter. These changes continue, though in a less degree, through the small, to the vicinity of the large intestines, which are in general free from them, and only contain an increased quantity of effused mucus; but the rectum again is inflamed, and its inner coat swollen and softened. These appearances are not constant, and are very various in degree.

The other mucous membranes were less generally affected; but he sometimes found the trachea red and inflamed, and in one instance the urethra of a dog. In no instance real inflammation of the peritoneum, but its vessels were always turgid with stagnating blood. The voluntary muscles were constantly and universally rigid; the limbs sometimes bent, but generally extended; the heart, urinary bladder, gall bladder, and intestines, were rarely contracted, but frequently distended by their contents. The veins, especially of the abdomen, were constantly turgid with much black fluid blood; and a similar stagnation was observed in the cavities of the heart, especially of the right side. The lungs in general were natural, as was also the brain.

Putrefaction seemed neither to be hastened nor retarded by their being poisoned with arsenic, whether they were buried or not.

He however remarked, that the immediate contact of the arsenical solution seemed in some degree to retard the putrefaction of the part to which it was applied in sufficient quantity.

As to the local effects of arsenic, he observed that when applied to the sound skin, it seldom injured it. If applied to a wound, it never,

after death, was observed to be gangrenous or inflamed; was rarely swollen, but generally pale; and for a considerable extent, the subcutaneous cellular membrane was filled with much stagnant, gelatinous fluid. The œsophagus, stomach, and intestines, were commonly, though not always, inflamed when arsenic was administered by the mouth. He never noticed real erosions, ulcerations and gangrene of the viscera. In the horse already mentioned, and into whose jugular vein two ounces of arsenical solution were injected, and which was put to death twenty-nine hours afterwards, there were only some discoloured spots in the left ventricle.*

Mr. Brodie of London performed numerous experiments on animals with arsenic, and in doing so, either applied it to a wound, or injected into the stomach. The results were similar in all essential circumstances. The symptoms were,—1. Paralysis of the hind legs, and afterwards of the other parts of the body; convulsions, dilatation of the pupils of the eyes, and insensibility. 2. A feeble, slow, and intermitting pulse. 3. Pain in the region of the abdomen; preternatural secretion of mucus from the alimentary canal, and sickness and vomiting in those animals which are capable of vomiting. These three classes of symptoms respectively indicate disorder of the heart, brain, and alimentary canal. Mr. Brodie also found that the symptoms occurred sooner when the arsenic was applied to a wound, than when it is given internally.

In whatever way the poison is administered, the inflammation is confined to the stomach and intestines. He never observed any appearances of it in the pharynx or œsophagus.† This inflammation took place more readily indeed from the external application of the poison than from its administration internally, and it preceded any appearance of inflammation of the wound. The degree of inflammation varied considerably. In some it was very slight, in others considerable, and it appears to be greater or less according to the time which elapses before the animal dies. The mucous membrane of the stomach and intestines assumes a florid red colour, becomes soft and pulpy, and is separable without much difficulty from the cellular coat, which has its natural appearance. In some instances there are small spots of extravasated blood on the inner surface of the mucous membrane, or between it and the cellular coat, and this occurs independently of vomiting. Mr. Brodie never found ulceration or sloughing of the stomach or intestines; but he suggests, that if the animal survives for a certain length of time after the inflammation has begun, it is reasonable to conclude that it may terminate in one or other of these

* Review of Jaeger's Inaug. Dissert. *de Effectibus Arsenici in Varios Organismos, &c.* in Edinburgh Medical and Surgical Journal, vol. vii. p. 80 to 84.

† Dr. Campbell, however, in several experiments with the white oxide, externally applied, found the œsophagus greatly inflamed. This appearance was witnessed by Dr. Gordon. (Gordon, p. 20.) Orfila mentions it as a common circumstance in persons dead from poison, and he also quotes a case in which it was distinctly observed. (Orfila's Toxicology, vol. i. p. 140.)

ways; and it is important not to mistake the layers of coagulated blood for sloughs.*

I shall lastly mention the result of a number of experiments made by Dr. Duncan, Jr., and Dr. Campbell. They are summed up by the former as follows: "1. Arsenic does not act chemically on animal matter, living or dead. 2. Its chief effects are to produce a disease somewhat analogous to cholera morbus, whether it be taken directly into the stomach itself, or inserted into the subcutaneous cellular membrane of a remote part, or applied to a delicate membrane. In some few cases, where the action of the poison is most intense, death occurs from the sickness or fainting, without vomiting or purging. 3. Frequently a considerable interval intervenes between its being received, even in solution, into the stomach, and its action. 4. Neither paralysis of the voluntary muscles, nor convulsions, nor delirium, nor coma, nor disordered respiration or circulation, are ordinary symptoms of the disease produced by arsenic. 5. After death, we were frequently unable to discover any organic lesion, and we generally found that the inflammation was less, in proportion as the arsenic was more speedily fatal."†

When arsenic was *introduced after death* into the rectum of animals, and allowed to remain there for twenty-four hours, the mucous membrane in contact with it became of a lively red colour, with darker interspersed patches as if from extravasation. The other coats were natural, and even the mucous was so, unless the poison actually touched it. The margin of the coloration was abrupt, and well defined. When the arsenic was not introduced until twenty-four hours after death, the part to which it was applied presented dark patches, while the rest of the membrane was healthy. The result of the application of arsenic during life was, on the contrary, a redness which extended to some distance from the points with which the poison had been in contact, and then passed gradually into the healthy colour of the surrounding membrane.‡

Chemical proofs. The tests of arsenic have been the subject of extensive and animated discussion. I should occupy a large portion of this volume, were I to enter into a critical examination of them; and the result, after all, might be to perplex the learner. I prefer, therefore, to point out and dwell on the more important, designate others of inferior value, and make full references to authorities for the student.

Arsenious acid is met with in two forms; as a snow white powder, and in solid masses, generally opaque, and sometimes translucent.

* Edinburgh Medical and Surgical Journal, vol. viii. p. 459, from Philosophical Transactions. From his experiments, Mr. Brodie draws the conclusion, that arsenic does not produce its deleterious effects until it has passed into the circulation.

† Edinburgh Medical and Surgical Journal, vol. ii. p. 127. In a recent examination at Paris, of seven horses poisoned by the arseniate of potash, inflammation of the stomach, intestines, and bladder was seen either separately or conjointly, and in all of them there were numerous ecchymoses at the base of the left ventricle of the heart. Every other part of that organ was healthy. (Annales D'Hygiène, vol. xii. p. 404.)

‡ Orfila's Toxicology, vol. ii. p. 540.

When newly sublimed, it is almost transparent, and has a vitreous lustre. The change to opacity occurs from keeping it, and this hence is possibly owing to the action of the atmosphere.* Guibourt has found the opaque variety most soluble in water. The powder is obtained by grinding down the massy arsenic.

Specific gravity. Authors do not exactly agree on this. Dr. Ure says it is 3·729. Transparent varieties, according to Guibourt, have a specific gravity of 3·7385; and the opaque, 3·695. Dr. John K. Mitchell and Mr. Durand, of Philadelphia, found that specimens of the transparent vary from 3·208 to 3·338, while the opaque was 3·656.† Bergman placed it as high as 5·0, but this is evidently inaccurate.

Solubility. On this there is also considerable diversity of statement. According to Bergman, 80 parts of water at 60° Fahr. dissolve one part of arsenic, while the same is dissolved by 15 parts of boiling water. Navier asserts that 80 parts of boiling water are requisite to dissolve one part. Klaproth, from a series of experiments, found that 400 parts of cold water at 60° dissolve one part, while 13 parts of boiling water were sufficient for the same purpose. He also examined how much of the oxide would be retained by the boiling water after it was cold, and found that 100 parts retained three of the oxide, and the remainder separated in the form of tetrahedral crystals.‡ Guibourt has recently found that 1000 parts of temperate water dissolve, in thirty-six hours, 9·6 of the transparent, and 12·5 of the opaque variety; and the same quantity of boiling water dissolves, of the transparent, 97 parts, retaining 18 when cooled; but of the opaque, takes up 115, and retains on cooling 29.§ Hahnemann remarked, that at the temperature of the blood, 1000 parts dissolve ten parts, with the aid of ten minutes' agitation.‖ The solubility of arsenic is much impaired by the presence of organic principles, as milk or mucus, in the water. This readily explains the fact why the poison is so often found in the solid state in the stomach.

Taste. The common statement in most systematic works is, that it is acrid. Dr. Christison, from experiment, is of opinion that it has scarcely any taste at all, but probably, if any, is rather sweetish. Certainly it has been swallowed, with many articles of food, without the individual being aware of any acridity. The mistake on this point may have arisen from confounding the inflammation subsequently induced in the throat with the impression in the act of swallowing.¶

* Kruger imagines that a hydrate is formed. (Brande's Journal, N.S. vol. iv. p. 214.) This is, however, doubted by Berzelius, as no appreciable difference in weight can be discovered.

† Philadelphia Journal of Pharmacy, vol. iv. p. 108.

‡ Annals of Philosophy, vol. iv. p. 132.

§ Guibourt, Edinburgh New Philosophical Journal, vol. i. p. 318., from Journa de Chimie Médicale.

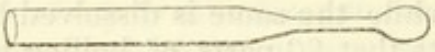
‖ Christison, p. 228.

¶ Christison, p. 227. Dr. Gordon, in his Inaugural Dissertation, p. 9., says that it is sweet. Hahnemann is of the same opinion, according to Dr. Christison. For authorities and facts in confirmation of Dr. Christison's opinion, see his communications in the Edinburgh Medical and Surgical Journal, vol. xxviii. p. 96; vol. xxxiii. p. 70. Turner's Chemistry, p. 562. 5th edition.

Effect of heat. The oxide of arsenic is sublimed at 380° F., and condenses in the form of a crystalline powder.* If the operation be performed slowly and on small quantities, the crystals are octahedral. When mixed with charcoal, and heated, it is reduced, and the metal sublimed. Berzelius says that it begins to sublime at nascent red heat.† Dr. Mitchell, on the other hand, found the temperature required was a *red heat visible in the dark.* ‡

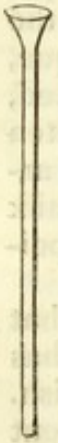
Tests of the oxide of arsenic in the solid state.

(*a.*) The process of REDUCTION is here to be employed. The only instrument necessary is a glass tube; and the best form of it, when the quantity of arsenic is small and probably impure, is that recommended by Berzelius, and represented in the accompanying figure.



Its length should be about three inches; and its diameter, according to Berzelius, should not be more than from $\frac{1}{7}$ to $\frac{1}{10}$ of an inch. The matter employed should not fill above three-fourths of an inch.

The arsenic should be mixed with about three times its weight of freshly ignited charcoal. This is decidedly preferable to the black flux, which was formerly employed.§ If the suspected substance be large in quantity, it may be mixed with the charcoal before it is introduced into the tube; but if small, it may be better to drop it into the tube, and then cover it over with charcoal. For the purpose of introduction, a small glass funnel is the best; and to it may be previously fitted a brass or silver wire, for pushing down the matter that adheres. It is of importance that the materials to be tested should all be collected together, and this object is best effected by the use of the funnel. In order to prevent the consequences of expansion, they should not be too closely rammed together.



Heat is best applied with the spirit lamp.‖ The upper part of the material or the charcoal should be first heated with a small flame. Then apply the heat to the bottom of the tube with an enlarged flame, and any water that may form on its sides should be removed with a roll of filtering paper. By continuing the tube in the flame, the metallic crust characteristic of arsenic will soon be formed. "The surface next the tube is almost exactly like polished steel, being a little darker in colour, but equal in brilliancy and polish; and the inner surface is either brilliantly crystalline to the naked eye, like the fracture of cast iron, or has a dull grayish-white

* Christison. Thomson says 383°; Bergman, 388°.

† Chimie, vol. ii. p. 429.

‡ American Journal of Medical Sciences, vol. x. p. 122.

§ "The *black flux* may be said to consist of charcoal in a state of extremely minute division, and the subcarbonate of potash. It is prepared by deflagrating, in a crucible, two parts of supertartrate of potash, with one part of nitrate of potash." (R. Phillips. Annals, N. S. vol. vii. p. 35.)

‖ Mr. Phillips and Mr. Brande appear each to have recommended this, but the first more particularly called the attention of chemists to it. (Annals, N. S. vol. vii. p. 36; vol. x. p. 300.)

colour, but appears crystalline before a common magnifying lens of four or five powers."*

These properties are manifest even in the most minute quantities. Berzelius says, that 190th of a grain of the oxide is more than sufficient to form a good crust.†

It has been objected to this test, that other substances, when treated in the same manner, may put on a similar appearance. Dr. Paris states, that a film of very finely divided charcoal has thus been mistaken for arsenic.‡ Antimony, when reduced, is also said to resemble the crust. This, however, is totally denied by Dr. Christison. And recently Dr. Mitchell, of Philadelphia, has observed that cinnabar, mixed with carbon and heated, exactly counterfeits metallic arsenic in its appearance.§

If the glass tube contains lead, it may assume an appearance on the outside resembling that of reduced arsenic. This is mentioned by Mr. Donovan, and I have repeatedly witnessed it when the heat was driven high.‖

It is from circumstances like these, although I was aware of but a portion of them, and particularly from an unwillingness to recommend any particular test to *the exclusion of all others*, that I was induced to make the remarks in the previous edition on the reduction test. The dispute, if there be any, is after all, I apprehend, more in words than in fact. No one conversant with the subject will deny, that reduction is the *confirmatory, the decisive proof;* but I also presume that no medical jurist, with the reduced metal before him, would be willing to stop with that experiment, and go into court and testify to the existence of arsenic. Certainly he would omit some of the means of rendering *assurance doubly sure.*

(*b.*) *Oxidation of the metallic arsenic by heat.* Apply heat to the ball which now contains the flux deprived of arsenic, and attach a bit of glass tube to its end, so that it can be drawn off and leave the crust, free of any danger of contact with it. Then apply heat to the crust with the spirit lamp, till it is all converted into a white powder. This (the arsenious acid) will then crystallise in the form of octahedrons, which can be readily seen with a proper lens.

* Christison, p. 225. For Berzelius's directions, see his Chemistry, or Annals, N. S. vol. ii. p. 232.

† Rose detected one eighth of a grain, although it was mixed with animal matter. (Edinburgh Medical and Surgical Journal, vol. vii. p. 85.) The late Professor Gorham of Harvard University also produced a distinct metallic film from the same quantity. (New-England Journal, vol. vi. p. 228.) Dr. Traill, one tenth of a grain. (Annals, N. S. vol. vii. p. 131.) Dr. Christison, one sixteenth, one hundredth part of a grain, and even less. (Edinburgh Medical and Surgical Journal, vol. xxii. p. 82; vol. xxxiiii. p. 68. Edinburgh Medico-Chirurgical Transactions, vol. ii. p. 93.)

‡ Pharmacologia, p. 217.

§ American Journal of Medical Sciences, vol. x. p. 126.

‖ Not long since, it was hinted that if arsenic had been used in the manufacture of glass, that metal might be reduced by a high heat, and thus impair the correctness of any medico-legal experiment. This, however, has been shown to be a perfectly futile objection, by Chevallier, Annales D'Hygiène, vol. ii. p. 224. Baltimore Medical and Surgical Journal, vol. i. p. 513.

A necessary caution, in performing this experiment, is not to heat the tube too suddenly or too highly, as the oxide may otherwise unite with the glass and form a white opaque enamel. It is better to pass the tube repeatedly through the flame, till the object is effected.

(*c.*) A portion of the tube containing the oxide may now be filed off. Boil this in a drachm or two of distilled water, acidulate the solution in the manner hereafter directed, and apply the liquid tests to be presently described.*

(*d.*) Dr. Christison recommends, as an additional test for the oxide in its solid state, to keep it for a few hours in a solution of the ammoniacal sulphate of copper.† It will be gradually converted into an apple-green powder, forming the arsenite of copper, while the blue solution of the cupreous salt becomes colourless. "No other substance in nature," he adds, "exhibits the same phenomenon with this agent."‡

The remaining tests are only mentioned, from having found a place in every work on medical jurisprudence. They are equivocal, besides requiring such a portion of arsenic as can hardly be spared in most cases.

(*e.*) *The garlic smell.* If a portion of arsenic be thrown on red-hot iron or burning charcoal, it will evaporate with a white smoke and a peculiar smell like garlic. Phosphorus, however, and zinc, under the same circumstances, burn with a similar odour.§ Animal matter, and even paper, will also sometimes imitate it. ‖

On the other hand, if arsenic be mixed with either a vegetable or an animal substance, the smoke and smell arising from these bodies when heated will altogether prevent us from detecting the peculiar properties of the arsenic. Dr. Bostock mixed equal parts of arsenic and flour, and placed them on iron at a low red heat, but the suffocating smoke arising from the flour could alone be perceived.¶

It is also ascertained that the garlic odour is evolved by the sublimation of metallic arsenic only, and not by the oxide, unless it be at the same time reduced.** Thus, Dr. Paris found that when the oxide was projected on red-hot copper or iron, the garlic smell was produced; but when it was placed on a plate of copper, iron, or

* Christison, p. 236. Clark in Brande's Journal, N. S. vol. vi. p. 357. Orfila has shown that *metallic arsenic*, when boiled with distilled water for two hours, is so far converted into arsenious acid, as to permit the liquid tests to operate. (Annales D'Hygiène, vol. ii. p. 484.)

† This appears to have been suggested by Orfila. (Edinburgh Medical and Surgical Journal, vol. xxii. p. 81.)

‡ Mr. Smithson also proposed to ascertain the presence of solid arsenic by fusing it with nitrate of potash. Arseniate of potash is the product, which gives a brick red precipitate with nitrate of silver. (Annals of Philosophy, N. S. vol. iv. p. 127.) A mode of applying this to a solution of arsenic is given by Mr. R. Phillips, ibid. vol. vii. p. 35.

§ Edinburgh Medical and Surgical Journal, vol. vii. p. 85. Murray's Chemistry, vol. iii. p. 358.

‖ Christison, p. 237.

¶ Edinburgh Medical and Surgical Journal, vol. vii. p. 173.

** Paris, in Brande's Journal, vol. vi. p. 342. R. Phillips, in Annals, N. S. vol. ii. p. 227.

platina, and heat was applied by the spirit lamp or the blow pipe, no odour was perceptible. No reduction took place in this case, and the arsenious acid was dissipated before the copper could acquire a degree of temperature sufficient to deoxidize it.

(*f.*) *The tombac or silvery alloy.* This is produced by mixing the oxide with charcoal or the black flux, and placing it between two copper plates, which are bound together by iron wire, and then subjecting it to heat for a few minutes. On rubbing the plates, a silvery white stain will be left on the surface of the copper, which is an alloy of the two metals. This, also, is an uncertain test. Dr. Bostock placed charcoal alone, moistened with oil, between copper plates, and after applying heat in the manner just directed, found an appearance somewhat similar to the alloy.* Dr. McNevin ascertained that oxide of tin had nearly the same effect on copper as oxide of arsenic has. If the quantity used be sufficient, it is probable that no mistake could be made in confounding the respective states of the copper; but, as I have already remarked, we can seldom spare enough for this purpose, and the use of this test must therefore be discouraged.†

Tests of oxide of arsenic in solution.

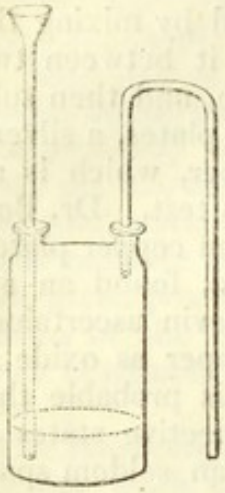
(*a.*) *Sulphuretted hydrogen.* If the fluid to be tested is alkaline, this gas will not act, because the precipitate it would otherwise form is soluble in the alkalies. If, on the other hand, a mineral acid be present in excess, an excess of sulphur is thrown down. This will defeat any subsequent attempts at reduction. Hence, if the suspected fluid reddens litmus, it must be neutralized with potash; if it be alkaline, it must be acidulated with acetic acid. This last, indeed, is now recommended to be used in all cases, as sulphuretted hydrogen has no action on acetic acid.

* Edinburgh Medical and Surgical Journal, vol. v. p. 172. On this test, see Orfila (American Journal of Medical Sciences, vol. v. p. 233.); Brugnatelli (Philosophical Magazine, vol. xliii. p. 445.)

† Besides the modes of reduction mentioned in the text, I may state two others. One is recommended by Dr. A. T. Thomson. It is, to boil the suspected fluid with animal charcoal. The arsenic will be absorbed by it, and, after removing the fluid, it may be reduced and sublimed by drying and heating the charcoal. This process, however, will not answer when the quantity of oxide is small. The other is the application of galvanism. This was first suggested by Jaeger, and several German chemists have used it with various modifications of apparatus; but it, also, from their own confessions, is not delicate. (Edinburgh Medical and Surgical Journal, vol. vii. p. 85; Orfila's Toxicology, vol. i. p. 108; Christison, p. 249.)

Dr. Clendenning has recommended the following method, founded on the researches of Mr. E. Davy. "A portion of the arsenical substance is mixed in a platina crucible with a little muriatic acid. A piece of zinc foil or wire is then dipped into the mixture and stirred about gently on the bottom for one or two minutes, when the platina will be found more or less covered with a crust of metallic arsenic. On throwing away the acid fluid, and applying heat to the platina, the arsenic rose in alliaceous vapours; it also gave the arsenites of silver and copper with the tests. In this manner Dr. Clendenning successfully operated on arsenic mixed with milk, soup, coffee, tea, &c. (London Medical Gazette, vol. xii. p. 440.) For Mr. Davy's paper, see Philosophical Magazine and Annals, vol. ix. p. 38.

With this previous preparation of the fluid, it is to be subjected to a stream of sulphuretted hydrogen gas for ten or fifteen minutes, and the apparatus best fitted for this purpose is here given.* The first portions of the gas turn the arsenical solution to a bright lemon yellow colour, and the subsequent portions throw down a flocculent precipitate of a sulphur yellow tint, which is the sulphuret of arsenic. If the proportion of oxide in solution be small, there will be only a yellowness, owing to the sulphuret being soluble in an excess of sulphuretted hydrogen. This excess may be expelled by boiling, after which a distinct precipitate is obtained.



The following are the only substances that can be confounded with the sulphuret of arsenic. The salts of cadmium yield nearly the same colour, but they are very rare.† The precipitated sulphuret of cadmium also is soluble in ammonia, which is not the case with the other.‡ The salts of selenium also give a yellow precipitate, but these also are very rare. The persalts of tin give a dirty greyish yellow precipitate, but ammonia turns it brown. The salts of antimony form an orange red precipitate with sulphuretted hydrogen.

This is a very minute test. Children found a decided yellow colour, in an ounce of distilled water, to which one drop of arsenious acid had been added. Jaeger detected arsenic thus in a solution which bore the proportion to the water of one to 50,000, and Christison says that it acts on the oxide in a hundred thousand parts of water.§

Sulphuretted hydrogen gas should in all cases be used in preference to its solution, or to the hydro-sulphate of ammonia. The ammonia of the latter may keep the arsenical sulphuret in solution.‖

(*b.*) *Ammoniacal nitrate of silver.* Dissolve lunar caustic in ten parts of water; add ammonia, which will precipitate the oxide of silver; and then redissolve the precipitate nearly, but not entirely, by adding gradually an excess of ammonia. In this state the ammoniacal nitrate of silver will cause, even in a weak solution of oxide of arsenic, a lively lemon yellow precipitate, the arsenite of silver, which passes to a dark brown under exposure to light.

There are, however, many impediments to the perfect action of

* The sulphuret of iron, with a little water, is placed in the apparatus, and sulphuric acid poured on it through the funnel.

† It was, in fact, this very property of yielding a yellow precipitate, with sulphuretted hydrogen, that led to the discovery of cadmium by Stromeyer. (Thomson's History of Chemistry, vol. ii. p. 220.)

‡ Bischoff, Philosophical Magazine and Annals, vol. ii. p. 231.

§ Annals, N. S. vol. i. p. 143; Edinburgh Medical and Surgical Journal, vol. vii. p. 65; Christison, p. 242.

‖ The uncertainty attending this last may be seen in Dr. Bostock's paper (Edinburgh Medical and Surgical Journal, vol. v. p. 167; Orfila's Toxicology, vol. i. p. 104.)

this test. Several of the acids, as well as an excess of ammonia, prevent its due operation. Common salt, if present, will give a pale yellowish white colour to the arsenic precipitate. Dr. Forbes, of Aberdeen, proposes to remove this difficulty by using the nitrate of silver alone, as long as any white precipitate falls down, then add a slight excess of it, and after subsidence to drop in ammonia. The chloride of sodium is thus removed, and the yellow arsenite of silver is formed in the last part of the process.*

But this test cannot be depended upon for exhibiting its characteristic appearance, if vegetable or animal matter is present. It is useful, however, even there, as its precipitate is copious, and which may be used in any additional experiments.†

(*c.*) The *ammoniacal sulphate of copper* is prepared by the same process as the last test; sulphate of copper being substituted for nitrate of silver. It causes, in solutions of oxide and of arsenic, an apple-green or grass-green precipitate. Arsenite of copper is formed.

This is also a delicate test; but its operation is prevented by the presence of ammonia and several of the acids. So also vegetable infusions and animal fluids prevent its characteristic colour; and again a green colour is produced by its action on different substances when arsenic is not present.‡

(*d.*) *Reduction of sulphuret of arsenic, as obtained by process* (*a.*). After the precipitate has been allowed to subside, and the supernatant fluid has been removed by the pipette, the remainder is poured on a filter. When all the fluid has passed through, the portions of the precipitate on the upper part of the filter are washed down to the bottom by means of the instrument here represented.§

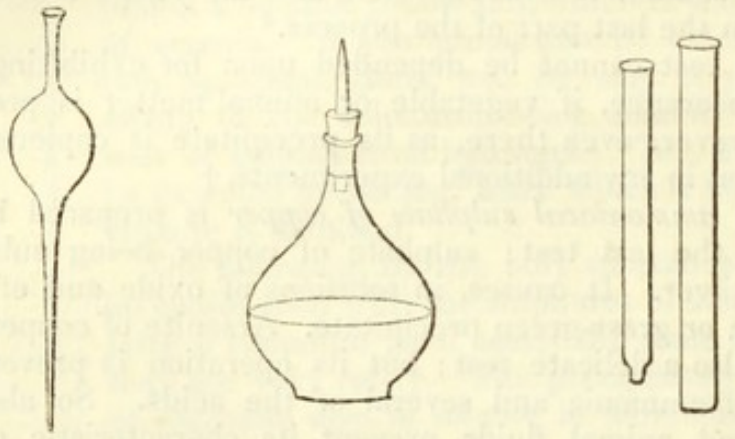
* Edinburgh Medical and Surgical Journal, vol. xxxii. p. 335.

† This test was originally proposed by Mr. Joseph Hume, modified by Dr. Marcet, and finally presented in its present form by the original proposer. Its history, and discussions concerning its value, may be found in Philosophical Magazine, vol. xxxiii. p. 401; vol. xl. p. 105. 179. 296. 333. 431; vol. li. p. 149.
Medico-Chirurgical Transactions, vol. ii. p. 157; vol. iii. p. 342; vol. vi. p. 663. — papers of Drs. Marcet and Roget.
Edinburgh Medical and Surgical Journal, vol. xxii. p. 64.
Annals of Philosophy, vol. viii. p. 152; ibid. N. S. vol. i. p. 142; vol. vii. p. 33. — Mr. Richard Phillips; ibid. N. S. vol. x. p. 60. — Dr. Paris.
London Medical Repository, vol. viii. p. 178. — Dr. Thomson.

‡ On this test, see Dr. Bostock, Edinburgh Medical and Surgical Journal, vol. v. p. 169; Paris's Pharmacologia and Medical Jurisprudence.
Edinburgh Medical and Surgical Journal, vol. xiii. p. 519; vol. xxi. p. 427.
Annals of Philosophy, N. S. vol. vii. p. 33.
Braconnot on the Schweinfurt green, Edinburgh Journal of Science, vol. x. p. 358.
On the liquid tests generally, see Dr. Murray, Edinburgh Medical and Surgical Journal, vol. xli. p. 365. He proposes to apply them for testing solid arsenic; and, ibid. vol. xlii. p. 86., to its detection in mixed fluids.
Dr. Brown on the tests of arsenious acid; United States Medical and Surgical Journal, vol. i. p. 11.
Dr. Feuchtwanger's remarks on arsenic; Silliman's Journal, vol. xix. p. 339.

§ This is a thin bottle capable of standing the fire, half filled with water, and having its cork pierced with a small tube drawn at its outer end to a very fine bore. The breath is impelled into the bottle, and the bottle being then reversed, a very fine stream issues with great force. This instrument for washing down scanty precipitates on filters was invented by Berzelius. The figure on the left represents a pipette.

The filter is then gently compressed between folds of bibulous paper, and the sulphuret is removed with the point of a knife before it dries, and dried in little masses on a watch glass by the side of a chamber fire, or still better in a vapour bath. Or again, the sulphuret may be allowed completely to subside, and then poured into a small glass tube of either of the accompanying forms. Add boiling water to



this; and having repeated this a sufficient number of times, pouring off the water each time until the subsidence is completed, the last portions of water may be gently driven off by heat, and wiped off the inside of the tube as they condense. The bottom of the tube, which contains the precipitate, may now be cut off with a file.

In either case, drop the sulphuret into the tube figured at page 738, and cover it by means of the funnel (see page 738) with a flux consisting of an alkaline carbonate and charcoal, either the black flux, or a mixture of two parts of ignited carbonate of soda and one of charcoal. Heat must first be applied to the part containing the flux, and the continuance of its application reduces the metal as in the case of the oxide.*

These tests are ample and conclusive for the detection of arsenic in the fluid state; and if they unite in presenting its characteristic results, the proof is complete.

It is, however, proper very briefly to mention some other tests that have been proposed.

1. *Lime water* gives a fine white precipitate with arsenious acid in solution — the arsenite of lime. This is a favourite with the German chemists.† But it acts on numerous other substances in a similar manner; and again it does not act if the solution contains free nitric, muriatic, and acetic acids.

2. *Chromate of potash* has been proposed by Dr. Cooper. It causes,

* Berzelius has also recommended the following: After a portion of the sulphuret has been introduced into the tube, insert a piece of steel piano-forte wire an inch long, so as to reach the surface of the sulphuret. Heat the wire with a spirit lamp, and continue it until the sulphuret, in a state of vapour, passes along the heated iron. In this way sulphuret of iron and metallic arsenic are obtained. The operation should be conducted slowly. (Edinburgh New Philosophical Journal, vol. ii. p. 338.)

† Jaeger speaks of it as a delicate test. (Edinburgh Medical and Surgical Journal, vol. vii. p. 84.) Lime water also enters into the processes recommended by Rose and Fischer. (Orfila's Toxicology, vol. i. p. 135.)

when added to a solution of arsenious acid, a grass green precipitate in about half an hour. This is the protoxide of chrome.*

3. *Iodide of potassium* has been recommended by Professor Emmet of the University of Virginia. It gives a white precipitate, which, on the addition of nitric acid, changes to a dark brown, purple, or black, according to the quantity. If starch be added at the same time, the deep blue tint, indicative of iodine, is present. Muriatic acid turns it to a bright yellow.†

Tests of oxide of arsenic when mixed with organic fluids and solids, and with the contents and tissues of the stomach.

It is safest, in medico-legal cases, to take the stomach itself, cut it into small shreds, and boil it in distilled water, along with any fluids that may be found in it. This should be continued for half an hour. The coarser solid particles are then separated by a gauze filter, and the fluid is filtered through paper. This filtration occupies at least thirty-six hours.

In order to free the fluid from animal matter, acetic acid should be added. And before applying sulphuretted hydrogen, it may be adviseable to use the nitrate of silver as a trial test in the manner already recommended. For this purpose, neutralize the fluid with ammonia or potash, and test a few drops with ammoniacal nitrate of silver. If it gives its characteristic precipitate, the process may be proceeded with; if not, evaporate the solution with a moderate heat to dryness, form a new solution by boiling successive portions of distilled water on the residue, and when cool filter this solution.

The remaining steps are similar to those already described,—acidulation with acetic acid, precipitation by sulphuretted hydrogen, reduction of the sulphuret and oxidation of the metal. If the sulphuret after boiling does not subside easily, add a little muriate of ammonia to the fluid; and if the fluid still continues muddy, and the deposition is not complete, allow it to remain at rest for forty-eight hours or more.‡

Besides this process, others have been recommended by various writers. Orfila at one period proposed to decolorize by chlorine, and supposed that the liquid tests would then act. Mr. Phillips advised to agitate the fluid with animal charcoal. Rose recommended the German process of forming arseniate of lime, and reducing it with charcoal and boracic acid. Rapp's process consisted in deflagrating the organic matter, and peroxidating the oxide of arsenic, by means of fused nitrate of potash. Dr. Paris has advised

* Silliman's Journal, vol. iv. p. 159. See also ibid. vol. iii. p. 354. Dr. Silliman (Chemistry, vol. ii. p. 193) says, "this appears to be one of the best tests that we possess." Dr. Reid, however, mentions (Chemistry, p. 346) that if a solution of bichromate of potash be added to a solution of tartar emetic, the liquid will assume the same green colour as with arsenic. This was pointed out by Mr. Laurence Reid, and the test of course is useless in any case where tartar emetic is supposed to have been used.

† Silliman's Journal, vol. xviii. p. 58. ‡ Christison, p. 252.

that the whole arsenic be thrown down with ammoniated nitrate of silver, and the precipitate reduced in a tube. Berzelius boils the suspected substance in potash, neutralizes the solution with muriatic acid, adds sulphuretted hydrogen, and then boils and evaporates till the precipitate subsides. The precipitate is then collected, dried, mixed with nitre in a large proportion, and deflagrated in a tube. The product is then dissolved in an excess of lime water, and the arseniate of lime so formed is collected and reduced with charcoal.

Orfila has recently recommended the following process, in order to destroy the animal matter previous to using the sulphuretted hydrogen. Boil the suspected fluid in nitric acid; then neutralize with potash; add muriatic acid in slight excess; then pour in sulphuretted hydrogen water; boil, and allow the precipitate to subside; it must then be thrown on a filter, and as it contains an excess of sulphur, wash the sulphuret with diluted ammonia, and finally throw down the sulphuret with hydrochloric acid.*

Having thus noticed the symptoms and the morbid appearances induced by arsenic, as well as the chemical means for its detection, it remains to mention some medico-legal cases. The records of criminal jurisprudence in every civilised country unfortunately abound in these; and they are peculiarly interesting to the student in legal medicine, as they either illustrate the errors and omissions of professional witnesses, or their skill and accuracy. In the former case, much allowance must be made for the imperfect state of knowledge, arising from a neglect of the science. This cannot, however, be conceded at present. Every physician who now offers himself as a witness has the means of accurate knowledge within his power.

The case of Miss Blandy. This is interesting, as it gives us the mode pursued to detect arsenic nearly a century since.

Mary Blandy was tried in February, 1752, at Oxford, for poisoning her father with arsenic. It appears that she fell in love with a Capt. Cranstoun, and that her father was averse to her marriage

* The following authorities on the detection of arsenic in mixed fluids are worthy of careful study: —

On the detection of minute portions of arsenic in mixed fluids, by Prof. Christison. (Edinburgh Medical and Surgical Journal, vol. xxii. p. 60.)

An account of several cases of poisoning with arsenic, in illustration of the delicacy of the chemical evidence, etc. by Prof. Christison. (Edinburgh Medico-Chirurgical Transactions, vol. ii. p. 273.)

Paris and Fonblanque, vol. ii. p. 252.

Thomson's London Dispensatory, p. 177. Berzelius's Chimie, vol. ii. p. 447.

Berzelius, Edinburgh Journal of Science, vol. iv. p. 131.

Giseke's account of Rose and Berzelius's process. (Brande's Journal, vol. xx. p. 398.)

R. Phillips, Annals of Philosophy, N. S. vol. vii. p. 31; vol. x. p. 300.

Dr. Christison, ibid. vol. xii. p. 25.

Dr. O'Shaughnessy, Lancet, N. S. vol. vii. p. 546.

Dr. Venables, London Medical Gazette, vol. vi. p. 615; vol. x. p. 115. American Journal of Medical Sciences, vol. ix. p. 524.

Taufflier's method, by treating the mixed fluids with a solution of oxide of zinc in potash. Philadelphia Journal of Pharmacy, vol. vii. p. 71. American Journal of Medical Sciences, vol. xvi. p. 240.

Reid's Chemistry, p. 347.

with him. The wretch then seems to have formed the plan of destroying him, in order to obtain possession both of his daughter and his property; and for this purpose forwarded arsenic to Miss Blandy, which she was induced from time to time to mix in his food and drink. It produced prickings and heat in his tongue and throat, and burning pains in his stomach and bowels, which went off with vomitings and purgings. His health sunk under this dreadful regimen, and in particular he observed that his teeth decayed very rapidly. Several females who had accidentally taken of the tea in which the poison was mixed, were also seized with vomitings and purgings, and suffered greatly. At last, on the 6th of August, she appears to have added a larger quantity than usual to his water-gruel. He was attacked with all his former symptoms, but with double violence; the abdomen swelled, and there was excessive pain and prickings over every part of his body. On the 10th, Dr. Anthony Addington visited him, and found his tongue swelled, his throat slightly inflamed and excoriated, his eyes inflamed, his pulse low, trembling, and intermitting, and his respiration difficult; there was also an inability to swallow even the smallest quantity. The patient stated that he had had several bloody stools. During the next two days, he appeared somewhat relieved, except that the rectum was ulcerated and painful; but on Tuesday (13th) a slight delirium, with a short cough and ulcerous discharges from the rectum, supervened, and death ensued on Wednesday.

On Thursday, the body was examined. "The back, and hinder part of his arms, thighs, and legs, were livid. The heart was variegated with purple spots. The lungs resembled bladders half filled with air, and blotted in some places with pale, but in most with black ink. The liver and spleen were much discoloured; the former looked as if it had been boiled, but that part of it which covered the stomach was particularly dark. The kidneys were stained with livid spots. The stomach and bowels were inflated, and appeared, before any incision was made into them, as if they had been pinched, and extravasated blood had stagnated between their membranes; they contained nothing but a slimy, bloody froth; their coats were remarkably smooth, thin, and flabby. The wrinkles of the stomach were totally obliterated. The internal coat of the stomach and duodenum, especially about the orifice of the former, was prodigiously inflamed and excoriated. There was no scirrhus in any gland of the abdomen, no adhesion of the lungs, nor indeed the least trace of a natural decay in any part whatever."

A portion of the powder found at the bottom of the gruel administered to Mr. Blandy was handed to Dr. Addington. He gave a part of this to Mr. King, a chemist in Reading, who examined it, and declared it to be white arsenic. On the remainder he experimented himself, and came to a similar result. The question was asked him, Why do you believe it to be white arsenic? He replied, "For the following reasons: — 1. This powder has a milky whiteness; so has white arsenic. 2. This is gritty, and almost insipid; so is white arsenic. 3. Part of it swims on the surface of cold water, like

a pale sulphureous film, but the greatest part sinks to the bottom and remains there undissolved; the same is true of white arsenic. 4. This, thrown on red-hot iron, does not flame, but rises entirely in thick white fumes, which have the stench of garlic, and cover cold iron, held just over them, with white flowers; white arsenic does the same. 5. I boiled ten grains of this powder in four ounces of clear water, and then passing the decoction through a filter, divided it into five equal parts, which were put into as many glasses. Into one glass, I poured a few drops of spirits of sal ammoniac; into another, a few of the lixivium of tartar; into the third, some strong spirit of vitriol; into the fourth, some spirit of salt; and into the last, some syrup of violets. The spirit of sal ammoniac threw down a few particles of pale sediment; the lixivium of tartar gave a white cloud, which hung a little above the middle of the glass; the spirits of vitriol and salt made a considerable precipitation of a lightish coloured substance, which, in the former, hardened into glittering crystals, sticking to the sides and bottom of the glass; syrup of violets produced a beautiful green tincture. Having washed the saucepan, funnel, and glasses used in the foregoing experiments, very clean, and provided a fresh filter, I boiled ten grains of white arsenic, bought of Mr. Wilcock, druggist in Reading, in four ounces of clean water, and filtering and dividing it into five equal parts, proceeded with them just as I had done with the former decoction. There was an exact similitude between the experiments made on the two decoctions. They corresponded so nicely on each trial, that I declare I never saw any two things in nature more alike than the decoction made with the powder found in Mr. Blandy's gruel and that made with white arsenic. From these experiments, and others which I am ready to produce if desired, I believe that powder to be white arsenic."

Miss Blandy was condemned and executed, denying to the last any knowledge of a noxious quality in the powder she gave to her father.*

Case of Donnal. Mr. Donnal, a surgeon, at Falmouth, in England, was tried in 1817, for poisoning his mother-in-law, Mrs. Downing. It appeared in evidence that she had breakfasted and dined at the prisoner's house in October, and returned home very ill, retching and vomiting, with a very violent cramp, and she continued so for three or four days after. On Sunday, the 2nd of November, she was prevailed upon to drink tea with him again. She was then in perfect health, and had just come out of church. Cocoa was provided for her, and while drinking part of the second cup she was taken very sick. Dr. Edwards was called in between 4 and 5 A. M. of the 3d, and found her very drowsy, and her pulse fluttering. According to the prisoner, she had been labouring under an attack of cholera morbus. Death followed in fourteen hours after taking the cocoa.

On dissection, the stomach was found partially inflamed, being stellated in several places. Its villous coat was softened, and in some

* Hargrave's State Trials, vol. x. p. 1.

parts nearly destroyed. The large intestines were also inflamed in different places. The lungs and liver were sound.

Dr. Edwards applied the liquid tests of sulphate of copper and ammoniaco-nitrate of silver to the contents of the stomach, and they each gave the characteristic appearances of arsenic.

On the part of the prisoner, it was urged that the disease was cholera morbus, and that in persons dead from it the stomach would present a similar appearance. Dr. Neale also deposed that he had tried the silver test on a decoction of onions (the deceased had eaten onions on the day before she died), and that a yellowish cloud was produced. He then varied the experiment by adding phosphate of soda (the acid of which is present in the human fluids), and a yellow precipitate fell down. The copper test used on the onions gave a green precipitate. He considered the reduction of the metal as the only decisive test. It is greatly to be regretted that this was omitted. The prisoner was acquitted.*

Mary Smith, a farmer's wife, near Dundee, was tried at Edinburgh, in February, 1827, for administering poison to her servant, Margaret Warden. The deceased was pregnant by the prisoner's son. It appears that the supposed poison had been twice given to her. From the first, which was taken at night, no decided effects seem to have occurred. She however complained of pain, and was said to have vomited. The second dose produced thirst, vomiting and purging, and violent pain in the bowels; and these were followed by prostration, stupor, cold extremities, and a feeble pulse. Death ensued in about thirty-six hours.

The body was disinterred twenty-two days after; and although there were marks of considerable putrefaction externally, yet the stomach and bowels were in a state of "wonderful preservation." The inner coat of the stomach was raised and separated in many places from the adjoining ones, and in other parts was corrugated or abraded. Blood was extravasated under it. The intestines also bore marks of vascular excitement.

The fluid found in the stomach amounted to ten or twelve ounces, and yellow particles floated in it. Similar particles also adhered to the villous coat, or were imbedded in its substance. The physicians of Dundee examined a portion of the contents by the liquid tests, and then reduced some with the black flux. With each indications of arsenic were given. Dr. Christison made a similar investigation, and also obtained the metal.

For the defence, the only points suggested were the possibility of cholera causing these fatal effects, and the uncertainty of post mortem appearances after so long a period. The prisoner was acquitted. She may have been innocent; but the only satisfactory alternative is, that it was a case of suicide.†

* The evidence on this trial is given in Paris's Medical Jurisprudence, vol. iii. Appendix, p. 277; and Gordon Smith on Medical Evidence, p. 212.

† Syme's Justiciary Reports, p. 93; Edinburgh Medical and Surgical Journal, vol. xxvii. p. 141; vol. xxviii. p. 84, 94. Mr. Alison (Practice of the Criminal Law of Scotland, p. 89) says that the court considered this case as proved.

Case of Wishart. The prisoner was accused of poisoning her pregnant sister. The porridge in which the arsenic was placed was eaten on Tuesday evening; and as far as testimony could be procured, the usual symptoms occurred. On Friday, the deceased was delivered of a living child, and on Saturday she died. The body was disinterred eight days after. There was a small perforation in the stomach, and its villous coat was very vascular, and in some places abraded. The intestines were also very red.

The contents of the stomach and portions of that viscus were submitted to the action of tests, but in none of these did the silver and copper tests give any indications of arsenic. Sulphuretted hydrogen, however, after the liquor had been acidulated with acetic acid, yielded a yellow precipitate, which was reduced by the black flux. Dr. Christison afterwards converted the crust, by repeated sublimation, into little octaedral crystals of oxide of arsenic, which he estimated to amount to about the fortieth part of a grain. In the stomach there were appearances of the sulphuret. The prisoner was convicted and executed.*

The following is a French case:—

In August, 1832, a couple named Terrier and their mother, then in good health, experienced severe colic and nausea, followed by violent vomiting, after having eaten of cabbage soup. Several other persons who had partaken of it were similarly affected. The husband died in 48 hours, and his mother 72 days thereafter; while the widow, although her life was saved, continued incurably infirm. The disease present was pronounced to be gastro-enteritis.

One Urbain X. succeeded to their property, and it was shortly ascertained that he was in possession of a large quantity of arsenic. On the 24th of July, 1832, he had called to dine with a brother and sister in law, and chatting about the quality of their new corn expressed a wish to see it. The wife, who was about to bake, had recently put flour in the chest. She showed this flour to Urbain, who took up a handful of it, and in a few seconds threw it back again into the chest, saying it was better than his. On the 26th she made her bread. Her husband and son, herself, and ten other persons ate of it, and all were attacked with a violent colic and frequent vomiting. If they resumed the use of the bread, the accident recurred. When its use was abstained from, it ceased. Bread was then made with other flour proceeding from the same corn and ground at the same time, and this produced no ill effect. Had the female and her son died, Urbain would also have inherited their fortune.

These facts led to a chemical examination of the bread. Two chemists were commissioned, but could find no deleterious substance. It was then committed to Orfila. He cut the bread into small pieces, treated it with distilled water, filtered the liquid, and tested it by concentrated liquid sulphuretted hydrogen. The fluid became instantly yellow, but was not sensibly troubled. A few drops of muri-

* Edinburgh Medical and Surgical Journal, vol. xxix. p. 18; Syme's Justiciary Reports, Appendix, p. 1.

atic acid were now added, to precipitate any sulphuret of arsenic that might form. It was not until *several days had elapsed*, that a yellow precipitate consisting of sulphuret of arsenic and organic matter was deposited.

This precipitate was repeatedly washed with distilled water, then placed on a little filter and washed with very weak ammonia. Thus the sulphuret was dissolved, and the organic matters left. The ammoniacal solution was now evaporated to dryness, and the residuum mixed with a little charcoal and carbonate of potash. Gentle heat was again applied, to drive off any further organic matter that might be present. And finally the watch glass and its contents were pulverized in a mortar, and the powder introduced into a tube, the upper end of which was drawn out in the spirit lamp. As soon as it became of a red heat, metallic arsenic quickly appeared.

This evidence caused the conviction of Urbain.*

Case of Mina and Mrs. Chapman. This is a wretched story of adultery and murder, which occurred in Pennsylvania in 1831. The prisoner became a lodger in the house of Chapman, the deceased, and either seduced his wife, or, what is more probable, was seduced by her. It would seem that there was an unsuccessful attempt to poison Mr. Chapman on the 17th of June, but of this he recovered. On Monday the 20th the arsenic was given to him in soup. He soon complained of burning heat in the stomach, and vomiting and purging appear to have followed; but no physician was called in, and no one saw him until the 21st, when Dr. Knight found him complaining of the above symptoms and thirst. He was deaf, his extremities were cold, and he was delirious at times, although no fever was present, and the pulse was very feeble. Dr. Phillips saw him on the afternoon of the 22d. He was now evidently moribund; the skin was shrunken, the hearing almost gone, and a bloody sanies or serum was passed by stool. He was calm and rather comatose for an hour or two before death, which happened at 5 A. M. of the 23d.

It should be understood that the above physicians rather visited as friends than in their medical capacity, until the last day. Having heard of his illness, they called to inquire how he was.

On the 5th of July, Mrs. Chapman was married to Mina. When this became known, the death of Chapman, which had previously been ascribed to cholera morbus, excited suspicion and inquiry. His body was disinterred on the 21st of September. The face was livid and putrid, but the odour of the corpse was not offensive. The abdomen was of a pale white colour, and Dr. Hopkinson on cutting into it was struck with its firmness and resistance. When the stomach was opened, a very peculiar smell arose, which he compares to pickled

* Annales D'Hygiène, vol. ix. p. 410. Lancet, N. S. vol. xii. p. 298. In another case, where a poisoned *bouilli* had been eaten, and several experimentalists declared that they could find no poisonous ingredient in it, Orfila found it equally refractory with tests, until it had been boiled for a quarter of an hour, to remove the animal matter. The albumen present was thus coagulated, and after filtration the liquor gave an abundant yellow precipitate, with sulphuretted hydrogen (Lancet, N. S. vol. viii. 318.)

herring. This is confirmed by several other medical witnesses.* Externally, the stomach was of a dark colour; internally, its whole surface was covered with a dark-brownish coloured mucus, and when this was removed it presented appearances of general inflammation in every part. The intestines were totally empty, of a pale colour, and apparently rather disposed to dry than to putrefy. The rectum was not examined: the œsophagus at its lower part was highly inflamed.

The stomach and its contents were taken to Dr. J. K. Mitchell of Philadelphia for examination. No gritty particles could be discovered adhering to its coats. The process decided upon was to remove the viscid mucus with which the walls of the stomach were lined, and subject that to one mode of analysis, and then the solid stomach and intestines to another.

Distilled water was added to the mucus, and the whole boiled in a Florence flask for a considerable time. The fluid was then thrown on a filter. The matter left on it (a dark brown substance) with the filter itself was thrown into nitric acid, in which the stomach and duodenum were undergoing solution. The filtered liquor was transparent, and of a faint amber yellow colour. Portions of it were subjected to the liquid tests. The copper one gave an *undecided grass green* — nitrate of silver, a brownish yellow flocculent precipitate, which grew darker and soon lost its yellowness — sulphuretted hydrogen gas deepened the yellow tint of the solution just perceptibly. The whole of the liquid was then subjected to the last test; thrown into a capsule, heated until it became distinctly yellow and its transparency was gone. The whole was then left on a filter for several hours. When again examined, a transparent liquid was seen below the filter, and on it a yellow substance which could not be separated from it, being in too small a quantity and the paper not being smooth. From the quantity being so minute, no hope was entertained of obtaining any marked result, and the whole (filter and all) was thrown in the vessel in which the stomach was dissolved. This solution was evaporated to dryness, heated again with nitric acid and evaporated, until it was supposed that the animal matter was destroyed. Water was added to the residue, and heat to boiling again applied. To the product obtained by filtration and evaporation lime water was added, and this again evaporated. A portion of this was mixed with charcoal, placed in a glass tube and subjected to the heat of a spirit lamp. The tube became covered at some distance from the material with a black and glistening substance, but at this instant the tube cracked from the action of heat. Mr. Clemson, a highly educated chemist, instantly detected the odour of arsenic. The other portions were treated in a similar manner, but nothing beyond the black matter just described could be obtained. "There was no evidence to the eye," says Dr. Mitchell, "that there was any arsenic there."

For the defence, the insufficiency of the testimony, as to symptoms,

* Dr. Mitchell subsequently obtained a stomach and put into it a small quantity of Fowler's solution (arsenic of potash). It remained in his laboratory some two or three months, and then had, as he thinks, precisely the same smell.

morbid appearances and chemical proofs, was greatly dwelt upon. The medical witnesses mentioned the sources of fallacy in each. One of them stated, that from the best of his impressions, "from the symptoms, post mortem examination, and chemical tests, William Chapman did not die of arsenic."

Mina was convicted, and Mrs. Chapman found not guilty.*

* Trials of Lucretia Chapman and Lino A. E. Y. Mina, for the murder of William Chapman; prepared for publication by William E. Du Bois, student at law. 8vo. Philadelphia, 1832.

I may also refer to the following cases, which my limits do not permit me to analyze.

Case of Nairn and Ogilvie, for poisoning the husband of one, and the brother of the other — tried at Edinburgh in 1765. The symptoms resembled those from taking arsenic; but the body was not examined, in consequence of the advanced state of putrefaction. The accused were convicted. (Hargrave's State Trials, vol. x. p. 479.)

Case of Miss Burns. I have noticed this in the previous volume (p. 219.), as to the proofs of pregnancy. Mr. Angus was also indicted for poisoning her. The symptoms were equivocal, but suspicious; and on dissection, a perforation of the coats of the stomach was found. Around this opening, the parts were extremely soft, pulpy, and tender; but there were no traces of inflammation. No poison could be detected in the fluids. With our increased knowledge on the subject of diseases of the stomach, it becomes at least possible that the morbid appearance in question may have been the result of ordinary illness. (Edinburgh Medical and Surgical Journal, vol. v. p. 220. Rutter's Vindication.)

Trial of John Lovie, for poisoning a female. (Edinburgh Medical and Surgical Journal, vol. xxix. p. 415. Syme's Justiciary Reports, Appendix, p. 24.)

Case of Eliza Fenning. This is remarkable for the evidence derived from symptoms — a whole family having been taken ill shortly after eating the poisoned dumplings; for the imperfect chemical examination and testimony; and for the conviction of, as I suppose, an innocent person. See Dr. Watkins's pamphlet on this case, London, 1815; Marshall's Remarks on Arsenic, London, 1817; Gordon Smith on Medical Evidence, p. 207; and Hints on the Examination of Medical Witnesses, p. 136.

Trial of Mary Higgins and Edward Clarke, for the murder of the uncle of the former — related by Prof. Amos. (London Medical Gazette, vol. ix. p. 896.)

Trial of the Widow Boursier and Nicholas Kostolo, for poisoning Boursier. Notwithstanding the positive discovery of arsenic in the stomach of the deceased a month after burial, the female was acquitted. (Causes Célèbres du XIX. Siècle, vol. iii. p. 105. Edinburgh Medical and Surgical Journal, vol. xxi. p. 238.)

Case of the Widow Laurent, accused of poisoning her husband. (Anderson's Journal, vol. ii. p. 306. Medico-Chirurgical Review, vol. vii. p. 289.)

A case by Ristelhueber, p. 161.

A case quoted in the Quarterly Journal of Foreign Medicine and Surgery, vol. ii. p. 103., from Rust's Magazine. Here the chemical examiners being dissatisfied with the equivocal results obtained from testing the fluid contents of the stomach, took that viscus and boiled it down. The liquid procured, after removing organic mixtures, yielded metallic arsenic.

In this country —

Case of Kesler, tried in this State in 1817, for the murder of his wife. I omit this, not because I have changed my opinion concerning it, or entertain any doubts that he poisoned her, but because its notice would occupy too disproportionate a space. As to the defects in the medical testimony, they at least have been sufficiently arraigned.

Case of Williams, convicted of the murder of his wife in November 1830, in Pennsylvania. She died five hours after taking a white powder, represented by him to be magnesia. Thirst, burning at the stomach, sickness, and bloody vomiting were pre-

Discovery of arsenic seven years after death. The following case is highly interesting, from proving the possibility of the discovery of

sent. She was disinterred twenty-four hours after burial. The inner coat of the stomach was extensively inflamed, and white particles were found adhering to it, particularly at that part where the inflammation was greatest. The contents of the stomach were tested with the silver and copper tests, but neither of them presented the appearances indicative of arsenic. The remaining contents were then evaporated, covered with nitric acid, and again evaporated. The residuum was mingled with charcoal, placed in a glass tube, and sublimed : metallic arsenic was readily obtained. The prisoner was convicted. The case is communicated by Dr. Worthington, North American Medical and Surgical Journal, vol. ii. p. 229.

Case of B. Becker, for murdering his wife in Montgomery county (New-York), in 1814. Here arsenic was found in the coats of the stomach, and its presence proved by the liquid tests, the copper plates, and the garlic smell. Before execution, he confessed his guilt.

Case of A. Hitchcock, for poisoning his wife. He was tried in Madison county in this State, in 1807. The mucous coat of the stomach was denuded in several places. Here also particles were obtained from the stomach, and the usual tests applied. "Some of the powder was put on a copper plate, suspended over a lamp, and above this another copper plate was held. In a short time the white fumes ascended, and hung on the upper plate in the form of white arsenic." One of the medical witnesses for the prisoner urged in his favour, that no sphacelation was discovered. We now know that this is very uncommon. This prisoner was also convicted, and confessed his guilt.

Case of Medad Mc Kay, tried twice in Allegany county (N. Y.), 1820 and 1821, for poisoning his wife. The prisoner escaped, through the imperfection of the chemical examination. This trial has been reported and published by Mr. Gould, Albany, 1821.

Case of Sager, tried in the State of Maine, October 1834, for poisoning his wife. Here extreme distress was *immediately* experienced after taking the poison. It was added to wine in which an egg had been stirred. Nausea, retching, and vomiting succeeded, with violent spasms, great distress of the stomach, feeble pulse, and cold sweats. The vomiting was stained with blood towards the last. She preserved her reason till near her death, which happened in a few hours. On dissection, livid patches were found in the stomach, as if blood was collected between the coats ; the remainder of that viscus, and the intestines, were of a high florid colour. In some tea and milk which had been prepared for breakfast, arsenic in large quantities was discovered by the three liquid tests, and by reduction. The silver and copper tests would not act on the contents of the stomach, or the matter vomited ; but Professor Cleaveland, who was the principal chemical witness, found sulphuretted hydrogen to produce its usual result on them. The counsel for the prisoner, in his able defence, urged that there was no swelling of the body, no paralysis, no drowsiness, no trembling of the limbs, and no loss of reason present in this case. If the distinctions under the head of symptoms be adverted to, a ready explanation may be given for their absence. The prisoner was convicted.

The following may be added, as worthy of a careful perusal : —

Analysis of soup containing arsenic, from which a female died at Baltimore, by Dr. Rogers, and Messrs. Andrews and Fisher. After being filtered and evaporated to dryness, it was sublimed with black flux, and gave metallic arsenic. The round of liquid tests was then applied, with corresponding results. It was also reduced with boracic acid and charcoal, as advised by Rose, and a ring of specular metallic crystals was produced. A galvanic circle, as proposed by Fischer, was tried, and the copper rod was found coated with a silvery white deposit. No indications of arsenic could, however, be obtained from boiling the coats of the stomach. (Philadelphia Journal of Pharmacy, vol. vi. p. 94.)

Analysis of bread in which arsenic had been placed by mistake, and which caused the death of two persons in Maryland, by Messrs. Tyson and Fisher. It was treated with nitric acid in excess, and a few drops of muriatic acid, and evaporated, in order to

arsenic many years after death:—An individual who died in 1822 was disinterred in 1829, at Bourg, in France. The body was entire; the the head, trunk, and shoulders had preserved their form and position; but the internal organs of the chest and abdomen were destroyed, and there only remained a mass of soft brownish matter, which was deposited along the sides of the spine. Messrs. Ozanam and Idt were under these circumstances appointed to examine the case.

A part of this matter was boiled in repeated portions of distilled water, till the water ceased to carry away with it any impregnation. The solutions thus obtained were subjected to two series of tests. 1. One portion was evaporated to dryness, and the extract redissolved. This solution was repeatedly evaporated, and then deflagrated with nitre. The saline residue being dissolved, filtered, and boiled with nitric acid, and saturated with pure potash, was now operated on with the tests of arsenic. Hydrosulphate of ammonia and the silver test gave their precipitates, and a portion of this last was sublimed by heat in a tube. On passing a stream of oxygen over these crystals, and dissolving them in distilled water, the usual tests of white arsenic were found to apply. 2. Another portion was treated with sulphuretted hydrogen and a little muriatic acid, and the precipitate was reduced in a tube with charcoal and potash. A brilliant encrustation was procured, which, when treated as in the former instance, became a solution of oxide of arsenic.*

There is one question that remains for consideration, and I have delayed its notice until now, that the reader may consider it in connection with the cases that have been given. It is, *Whether we are authorized in declaring a person to be poisoned with arsenic from the symptoms merely?* In the previous edition, I considered this at some length, and inclined to the affirmative, and I am happy to say that so distinguished a medical jurist as Dr. Christison has advanced similar sentiments.

There is in most of the cases of poisoning by arsenic, if they be at all protracted, so remarkable a union of symptoms that they can hardly be confounded with natural disease. The marks of irritation extending from the throat to the rectum, the difficulty in swallowing, the pain of the bladder in passing water, the affection of the genitals, the vomiting and bloody diarrhœa, the extreme weakness—all these combined, as they often are, with nervous symptoms, present a combination that is certainly extremely unusual in ordinary practice. In connection with this, the fact that a person is attacked soon after eating a meal or taking some drink, and particularly so if a number of individuals be simultaneously affected, offers additional weight to the suspicion.

A family residing in the parish of Keig, in Scotland, and consisting

drive off organic matters. The residuum was treated with boiling water, and filtered. It gave indications of arsenic, with lime water, the copper test, and sulphuretted hydrogen. The sulphuret was then reduced in glass tubes. (Philadelphia Journal of Pharmacy, vol. vii. p. 107.)

* Edinburgh Medical and Surgical Journal, vol. xxxiii. p. 453; Orfila's Exhumations Juridiques, vol. ii. p. 330. See also p. 686.

of two brothers and two sisters, were taken ill on the morning of the 19th of August 1821, shortly after eating breakfast. They were all previously in good health; and the dish of which they ate was porridge, consisting of milk, salt, and meal. William Mitchell, one of the brothers, partook largely; but James, who perceived a sickening taste, took less than common, while the sisters had their usual quantity. They were all seized with vomiting, burning heat in the stomach, weakness, and fainting, which continued for a considerable length of time, and William finally sunk after seven days. The others gradually recovered, but great debility remained for some months. On dissection, the stomach and intestines presented unequivocal marks of inflammation.*

No part of the salt and milk used that morning was to be found; but the remainder of the meal, and also the contents of William Mitchell's stomach and duodenum, were examined by several physicians and surgeons. No poisonous ingredient, however, could be detected.

In this instance, a family in good health was simultaneously attacked with symptoms that indicated a *common cause*, and there was no epidemic prevalent that would account for them. So violent, too, did the cause in question prove, that the individual who had partaken most largely sunk under its effects. Under these circumstances, the brother-in-law of the deceased was tried, and the medical witnesses did not hesitate to give it as their opinion that poison had been administered to his relatives. He afterwards confessed his guilt, and stated that he had perpetrated the crime by means of arsenic put among the salt, on the morning when the Mitchells were taken ill.

It is not probable that this question will arise so frequently as it has formerly. The improved modes of detection, searching for the poison in the tissues of the stomach, will undoubtedly diminish the number of cases in which, notwithstanding the positive nature of other testimony, no poison could be detected by the best chemists. If a medical witness ever finds it necessary to give such an opinion, it should be founded on a strong combination of circumstances, a marked peculiarity of symptoms, and a striking disorganization of parts.†

TREATMENT. — It will not comport with the object of this work to enlarge much on the present topic; but it is, notwithstanding, proper briefly to notice the most approved mode of obviating the effects of the poison.

As to ANTIDOTES, the *sulphuret of potash* once had a high reputation, but we have already shown that this is itself a poison. Renault tested its efficacy on animals, and found that they died even sooner when this pretended antidote was administered, than when they had taken the arsenious acid solely.‡ *Sulphuretted hydrogen* was rather

* Cases of poisoning by Mr. Murray, Edinburgh Medical and Surgical Journal, vol. xviii. p. 167.

† For Dr. Christison's views, see Edinburgh Medico-Chirurgical Transactions, vol. ii. p. 308. Toxicology, 2d edition, p. 295. It is proper to add that most medical jurists deem it unsafe to rely on symptoms alone.

‡ Edinburgh Medical and Surgical Journal, vol. vii. p. 90. Orfila's Toxicology, vol. i. p. 141.

more successful, but only when the poison was taken in a fluid, and not in a solid form. *Sulphur* has been suggested, on the principle of its uniting with the arsenic, but even this has little effect. *Charcoal* has been recommended, in consequence of the experiments of Bertrand, and it would seem to have attained a partial celebrity. The results obtained by Orfila are, however, destructive to its character, and I should consider it very hazardous to depend on this substance.*

Of late, a great deal has been said in favour of the *hydrated oxide of iron*. This substance is prepared by taking a pure solution of the subsulphate of iron, increasing its dose of oxygen by heating it with nitric acid, and then pouring into the solution an excess of caustic ammonia. The hydro-oxide is now obtained by decantation.

Arsenious acid will unite with oxide of iron, and form an insoluble salt, the arsenite of iron, which has little or no effect on the animal economy. In this respect, then, the character required for an antidote is attained. "Every supposed chemical antidote will prove useless which does not render the arsenic insoluble, not only in water, but likewise in the contents and secretions of the stomach." † This has been the objection, as well as the cause of the failure of all that have been previously recommended; for the arsenites, though insoluble in water, are all so soluble in the juices of the stomach as to allow of the introduction of a sufficient quantity of the poison into the blood to prove fatal.

Drs. Bunson and Berthold, two physicians of Gottingen, being aware of the above results, and also that ten or twelve parts of the oxide of iron were sufficient to neutralise a single part of arsenic, proceeded to ascertain the virtue of this substance on animals. A sufficient quantity of arsenic (to the amount of three grains in solution) was given to rabbits and dogs, and the hydrated iron immediately thereafter. No inconvenience appeared to follow; but when only enough of the oxide to neutralise half of the arsenic was given, the animal was soon seized with symptoms of poisoning and died. They hence advise that in all cases where the quantity of poison taken is unknown, the antidote should be exhibited in large and repeated doses, and its efficacy may be aided by the addition of a few drops of ammonia. ‡

Orfila repeated these experiments on animals with *arsenic acid* and *arsenic*, and generally the results were favourable. If, however, the administration of the antidote was delayed beyond half an hour, all the symptoms of poisoning succeeded, and death was the termination. In addition to these, it is stated that Lassaigne and Bonlay have each proved the efficacy of the antidote in cases of poisoning

* Orfila's Toxicology, vol. i. p. 500; vol. ii. p. 470. Dr. Chisholm says that the juice of the sugar cane is an antidote, and states that it has been tried on animals in the West Indies with complete success. (Brande's Journal, vol. x. p. 193; Edinburgh Medical and Surgical Journal, vol. iv. p. 416.)

† Christison, p. 320.

‡ Lancet, N. S. vol. xv. p. 126. London and Edinburgh Philosophical Magazine, vol. vi. p. 237. There is an inaccuracy somewhere as to the poison used by the German experimenters. In the work last quoted, the *arsenious* acid is mentioned, while in the Lancet it is the *arsenic*.

with arsenious acid. But they add, that it has no power when arseniate of potash has been given. This, indeed, could not be expected, since potash has a greater affinity for the arsenious acid than iron. *

On the other hand, Messrs. Brett and Orton, both surgeons in London, have found that the supposed antidote did not preserve life in the animals on which they operated. Mr. Brett gave two grains of arsenious acid to a rabbit, and in three or four minutes thereafter eight or ten grains of the hydrated oxide. It died in less than three hours, but did not appear to suffer pain; and the stomach was not inflamed, although mucus was present on its lining membrane. In Mr. Orton's experiments, the vascularity of the stomach was more marked. Mr. Brett also found that the hydrated oxide would not neutralize arsenious acid in solution.†

From these facts, the reader may form an estimate of the value of this substance. There is probably sufficient testimony to warrant its use in cases of poisoning, but I fear that its action will not prove sufficiently powerful.

Aside from this, our indications are, 1. To remove the poison; and 2. To prevent its injurious consequences on the stomach, and system generally.

The first is attempted by means of an emetic, as the sulphate of zinc; but if vomiting be present, we may aid it by diluents in small quantities. ‡ Tartrite of antimony should never be given.

But when vomiting does not take place immediately from the means just directed, the urgency of the case warrants us in using more direct remedies. Renault recommends that the stomach be washed and emptied mechanically, by means of a large tube of elastic gum and a syringe. In this way, a certain quantity of liquid may be thrown in, to dilute or suspend the poison, and by the action of syringe the whole may be again withdrawn. § The *stomach pump* has in this way proved a useful assistant in some cases, but it is probably most valuable in instances of poisoning with opium. ||

* Lancet, N. S. vol. xv. p. 157. 516.

A case is also given by M. Leger, of a child poisoned by a solution of fly powder, to whom the hydrate of the tritoxide of iron was administered with immediate and permanent relief. (London Medical and Surgical Journal, vol. vi. p. 572. 602. American Journal of Medical Sciences, vol. xvi. p. 518.)

† Mr. Brett in London Medical Gazette, vol. xv. p. 220. Mr. Orton in Lancet, N. S. vol. xv. p. 232.

‡ In a case related by Mr. Kerr (Edinburgh Medical and Surgical Journal, vol. xxxvi. p. 94.), where a large quantity of solid arsenic had been taken, and vomiting did not occur for an hour afterwards, he continued the exhibition of sulphate of zinc and ipecacuanha, to the amount of 175 grains of the one, and 230 of the other, all in the space of three hours. Copious vomiting ensued, and the patient recovered. Mr. Kerr particularly cautions against the too free use of diluents. Strong and complete contractions (he observes) of the stomach are required to throw off the poison, and these cannot take place if that viscus be distended with liquids.

§ Edinburgh Medical and Surgical Journal, vol. vii. p. 91.

|| Renault, and even Boerhaave, have proposed its use; so that the contest of late years about the priority of its invention, is evidently futile. Dr. Physick of Philadelphia published a paper in 1812, in which he mentions that he *successfully* applied the

2. In several instances the free use of magnesia has proved of service. Mr. Joseph Hume was, I believe, the first who administered this article. Copious vomitings had already occurred, and retchings and pain continued. Under these circumstances, he gave carbonate of magnesia very freely with tincture of opium, suspended in water. In five days the patient was well. *

Inflammation of the stomach is not an uncommon secondary consequence in those who survive, and Dr. Yelloly first suggested that it should be treated accordingly. In Dr. Roget's case it succeeded perfectly; and several instances have since occurred, in which venesection, blisters, &c. were used with the happiest results.† Opium, after free depletion, is also useful.

Medical police. It is certainly a duty that legislators owe to their constituents, and sovereigns to their subjects, to restrict the sale of this dangerous article; and I am happy to add, that in several countries proper regulations exist. In France and Prussia, the sale of arsenic is strictly guarded.‡ In the state of New-York, the following is now in force: — All apothecaries, druggists, or other persons selling arsenic, corrosive sublimate, prussic acid, or any other substance or liquid usually denominated poisonous, shall have a printed or written label, with the word "Poison" on the phial, box, or parcel containing the same; and in case they sell tartar emetic, its name shall be attached in the same manner. The breach of this is declared a misdemeanor, and punishable by a fine not exceeding one hundred dollars.§ But although the danger of accidental poisoning is thus diminished, there is not a sufficient check on its criminal employment. Why should all and every one be allowed to purchase this virulent substance?

The *black oxide of arsenic* deserves attention, since it is the basis of the *fly powder*, which is much used in France and Germany to destroy animals, and hence may often be the cause of accidental poisoning. It is commonly deemed to be a mixture of metallic arsenic and the white oxide. Renault, in his experiments on dogs, found it quickly mortal; and when it had acted sufficiently, it produced in the stomach an exudation of blood, and infiltration of the same between the coats of that viscus, without any trace of erosion.‖ Jaeger witnessed the death of

syringe to a child poisoned with laudanum, and Dr. Dorsey afterwards cured two individuals by the same treatment. This distinguished surgeon, however, subsequently states that Dr. Alexander Munro, jun., first suggested the invention in 1797, although he (Dr. Physick) was ignorant of this fact when he applied it practically. I conceive Dr. Physick is entitled to the *honour of having been the first who saved life by its means.* See Eclectic Repertory, vol. iii. p. 111. and 381; and American Medical Recorder, vol. vi. p. 294.

* London Medical and Physical Journal, vol. xlvi. p. 466. Mr. Edwards, ibid., vol. xlix. p. 117., and Mr. Buchanan in London Medical Repository, vol. xix. p. 288., have published similar cases. In both, however, copious vomitings had already occurred, and in the former venesection was required to complete the cure.

† McLeod in Edinburgh Medical and Surgical Journal, vol. xv. p. 553. Davies in London Medical and Physical Journal, vol. xxviii.

‡ Edinburgh Medical and Surgical Journal, vol. ix. p. 351; vol. xiii. p. 143.

§ Revised Statutes, vol. ii. p. 694.

‖ Edinburgh Medical and Surgical Journal, vol. vii. p. 90.

a girl, aged sixteen, who was poisoned by drinking water that had stood on it. She made no complaint of pain, and retained her senses to the last, asking for every thing she wanted. Nine hours after death, the skin exhibited no change, except its paleness and a few blue spots on it. On dissection, a slight spotted redness was found about the cardia; the bottom of the stomach was discoloured, and there was a small brown spot where the villous coat seemed as if superficially burnt.* In several cases quoted by Orfila, the stomach was inflamed, and red spots with extravasated blood were present.†

In a case that occurred to Dr. Wagner, a child drank some from a cup, and death ensued in twelve hours; yet the most careful analysis of the intestinal canal and its contents did not detect any vestige of it. This is ascribed to the previous vomiting, and the small quantity taken.‡

From the nature of this substance, it is evident that it may be detected by the application of heat. This will sublime the white oxide and form the bright metallic crust. By solution in water also, and the application of tests, the characteristic proofs of the oxide will be exhibited.

Arsenites. Two of these are in use, and may become the cause of poisoning; the *arsenite of copper* (Scheele's green, mineral green); and the *arsenite of potash* (Fowler's solution). The former is used as a paint, and is sold in cakes.§ The latter is employed as a medicine, and sometimes called the tasteless ague drop.‖ Both of them may be detected by the addition of acetic acid, and then heating the mixture. Sulphuretted hydrogen is then transmitted through it, and in the one case the sulphuret of copper is separated from the sulphuret of arsenic by the addition of ammonia. The reduction of the sulphuret is then to be effected as already directed.

Arsenic acid is to be considered as a more violent and rapid poison than even arsenious acid. This was abundantly proved by the experiments of Brodie, Jaeger, and Campbell. Its action is, however, similar.

There are two cases on record, according to Dr. Christison, of poisoning with *arseniate of potash.* This substance is very soluble in water, and is reduced to the metallic state with charcoal in a tube, on the application, however, of a higher heat than is required for arsenious acid. When in solution, nitrate of silver throws down a *brick red* precipitate; sulphate of copper, a pale bluish white one; while sulphuretted hydrogen, preceded by acidulation with muriatic acid, and transmitted for some time, gives the yellow sulphuret. It will at

* Edinburgh Medical and Surgical Journal, vol. vii. p. 80.

† Orfila's Toxicology, vol. i. p. 160.

‡ London Medical Quarterly Review, vol. ii. p. 488.

§ The mineral green commonly sold in shops is not an arsenite, according to Dr. Christison. By analysis, he ascertained it to be a mixture of the hydrate of copper and carbonate of lime; p. 258.

‖ When given in too large doses as a remedy, disastrous consequences may follow. Dr. Astbury (Edinburgh Medical and Surgical Journal, vol. xv. p. 415.) relates a case of this description. Vomiting is an early symptom.

first, according to Orfila, produce only a whitish and slightly yellow precipitate.

Sulphurets of arsenic. The native sulphurets (Orpiment and Realgar) were administered by Hoffman and Renault, to dogs and other animals, without occasioning the slightest derangement. Smith and Orfila have, however, found them poisonous. The latter applied these substances to the cellular tissue of dogs, and also introduced them into the stomach; and in each case, when doses of 50 to 120 grains were used, the animals died in between 40 and 60 hours. On dissection, marks of inflammation and ulceration were seen on the mucous membrane of the stomach, and the interior of the ventricles of the heart presented several red spots.*

Artificial orpiment is, however, more actively poisonous, and for the reason that it is a mixture of sulphuret of arsenic and arsenious acid.† The paint called *king's yellow* is also decidedly noxious. This is an impure sulphuret, consisting, according to an analysis of Dr. Christison, of the sulphuret, caustic lime, and free sulphur.‡

Although the native sulphurets are evidently less poisonous than the artificial, yet Decourdemanche has indicated another cause why the former are also more active under certain circumstances. When boiled with water, it decomposes them, sulphuretted hydrogen is evolved, and the white oxide of arsenic remains in solution. This change will even take place in the cold, though more slowly; and it is much accelerated by the presence of animal or vegetable principles in the water.§

There are some interesting cases of poisoning with the sulphuret which may be here stated.

A lady aged sixty, and named Mrs. Smith, the owner of some property, went to lodge with Mrs. Burdock in Bristol (England). She shortly became unwell, from a cold, and some gruel was given to her by her landlady. In half an hour she was taken very ill; vomiting, purging, and violent pain ensued, and she spat thick blood in the pot. No medical assistance was summoned, and she died in about an hour, and was privately interred.

Her relations, who had not been apprised of her decease, presently became aware of it. Suspicions were excited; and at the end of fourteen months after her burial, in December, 1834, a warrant was issued for the disinterment and examination of the body. There was some water in the coffin, but the dress was tolerably firm. The face of the corpse was shrunken, and of a dingy yellow colour; the nose depressed and the orbits sunk. The abdomen was considerably flattened, but the thorax maintained its usual convexity. The integuments of these were found converted into adipocire. On opening the abdomen, the alimentary canal was found in a remarkable state of preservation. The intestines contained neither fluid nor gas; and some of its convolutions were matted together. The diaphragm was firm; the lungs

* Lancet, vol. x. p. 276., from the Journal De Chimie, 1826.
† Guibourt, Edinburgh New Philosophical Journal, vol. i. p. 319.
‡ Christison, p. 262.
§ Edinburgh Medical and Surgical Journal, vol. xxviii. p. 228.

and heart shrunk in size, of a dark blue colour; and the latter contained some dark-coloured fluid, which was evidently decomposed blood.

On separating the duodenum from the small intestines, its mucous membrane was observed to be covered with a large quantity of a viscid yellow substance. This was carefully removed. The mucous membrane of the mouth and gullet was decomposed; the stomach and intestines, however, were firm, and appeared as little affected as "if the person had been dead only a few days, in cold weather." Their lining membrane was smeared with a large quantity of an unctuous yellow substance, which was readily scraped off, and it was seen to be more firm in the parts where the yellow matter was in contact. The large intestines bore the marks of inflammation, being more or less red in various points. The soft parts of the brain were decomposed.

Mr. Herepath, lecturer on chemistry at the Bristol Medical School, took a portion of the matter found in the stomach, applied heat to drive off moisture, and then mixed it with a little carbonate of soda and charcoal, and introduced the whole into a glass tube. On applying heat, metallic arsenic was condensed. The part of the tube that contained the metallic crust was then cut off, heat was freely applied, and it being now in contact with the atmosphere arsenious acid was produced. A portion of this was now dissolved in a small quantity of water, and the solution divided into three parts. To these, the ammoniated nitrate of silver, the ammoniated sulphate of copper, and sulphuretted hydrogen were respectively added, and they each gave their characteristic results.

It is probable that nearly a drachm of the sulphuret was present in the alimentary canal of the deceased. When we recollect that some was evacuated by vomiting, and also that the accused had given some to Mrs. Smith on the day previous to her death, certainly a sufficient quantity to produce the result was accounted for.

This anatomical and chemical examination (and which cannot be too highly commended, and confers the highest credit on Mr. Herepath and Drs. Riley and Symonds), led to the apprehension, trial, conviction, and execution of Mrs. Burdock. It appears that she endeavoured to purchase arsenic of a druggist; but not having any on hand, she obtained the sulphuret from him.*

On the 30th of June, 1829, Dr. Lepelletier was directed to disinter and examine the bodies of M. Fortier and his daughter, the former nine and the latter three months after interment, from a suspicion that they had been poisoned. The body of the daughter, aged forty years, was in a state of complete putrefaction, except that the abdominal viscera were scarcely affected by it. The peritoneum was sound, and the mucous membrane of the digestive canal from the œsophagus to the rectum was untouched by decay; but it was covered with bright red spots, and in these a yellow matter was

* London Medical Gazette, vol. xv. p. 516; vol. xvi. p. 87. 121. 231.
Medico-Chirurgical Review, vol. xxvi. p. 463.
London Medical Quarterly Review, vol. iv. p. 390.
London Medical and Surgical Journal, vol. vi. p. 760.

found. The œsophagus contained about two spoonfuls of a dark fluid, similar to venous blood, and also some of the same yellow substance, while in the stomach was a yellow liquid. In several places false membranes were found, and readily detached from the lining coat.

In the body of the father, although putrefaction was still farther advanced, yet the abdominal viscera were also sound, and the same marks of inflammation were seen, while several ounces of a thick yellowish fluid were found.

In both these instances, a few experiments served to show that the yellow substance was sulphuret of arsenic.*

Dr. Christison advises, that when sulphuret of arsenic is contained in organic mixtures, it may be removed by adding caustic ammonia. This dissolves it; and the solution, on being acidulated with muriatic acid, will deposit the sulphuret sufficiently pure for undergoing the process of reduction.

Arseniuretted hydrogen gas. This substance has proved fatal to a distinguished chemist, the late Mr. Gehlen, of Munich. He was distilling a mixture of arsenic in powder and caustic potash, in order to observe the action of the latter on the former. Finding that the combination was taking place very slowly, he applied his nostrils several times to the flask which contained the mixture, in order to ascertain by the odour the state of the mixture. About an hour afterwards, he was seized with uninterrupted vomiting, rigor, and excessive prostration of strength; these symptoms continued for nine days, when he died, although every effort was made for his relief.†

It has been suggested that this gas, on being inspired, is decomposed in the lungs, the hydrogen uniting with the carbonic acid, while the arsenic is deposited in the bronchiæ.‡

Arsenic, in its metallic state, oxidizes so readily, that it would be extremely hazardous to pronounce it innoxious. Renalt has, however, given two drachmes of mispickel (an alloy of arsenic and iron) to animals, without any injurious effects. This fact gives us the assurance that the arsenic which is sometimes contained in tin need not be feared, as it is in the metallic state.§

* Orfila, Exhumations Juridiques, vol. ii. p. 317. Suspected cases of poisoning by sulphuret of arsenic, but in which none could be found, are given in Annales d'Hygiène, vol. ii. p. 405; vol. iii. p. 381.

† Male, p. 176.

‡ London Medical Repository, vol. iv. p. 331. Brande's Journal, vol. iii. p. 208.

§ Edinburgh Medical and Surgical Journal, vol. vii. p. 90. There are two curious cases, which it may be somewhat difficult to arrange, but which I may mention in a note. One occurred in France, and its history was communicated to the Academy of Medicine. A manufacturer of the blue pigment used in painting china was engaged with his servant in boiling a mixture of nitric acid, cobalt, and arsenic. On a sudden the matrass burst, and the room was filled with the fumes. The servant escaped, but the master was knocked down, and lay insensible for some time. He died after eight days' intense suffering, his body having become enormously swollen. The servant was attacked with similar swelling of the abdomen, but was relieved by purgatives and the warm bath. (Medico-Chirurgical Review, vol. xxiii. p. 504.) The other is mentioned by Dr. Elliotson. A whole family were seized with nausea and vomiting, and all had watery eyes. Their pulses were rapid, and indeed there

MERCURY.

The most important compound of this metal, in its relation to legal medicine, is

Corrosive sublimate. Like arsenic, this substance is poisonous, whether internally or externally applied, but a larger quantity is required to produce deleterious effects.

Internally, (a.) *Its exhibition by the mouth.* If corrosive sublimate be exhibited in considerable doses, and especially if its use is too long continued, it causes colic and vomiting. These are succeeded by affections of the salivary glands, ptyalism, swelling of the tongue and gums, destruction of the teeth, and swelling of the face and head. Cardialgia, diarrhœa, dysentery, phthisis pulmonalis, tremors of the limbs, paralysis, or even death, have been the consequences of persisting in such a course for an improper space of time.*

Dreadful as this catalogue of ills may appear, it is usually aggravated when we are called to view a patient *poisoned* by this mineral. The dose is then larger, and the effects are more immediate. We may state the *ordinary* symptoms in such cases to be the following:— "An acrid, astringent, metallic taste in the mouth; a sensation of stricture and burning heat in the throat; anxiety, and rending pains in the stomach and in the whole of the intestinal canal; nausea; frequent vomiting of a fluid, which is sometimes bloody and accompanied with violent efforts; diarrhœa, sometimes dysentery; pulse small, tight, and frequent; faintness, general debility, difficulty of breathing, cold sweats, cramps in all the limbs, general insensibility, convulsions, and death."†

As discriminative of the effects of this substance from those of arsenic, Dr. Christison observes, that its symptoms begin much sooner, the irritation in the throat and stomach sometimes, indeed, commencing during the very act of swallowing, or the first five minutes; that its taste is more unequivocal and strong; that the sense of acridity along the throat and in the stomach is much more severe, and that the countenance is usually flushed and swollen.

In addition to these, it has been noticed by some observers that there is a great diminution in the secretion of urine. Dr. Henry, of Manchester, in a case where death followed in four days, remarked that no urine was voided after the third day; and on introducing the catheter, the bladder was found empty.‡ In the cases related by Mr. Valentine, where a mother poisoned herself and four children,

was a general inflammatory state of the system in all. As none of the neighbours were similarly affected, he suspected from the symptoms that arsenic might be the cause, and on inquiry found that the persons who had previously occupied the premises were mixers of colours, and had deposited, before leaving, in the kitchen and garden, large quantities of arsenite of copper. The situation of the house was damp, and it was the opinion of a chemist that the contact of water decomposed the arsenite and produced arseniuretted hydrogen. (Lancet, N. S., vol. x. p. 133.)

* Orfila's Toxicology, vol. i. p. 47.

† Ibid. vol. i. p. 60.

‡ Edinburgh Medical and Surgical Journal, vol. vii. p. 151.

the same observation was made. One child died in twelve hours after taking the poison, and during this period no urine was secreted; another in twenty-four hours, and voided a very small quantity. The third died in thirty-one hours, and secreted none; while the mother, who lived seventy hours, only passed a very little.*

It must also be remarked, that the pain and stricture in the pharynx and œsophagus are sometimes so severe as to cause the greatest distress in swallowing even the mildest fluids; and in one instance, they were so excessive as for some hours to destroy the power of speech.† Bloody vomiting is not uncommon, and coagulable lymph has been found in the matter purged, mixed with clots of blood.‡ In fatal cases the pain at the scrobiculus cordis continues without intermission, and in those who recover it is among the last symptoms that disappear. In Dr. Henry's patient, a complete paralysis of the upper and lower extremities occurred a few hours before death.

According to Dr. Christison, the ordinary duration of fatal cases is from twenty-four to thirty-six hours. There are but a few where life has been prolonged beyond this. The most protracted, with the ordinary symptoms of irritation, is that related by Dr. Venables. A female took this poison to procure abortion. She was seized with vomiting and purging, tenesmus, a muco-sanguineous discharge from the bowels, and total suppression of urine, while blood was contained in the matter vomited. Still there was no fœtor or salivation. She died on the eighth day.§

* Edinburgh Medical and Surgical Journal, vol. xiv. p. 468. The only one (a child) that recovered, in consequence of having taken a small quantity, voided no urine in three days. Dr. Christison, p. 359, adduces several parallel instances.

† Case by Mr. Anderson, Edinburgh Medical and Surgical Journal, vol. xiv. p. 474. On the contrary, a case is related by Mr. Saunders, where the patient lived nine days, and during that period experienced little pain, and only felt some soreness after the sixth day. Hiccup was present during part of his illness. (London Medical Repository, vol. ii. p. 458.)

‡ Valentine *ut antea*. In two of these cases, coma and insensibility of the pupils were present for some time before death.

§ London Medical Gazette, vol. viii. p. 616. I have noticed the following cases, in addition to those already quoted:—

Houlston on Poisons, p. 81. An adult took six drachms in solution. Recovered.

Coxe's Medical Museum, vol. ii. p. 180. Case by Dr. Budd. A female took an ounce; she had the usual severe symptoms, but recovered.

American Journal of Medical Sciences, vol. vi. p. 540. Case by Dr. Hort. Recovered.

Edinburgh Medical and Surgical Journal, vol. xv. p. 510. Case by Mr. Thomas. Recovered.

Ibid. Case by Mr. Blacklock. A man aged fifty took a drachm dissolved in three gills of water, through mistake. His symptoms were not peculiar. There were present bloody vomiting and purging, succeeded by bilious vomiting and purging, and during the whole of his illness he suffered under violent and incessant hiccup. The urine was suppressed, and there was a numbness of the arms and legs. He died on the seventh day. (Vol. xxxvi. p. 92.)

Ibid. vol. xliii. p. 253. Case by Ollivier and Barruel, of three children, poisoned through carelessness at Paris. The oldest, aged seven, took eighteen grains, and died in three hours; the youngest, about two years old, took six grains, and died in eleven hours. The mistake was discovered in two hours, and antidotes were given, but the youngest would not take them. The second, aged three and a half

To this variety of poisoning Dr. Christison adds a second, which begins like the former, with irritation of the alimentary canal, but the symptoms of mercurial erythysm (inflammation of the salivary glands and parts adjoining) supervene. These usually occur on the second day, and the fatal termination is generally delayed beyond the period mentioned above.

Even besides these, there are many other instances in which the patient escapes the immediate danger, but is still liable to the chronic effects of the metal, such as salivation and its accompanying consequences. The constitution often breaks down after a time, under their severity.

(*b.*) *By injection into the anus.* We have reason to believe, from the result of experiments on animals, that the effects of the poison administered in this way would be similar to the former. The only case on record, that I have noticed, is a complex one, from the extraordinary combination of poisons given to destroy life. As, however, the corrosive sublimate appears to have been the immediate agent of death, I shall mention it in this place.

Sir Thomas Overbury was poisoned in the year 1613, in the Tower of London, at the instigation of the Earl and Countess of Somerset. The agents were punished, but the principals escaped. From the confession of Franklin the apothecary, it appears that the Countess wished to procure the strongest possible poisons for Sir Thomas. He accordingly bought seven—*aqua fortis, white arsenic, mercury, powder of diamonds, lapis costitus, great spiders,* and *cantharides.* All these were given at different times. Sir Thomas never ate white salt but there was arsenic put into it; and Mrs. Turner, when two partridges were sent to him, and water and onions were the sauce, put in cantharides instead of pepper. Indeed, said Franklin, he seldom ate any thing in which there was not poison. Richard Weston, while acting as keeper to Overbury, procured a poison of a green and yellow colour (rosalgar), and mixed it with his broth. He procured white arsenic, and mixed it with the food; and in addition, mingled some corrosive sublimate in tarts and jellies. *The sublimate was also dissolved in a clyster, and administered to the prisoner.* This produced, according to the confession of Weston, sixty stools, together with vomiting. Sir Thomas died the next day.*

Externally. *Applied to a wound or ulcer, or to the skin.* Orfila quotes several cases, illustrating the dangerous, and indeed fatal effects of this mode of application. I shall only cite one, from Pibrac. "A strong robust woman, aged forty-nine years, of a good temperament, having an ulcerated cancer of the breast, was entrusted to the care of an empiric, who employed upon her his white powder exter-

years, took twelve grains. It apparently recovered from the immediate effects, but in a few days diarrhœa and other symptoms of gastro-enteritis came on, and death followed on the twenty-third day.

The same cases are given in the Medico-Chirurgical Review, vol. xxvi. p. 515.

Many other instances under the different varieties are cited by Christison and Orfila.

* Hargrave's State Trials, vol. i. p. 323. 345.

nally applied; it was corrosive sublimate. The patient was in great pain after the application; the pains of the cancer greatly increased, and in the space of a few hours became intolerable. A crowd of accidents occurred at once; oppression, nausea, vomitings, which extended even to blood, and convulsive motions the most violent. In fine, she suffered in every part of her body a dreadful torture, from which she was not delivered till the next morning by a horrible death."*

A solution of corrosive sublimate in alcohol, applied to the skin, has produced, within a few hours, violent pains of the stomach, accompanied with sickness, vomiting, and diarrhœa. The debility that follows is of the most alarming kind. In one instance, the stools consisted of blood and mucus; and it is evident that if the use of this noxious substance had been continued, fatal consequences would have ensued. Salivation seems to be a constant effect from this mode of application.†

Appearances on dissection. In the case of Dr. Henry, already quoted, the external appearance of the stomach and intestines was perfectly natural. About two ounces of a thick yellowish ropy fluid were found in the stomach, which was but moderately distended with air. On its inner surface, numerous dark red spots, indicating inflammation of the villous coat, were observable; they extended through the whole length of the smaller curvature, and occupied the greater part of the fundus, but did not appear in the lower portion of the large curvature. No abrasion of the villous coat was perceptible. The inner coat of the duodenum, as far as the middle of its length, presented the same appearance of inflammation. The lower part of the œsophagus, for about three inches above the cardia, was slightly inflamed; but higher up it was of a natural colour. The heart, lungs, liver, and spleen were sound. The gall-bladder was emptier than usual. The left kidney was of a looser texture than natural, and a small abscess was discovered in it, filled with pus. *The bladder was empty, and exceedingly contracted.*

In each of the four cases of Mr. Valentine, he found the stomach greatly diseased. Black circular patches, about three inches in diameter, were observed, and from them an extensive inflammation of

* Orfila's Toxicology, vol. i. p. 59.

† Cases of this nature are related by Dr. Anderson (Edinburgh Medical and Surgical Journal, vol. vii. 437.), and Mr. Robertson (ditto, vol. viii. p. 195.); and by Dr. Cloquet of himself, communicated to Orfila (vol. ii. p. 462.) In this latter, vomitings, gripings, and tenesmus were induced, barely from plunging his hands several times in a concentrated solution, for the purpose of taking out some anatomical preparations, and neglecting afterwards to wash them.

Two dreadful cases of suffering and death, by Mr. Ward (London Medical Gazette, vol. iii. p. 666.), in brothers, who each rubbed in an ounce of corrosive sublimate mixed with hog's lard on the lower part of the abdomen. Sensations of roasting alive followed in each, and one went and laid himself in a stream of water for relief. Nausea, pain, constriction about the fauces, suppression of urine, discharges of blood from the stomach, and ptyalism followed. Both died; and in the one who survived longest, mortification occurred previous to death.

Another fatal case is mentioned by Dr. Kimball, in Western Journal of Medical and Physical Sciences, vol. iv. p. 483.

the inner coat diverged in all directions. "In the child which died first, the texture was totally destroyed through all the coats, as far as the circular patch extended; and on washing off the destroyed parts, only the peritoneal covering of that part of the organ was left. It cannot be better compared," he observes, "than to a piece of leather *burnt with a red-hot coal.*" The intestines were highly inflamed. The gall-bladder, in every case, was greatly distended with bile; the peritoneum generally inflamed, as were also the mesentery and omentum. In one instance, the kidneys were inflamed. *In all, the urinary bladder was much contracted; in the mother it was of the size of a walnut, and in one of the children no larger than a marble.*

The mouth, throat, and gullet are also frequently inflamed.* A singular appearance, sometimes observed in the former, is shrivelling of the tongue, with great enlargement of the papillæ at its root. †

The destruction of the coats of the stomach and intestines, and more particularly the colon and rectum, which is so commonly seen in fatal cases, originates, according to Dr. Christison, from two causes,—corrosion and ulceration. The former is described in Mr. Valentine's cases, and also in Dr. Venables'. In this last, there was a patch on the under surface of the stomach, as large as two crown pieces, and of a very dark olive colour, besides general erosion of the villous coat. If life is prolonged, the disorganized matter sloughs off, leaving an ulcerated cavity. Ulceration is either a consequence of inflammation, which of course is an almost constant morbid appearance, or it results from corrosion. Often large, black, gangrenous ulcers are seen, both in the stomach and the lower intestines; the small ones, I believe, generally escape. Inflammation of the peritoneum and kidneys frequently occurs. Orfila has found that the internal membrane of the heart is sometimes inflamed, and checkered with black spots. In both of Ollivier's cases, the same was seen. There were ecchymosed patches on the internal surface of the left ventricle, beneath its inner membrane, and which was pale and whitish.

I have already, in a previous chapter, noticed the effects of the introduction of corrosive sublimate into the dead body. On the rectum, its chemical effects alone were visible, and no marks of vital reaction appeared. ‡

Effect on animals. Mr. Brodie injected into the stomach of a rabbit, by means of an elastic gum tube, six grains of corrosive sublimate, dissolved in six drachms of distilled water. No immediate symptoms followed the injection; the animal made no expression of pain, but in three minutes he became insensible, was convulsed, and in four minutes and a half from the time of the injection being made he died. On opening the thorax, the heart was found to have entirely ceased acting, and the blood in the cavities of the left side was of a scarlet colour. The stomach was much distended; the pyloric and cardiac portions were separated from each other by a strong muscular con-

* In one of Ollivier's cases (the oldest), the mucous membrane of the œsophagus was easily detached in curling shreds.

† Christison, p. 387.

‡ Orfila. See *ante*, p. 678.

traction, which appeared to have prevented the passage of the fluid from the upper to the lower part, since the contents of the pyloric portion were firm and solid, and in every respect resembled the usual contents of the stomach, while those of the cardiac portion consisted of the food of the animal much diluted with fluid. In the pyloric portion, also, the mucous membrane had its natural appearance; but in the cardiac portion, it was of a dark gray colour, readily torn and peeled off, and in some parts its texture was completely destroyed, so that it appeared like a pulp, on removing which, the muscular and peritoneal parts were exposed.

A similar experiment, with a scruple of corrosive sublimate, on a cat, produced death in twenty-five minutes; and on dissection, the texture of the stomach was found destroyed as in the preceding case; the mucous coat tore and separated from the muscular with great facility, and the upper part of the duodenum was similarly altered, although not in so marked a manner.

The same experiments were now performed on a dead rabbit and cat, and *precisely the same appearances were found on dissection*, except that as the middle contraction was wanting, the disorganization was not confined to the cardiac portion.

The conclusion drawn by Mr. Brodie is the following: "Corrosive sublimate, when taken internally in large quantities, occasions death by acting chemically on the mucous membrane of the stomach, so as to destroy its texture; the organs more immediately necessary to life being affected in consequence of their sympathy with the stomach." * He also denies the idea of the absorption of the poison in these cases. This, however, is believed by many physiologists, and at all events is far from being a settled question.†

Corrosive sublimate has been considered as nearly innoxious to horses, and has been given in doses of several drachms without producing any apparent effects. An instance is, however, related by Dr. Reeve, where two ounces produced death in eight hours; and previous to this, there was a copious discharge of urine and fæces. On dissection, no inflammation was observed in the coats of the stomach; the intestines, however, were flabby and tender, and putridity had far advanced in them. The liver and kidneys were in a putrid state.‡

In several experiments made by Dr. Bostock and others on dogs, with small doses of this mineral, vomiting and purging, with symptoms of violent pain, ensued; and after some hours, they terminated in death. In one case, on dissection, the peritoneal coat of the stomach was found inflamed, and the vessels of its internal surface were injected so as to present a general redness; but there was a very slight corrugation of the coats, and no erosion. But in another instance, where the dose had been larger, the villous coat was much corrugated and inflamed; and on that part of it which lines the small curvature, there was much blackness, which had the appearance of blood extrava-

* Edinburgh Medical and Surgical Journal, vol. vii. p. 462.
† See Edinburgh Medical and Surgical Journal, vol. xi. p. 126.
‡ Edinburgh Medical and Surgical Journal, vol. v. p. 254.

sated between the coats. On cutting, however, through the villous coat, there was no extravasation.*

Campbell, Smith, Gaspard, and Orfila have severally ascertained the effects of corrosive sublimate when applied to the cellular tissue, or injected at once into a vein. In the former case, and even when in a solid state, it causes death in three or four days. The symptoms are those of dysentery; and on dissection, inflammation, and sometimes ulceration of the stomach and rectum, are observed. Some of the experimenters also found the lungs and heart inflamed, and this was particularly noticed by Gaspard, who injected the poison at once into the blood. The mucous membrane of the intestines was red; and the lungs, according to the length of time that the animal survived, showed black ecchymosed spots, some inflamed, and others either suppurated or gangrenous.†

Tests. There is some difference among chemists, as to the precise solubility of corrosive sublimate. According to Thenard, it is soluble in eleven parts of temperate water, while Orfila says twenty. It dissolves in thrice its weight of boiling water. These proportions should be remembered, as an unnecessary addition of fluid may thus be avoided.‡ Corrosive sublimate is soluble in alcohol and ether.

We shall consider its tests in three states — in a solid form; in a state of solution; and when mixed with animal and vegetable fluids and solids.

In the solid state.

(*a.*) Expose a small quantity of the powder without any admixture, to heat, in a coated tube, corrosive sublimate will be ascertained by its rising to the top of the tube, lining the inner surface in the form of a shining white crust, and from its peculiar crystalline form. This last, if necessary, should be examined with the microscope.

(*b.*) Add a solution of caustic potash to it, and it will become yellow, the peroxide being disengaged. This yellow colour distinguishes it from calomel, which is also decomposed by the solution of potash, but yields a black protoxide.

(*c.*) Caustic ammonia produces a permanent white precipitate, while it blackens calomel.

(*d.*) If corrosive sublimate be let fall in minute fragments into a tube of glass, the bottom of which contains a little pure caustic potash melted by heat, one portion of the salt rises in the form of smoke, to

* Rutter's Vindication, p. 28.

† Christison, p. 350. Dr. Roupell (Illustrations, part 2.) introduced into the stomach of a dog a drachm of corrosive sublimate, and tied the œsophagus. The animal died in four or five hours, with little outward marks of pain. On dissection, the stomach was highly vascular, and its mucous membrane of a leaden hue. The duodenum had a mixed appearance, partly red, and partly of a lead colour, and its mucous membrane was thickened. All the small intestines were inflamed, and a thick white mucus thrown upon their internal coat.

‡ Dr. John Davy, in a paper read before the Royal Society, June 6. 1832, entitled "Some Observations on Corrosive Sublimate," states that he found it soluble in water at 57° of Fahr. in the proportion of 5·4 per cent. Alcohol at 60° dissolved half its weight, and ether about one third its weight. (Philosophical Transactions. Abstract of the Papers read from 1800 to 1830, vol. ii. p. 173.)

condense itself on the sides of the tube ; while another portion sinks down, and takes a red colour. If the heat be continued for five or six minutes, metallic mercury in the form of globules is obtained, adhering to the sides of the tube, and mixed with the corrosive sublimate that is not decomposed. If the quantity be small and difficult of detection, dissolve the remainder of the salt, and the globules will be precipitated.

(*e.*) When corrosive sublimate is left for some time in a solution of protochloride (muriate) of tin, it becomes grayish black; and in no long time, its place is supplied by globules of mercury, the chlorine being entirely abstracted by the protochloride, which consequently passes to the state of a bichloride. Calomel is similarly affected.

In the fluid state.

(*a.*) *Reduction.* Add to the solution a little of the protochloride of tin. If mercury be present, a bluish gray or grayish black precipitate falls down. After boiling, allow this precipitate to fall down in a proper glass tube (see page 738.), and decant off the superincumbent fluid as far as possible. Afterwards draw off the remaining fluid by the pipette (page 744), pour water over it, and withdraw again, after the precipitate has once more subsided. The bottom of the tube is then cut off with a file, and the moisture which remains is driven off with a gentle heat. The powder, which is nothing else than metallic mercury, may often be now seen in running globules. If not sufficiently coalesced to determine their nature, they may be scraped together with the point of a pen-knife, or by applying heat to the tube, a ring of minute globules will be formed. Of the liquid tests, Dr. Christison deems the four following as the most satisfactory.

(*b.*) Sulphuretted hydrogen, when transmitted in a stream through a solution of corrosive sublimate, causes a dark brownish black precipitate, the bisulphuret of mercury. Before the blackening commences, the gas forms a whitish or yellowish precipitate.* The hydrosulphate (sulphuret) of ammonia may be alternatively used, instead of the sulphuretted hydrogen.

(*c.*) Hydriodate of potash causes a beautiful pale scarlet precipitate, which rapidly deepens in tint. This is the biniodide of mercury. Care is however necessary in using this test. If applied in too large a quantity, the precipitate will dissolve in the excess of the hydriodate ; if too little, it will dissolve in the excess of corrosive sublimate.

(*d.*) *Protochloride of tin* gives a white precipitate, which, when more of the test is added, gives place to a grayish black one. The reason of this has been already explained. Metallic mercury is finally

* Professor Pfaff, of Kiel, is said to have discovered the presence of corrosive sublimate by means of this test, though it was diluted with forty thousand times its bulk of water. (Annals of Philosophy, vol. v. p. 22.) See also M. Rose on the action of sulphuretted hydrogen gas on solutions of mercury, in Philosophical Magazine and Annals, vol. v. p. 310. He observes, that unless sufficient gas be added, the precipitate will be a combination of sulphuret and undecomposed protochloride of mercury.

formed. This is an extremely minute test. Dr. Bostock says, that two drops of the muriate, added to a solution which contained $\frac{1}{30,000}$ of its weight of the sublimate, caused an obvious precipitate. When diluted, so that the fluid held only $\frac{1}{3,000,000}$ of its weight of the salt, two drops produced an immediate gray cloud, but no precipitate was thrown down. *

(*e.*) Nitrate of silver causes a heavy white precipitate, the chloride of silver, which darkens on exposure to light.

Other tests have been enumerated by various writers.

(*f.*) Lime water in small quantity precipitates the solution, of an orange yellow colour, but if increased, the precipitate becomes red. In still greater quantity, "the precipitate is transformed into an oxide at maximum of a beautiful yellow."

(*g.*) A solution of saturated carbonate of potash (salt of tartar) produces a deep brick-coloured precipitate. Carbonate of soda has the same effect.

(*h.*) The caustic alcoholised potash, poured in small quantity on a saturated solution, forms a yellowish red precipitate, but if, on the contrary, the potash in excess be poured on it, the precipitate will be a beautiful yellow. The precipitate, both in this experiment and in experiment *g*, on being dried and exposed to heat in a glass tube, will give out metallic mercury.

If, however, the solution of corrosive sublimate is very much diluted, the caustic potash will throw down a white precipitate. †

(*i.*) A solution of pure ammonia produces a permanent white precipitate. On the application of heat it becomes yellow. Although this is a delicate test, yet it is not a certain one, as ammonia throws down a white precipitate in other metallic solutions.

(*k.*) The triple prussiate (ferrocyanate) of potash gives a white precipitate, which in a short time becomes yellow, and afterwards passes into a clear Prussian blue. All these changes of colour are generally produced within thirty-six hours.

(*l.*) If a perfectly clean plate of copper be plunged into a solution of corrosive sublimate, and left there for an hour or two, it will become tarnished; but, on rubbing it with a piece of paper, it assumes a white, shining, and silvery appearance, owing to a coating of metallic mercury. The same effect will be produced if the corrosive sublimate be dropped on it, or if any of the precipitates obtained in experiments *f*, *g*, *h*, *i*, and *k*, be rubbed over it. This effect is now explained

* Edinburgh Medical and Surgical Journal, vol. v. p. 14.

† The distinct effects produced by lime water and pure potash on calomel and corrosive sublimate, are well shown in an analysis performed by Messrs. Tyson and Fisher at Baltimore, in May, 1835. A valuable horse was supposed to be poisoned, but a grain only of the suspected matter was sent to them. They proved first, by sulphuretted hydrogen, by hydriodate of potash, and by the galvanic circle, that the substance was mercury. In order to ascertain its exact nature, they placed a portion of the powder in a tube, and applied heat. The whole was sublimed in a beautiful white powder. Liquid potash added to this gave a black precipitate, and lime water also a brownish black one — in both, the black oxide of mercury; and thus proving that the suspected powder was calomel. (Philadelphia Journal of Pharmacy, vol. vii. p. 105.)

as a galvanic action, and a piece of gold clasped by a zinc wire and immersed in the sublimate solution was obviously whitened in an hour, although the solution in question only contained $\frac{1}{2400}$ of its weight of the salt.

(*m.*) The following elegant test was proposed by Mr. Sylvester, and improved by Dr. Paris. It is an application of galvanic electricity. Drop a small quantity of the suspected solution on a polished plate of gold, and then touch the gold through the solution, with the point of a small iron wire or a key. As soon as the galvanic circuit is completed, if corrosive sublimate be present, the gold will become silvery white, in consequence of the formation of the amalgam.*

(*n.*) A solution of albumen causes a white precipitate, which is soluble in a considerable excess of the reagent. "The precipitate is a compound of calomel and albumen — a chloride of albumen and mercury."

The next point of importance is, whether any substances which by possibility may be present in the stomach, or any of the human fluids, will change the nature of the poison, or will alter the operation of the above tests? Orfila has made this the subject of notice.

Corrosive sublimate, according to him, is decomposed sooner or later, and converted into the submuriate, by most vegetable substances, distilled waters, extracts, oils, syrups, honey, and gums. Muriatic acid gas is set at liberty, and calomel will be precipitated, with a portion of the vegetable matter which has undergone some change. A decoction of tea throws down instantly a yellowish gray precipitate in flakes, which becomes pulverulent, and of a violet colour by desiccation, while at the same time, if the water be much loaded with sugar, no alteration takes place till after several days; and alcohol produces no effect for the space of three or four months. The action of albumen on a solution of corrosive sublimate deserves particular notice. If a considerable quantity of the latter is poured on the former, a white flaky precipitate is formed, which, on being dried, is brittle, semi-transparent, of a yellowish colour, and insoluble in water. On being submitted to heat in a glass tube, the products are principally charcoal, metallic mercury volatilised and adhering to the sides of the tube, and muriatic acid. Small quantities of corrosive sublimate produce milkiness, and the slow deposition of a precipitate. Gelatine causes similar change

* Nicholson's Journal, No. 154.: Paris's Medical Jurisprudence, vol. ii. p. 269. In the case of Mary Bateman, in 1809, Mr. Chorley, a surgeon, immersed a penknife in the solution, and by rubbing it, numerous globules of mercury were produced, and the knife at the same time was blackened. Here (says Dr. Paris) the steel knife decomposed the corrosive sublimate, formed chloride of iron, and the mercury, unable to amalgamate, appeared in globules. (Ibid. vol. ii. p. 270.)

A gold ring, armed with tin foil, immersed in the suspected solution, and to which a drop of muriatic acid is added, has been recommended by Smithson, and followed by Nicole, to reduce the sublimate. (North American Medical and Surgical Journal, vol. i. p. 468.) But Orfila has shown the fallacy of this, in proving that the gold will be whitened by the action of the muriatic acid on the tin alone, without requiring the addition of mercury. (Brande's Journal, N. S., vol. vi. p. 183.; Annales d'Hygiène, vol. i. p. 559.)

and decomposition as albumen. Osmazome gives a reddish yellow precipitate, and bile a yellow one, inclining to red. A concentrated solution of corrosive sublimate brought in contact with a large quantity of milk, produced no visible change; but when seven parts of the solution and one of milk were united, a white coagulum instantly formed, which collected together, and over it floated a liquor extremely clear. Ordinary soup mixed with it in the proportion of one to six, produced a white precipitate. Fibrin or flesh, on being immersed in a solution of corrosive sublimate, loses its solidity and becomes friable.*

The experiments of Professor Taddei of Florence have also shown that gluten possesses the power in a high degree of decomposing corrosive sublimate. If the salt in solution be mixed with the gluten of wheat, in the proportion of four times its weight, the water will be found no longer to contain any mercury, while the gluten becomes whitish, brittle, hard, and not prone to putrefaction. The protochloride of mercury and gluten is formed.†

It appears thus, that many common substances will decompose the corrosive sublimate, and convert it into submuriate; and the operation of the liquid tests must necessarily be equivocal.

"In all these compounds, thus formed, the powder may be boiled in a solution of caustic potash. The organised matter is dissolved; a heavy, grayish black powder is formed, which is the protoxide of mercury;" and this, on the application of heat, will form running quicksilver. "*As the potash thus separates the mercury in the form of protoxide, it follows that it existed in the compound in the form of protochloride.*" ‡

In organic mixtures.

1. *Dr. Christison's process.* Divide all the soft solids into small fragments, and boil the mass in distilled water. Filter a small portion, and to this add the protochloride of tin. § If *it causes a pretty deep ash gray or grayish black colour*, take the whole of the remaining fluid unfiltered, and agitate it for a few minutes with about a fourth part of its volume of sulphuric ether. This abstracts the salt from

* Orfila's Toxicology, vol. i. p. 37 to 46.

† In confirmation of this, it may be added, that on the trial of Michael Whiting for administering corrosive sublimate to his brother-in-law, in dumplings, the housekeeper deposed that she could scarcely make the flour into dumplings with milk; they broke and crumbled into little pieces; and another witness said, that the unboiled dumplings were more like glazier's putty than paste, though not greasy. Dr. Paris confirmed these results by his own experiments. (Paris's Medical Jurisprudence, vol. ii. p. 265.)

‡ Christison, p. 337.

§ Dr. Bostock, in his "Experiments to ascertain how far the presence of albumen and muriatic acid interferes with the action of bichloride of mercury and protomuriate of tin upon each other," (Edinburgh Medical and Surgical Journal, vol. xxiii. p. 65.) has shown that the presence of albumen may diminish, but not very seriously, the minute powers of the tin; that when coagulated albumen is combined with the mercury, the addition of tin will still detect the poison; but not when the compound has been dissolved in hot water. The protomuriate of tin was added to this fluid, without any effect. Muriatic acid presented no obstacle, but rather aided the action of the test, by promoting the coagulation of the albumen.

its aqueous solution. After being left at rest for a few minutes, the etherial solution rises to the surface, and may then be removed by suction with the pipette. (See page 744.) * It is next to be filtered, if necessary, evaporated to dryness, and the residue treated with boiling water. The fluid thus obtained must be tested as directed under the examination of corrosive sublimate, in the fluid state: *but if the shade from the protochloride of tin is not deep*, omit the above, and continue treating the mixture with that salt as long as any precipitate or coagulum is formed. Even if but a small quantity of mercury be present, it will have a slate-gray tint. Collect this, and wash and drain it on a filter, "from which it is then to be removed without being dried, and care should be taken not to tear away with it any fibres of the paper, as these would obstruct the succeeding operation." Next boil the precipitate in a solution of caustic potash, until all the lumps disappear. If the solution be now left at rest, a heavy grayish black powder will begin to fall down in a few seconds. This is chiefly metallic mercury, which may be distinguished by the naked eye or a magnifier. After a proper time, remove the supernatant fluid, and transfer the powder into a small glass tube, and wash it repeatedly, till the washings do not taste alkaline. The black powder should be allowed to subside for several hours. It may then be heated and sublimed as already directed.

Dr. Christison states that, by this last process, he has detected a quarter of a grain of corrosive sublimate, mixed with two ounces of beef, or with five ounces of new milk, or porter, or tea, made with a liberal allowance of cream and sugar. He found the tenth part of a grain in four ounces of the last mixture, i. e. in 19·200 times its weight. †

2. *Orfila and Lesueur's process.* This will only answer, according to Dr. Christison, when the proportion of corrosive sublimate is considerable. They direct that the whole of the solids and fluids be boiled at once in a solution of caustic potass, so as to dissolve the organic matter and separate the protoxide of mercury, which may be subsequently converted by heat into the metal.

3. *Devergié's process.* Treat the suspected mixture with diluted muriatic acid till all the solid matter is dissolved. Evaporate so as to expel most of the acid employed. Add water to the rest, and transmit chlorine to coagulate and remove the animal matter. Filter, boil, and concentrate. Then immerse for ten minutes a small plate of pure tin. If mercury be present, the tin will be immediately whitened. Continue this with successive plates until the whitening ceases. Dry the plates, scrape off the tarnished surface, put the scrapings in a proper tube, and heat them over a spirit lamp. The mercury will be driven off from the amalgam and condense in a ring of globules. ‡

* Devergié, in a recent memoir on the detection of corrosive sublimate, objects that ether does not take up all the mercury. He tested the remaining liquid with the plate of gold and tin, and found marked traces. (Annales d'Hygiène, vol. xi. p. 414.)

† Christison, p. 339.

‡ The above is copied, like all the others, from Dr. Christison, p. 342, &c. Devergié has subsequently recommended a modification of this process. He now directs

4. *Professor Buchner's process.* Evaporate the suspected mixture to dryness, and boil the residue in nitro-muriatic acid till the decomposition of the organic matter is at an end, which is indicated by the cessation of the discharge of orange fumes. Then treat the solution with sulphuretted hydrogen gas, which occasions first a white, and then a black precipitate. This precipitate is then to be collected and heated in a tube with a little carbonate of soda, previously deprived of its water of crystallization; upon which globules of metallic mercury are sublimed.

5. *Dr. O'Shaughnessy's process.* He proposes to use ether and protochloride of tin successively in trial experiments. If neither of them gives an indication of mercury, filter, acidulate the fluid part with nitric acid, and concentrate by evaporation. Boil the solid part in a solution of caustic potash, add a large excess of nitric acid, and digest with a gentle heat in a Florence flask, for at least six hours. Filter, unite with the fluid part of the mixture, and concentrate the whole by evaporation. Filter again after cooling. Introduce into this fluid a thin slip of gold, bound with a coil of iron wire. The gold will become amalgamated.*

6. *Dr. Venables' process.* Nitric acid in excess is agitated on the solid matter of the mixture. Chlorine gas is then transmitted through the fluid to convert the mercury into the chloride. The mixture is next boiled to destroy organic matter as much as possible, and then filtered and evaporated; and as it becomes dark or thick under evaporation, solution of chlorine is added from time to time. It is then neutralized with potash, and filtered and treated with proto-chloride of tin. The precipitate is collected as has been already directed, and the mercury sublimed in a tube. Dr. Venables was thus able to detect mercury in the tissues of the stomach and duodenum of the individual whose case I have quoted from him, although she lived eight days, and had vomited much at first.†

7. *Fischer's process.* In a little glass jar three or four inches deep and an inch in diameter is suspended, by means of a perforated cork fitted to the mouth of a jar, a small glass tube three inches long, half an inch in diameter, and covered at its lower end with bladder. Between the tube and side of the jar is a semi-cylindrical plate of zinc nearly as long as the jar is deep, and the upper end of this plate, which is cut small for the purpose, perforates the cork of the jar. This little tube has a cork fitted to it, through which a thin platina wire, terminated by a slip of platina foil a tenth of an inch in breadth and an inch in length, passes nearly to the bladder at the bottom of the tube. The

concentrated muriatic acid to be used. The remainder is similar to the above, except that, in place of tin alone, he advises the immersion of a piece of gold bound with tin, thus forming the galvanic pile (*une pile d'or et d'étain.*) (Annales d'Hygiène, vol. xi. p. 432.)

* Lancet, N. S., vol. vii. p. 420.

† On applying the flame of a spirit lamp, a dew, consisting of a number of minute globules, was formed on the neck of the tube. They were united into one by applying the point of a penknife, and Dr. Venables estimates the quantity thus obtained at 1-16th of a grain of metallic mercury.

mercurial fluid being poured into the central tube, and a solution of muriate of ammonia or lime into the jar around the tube, the upper part of the platina wire is brought in contact with the upper end of the zinc plate. The galvanic action now goes on, and metallic mercury forms on the platina foil. This, as will be observed, is another form of applying galvanic action. It should be allowed to go on for two days. Then remove the platina, dry it, fold it in as small a space as possible, afterwards heat it in a glass tube.

It is evident that several of these processes may be employed in the same case, and thus an accumulation of testimony will be presented.

Should calomel or metallic mercury be found in the alimentary canal, how far is this to be deemed a *presumptive proof of the exhibition of corrosive sublimate?*

I have mentioned repeatedly that many animal and vegetable substances decompose corrosive sublimate and reduce it to the state of calomel. The following problem is therefore put by Orfila. A person out of health takes some calomel as a purgative, and dies in three or four hours afterwards, under suspicion of poisoning. How are we to distinguish between these cases? Our author answers this by observing, 1. That the calomel which has been taken may be found on the membranes of the intestinal canal in the form of a white powder, which is insoluble in water; that it becomes black on adding lime water; that it preserves its physical properties, and even when combined with solid alimentary substances, it will, on the addition of water, fall down, in consequence of its greater specific gravity. 2. That the calomel which results from the decomposition of corrosive sublimate, and the presence of which warrants us in pronouncing that poison has been taken, is never applied in the form of powder to the membranes of the alimentary canal; it never has the physical properties of common calomel; since it is intimately combined with the substance which has been the cause of its formation (forming, indeed, in several instances, a ternary chemical compound). Lastly, lime water, when added to it, induces no change. *

* Orfila's Toxicologié, 3d edition, vol. i. p. 301. The cases of Ollivier and Barruel occurred subsequent to the publication of the above, and I add the principal results of their chemical examination in this place, that the reader may compare them with the statements in the text. The fluid found in the stomach was not affected by sulphuretted hydrogen, and, as a necessary consequence, the poison was not present in it. The curdy and mucous matters also found there were next tested, and although milk and albumen had been taken as antidotes, yet, on being triturated with a solution of potash, no black precipitate was caused, as would have been the case if calomel had been present. On the contrary, *yellow* flocculi were thrown down, indicating the existence, in all probability, of corrosive sublimate, still undecomposed.

These yellow flocculi were subjected to the action of chlorine, and after that, a plate of gold, surrounded by a spiral one of tin, was immersed in the liquor. The gold was whitened, as was also the tin, in the intervals which separated each turn. The last had also become brittle.

It thus evidently appears, that although milk and albumen decompose the salt, yet this is not always complete. Ollivier indeed remarks, that in one case it was so involved in the caseous matter, that it was prevented from being further altered, and from acting on the organs containing it.

The following case was lately referred by the law authories in France to him. A female, after suffering under what are usually styled bilious symptoms, died rather suddenly, with previous vomiting and diarrhœa. There was, however, no immediate suspicion of poisoning, and the body was not taken up until fifteen days after burial. There were several perforations in the stomach, but no softening, and there were many black stains. Both in this viscus, and in several of the intestines (large and small), mercurial globules were found and collected, to the amount of upwards of two drachms. On boiling the intestines also, every part appeared as if penetrated by a mercurial dew.

The most careful analysis of the contents of the alimentary canal failed to detect any poison in them; and the question presented to Orfila was, whether the discovery of metallic mercury in a person who had died with many symptoms indicative of irritant poisons, could originate from swallowing some poisonous compound of mercury, which was subsequently decomposed and reduced to the metallic state in the body?

In answer to this, our author found that corrosive sublimate is not reduced by the ordinary contents of the stomach and intestines to the metallic state, since, in a dog poisoned by it and buried for two months, the mercury was found united with the textures, in the form of an insoluble triple compound of mercury. Chlorine and animal matter, but no globule, could be discovered, even with the microscope. The red oxyde of mercury is also incapable of being reduced. The protoxide exhibits no more appearance of globules than it does previous to being swallowed. The protonitrate exhibits them under peculiar circumstances, but so firmly adhering to the inner membrane that they cannot be displaced. The compounds of mercury, when it is merely in a state of minute division, will present them, but it is merely separation, and not decomposition. Orfila next tried the effect of introducing into the stomach, along with the poison, some substances which are capable of reducing it to a metallic state, as oil of turpentine, and some of the salts of iron or copper. The animals died, and the mercury was found reduced, but no globules were visible to the naked eye, nor could they be displaced from the membranes of the stomach.

He therefore was of opinion that the female had not been poisoned by a salt of mercury, but that probably some of it in a metallic state had been given.*

The rapid progress of medico-legal analysis is strikingly seen in the history of the tests of this salt. Being soluble, and very liable to be discharged by vomiting, and, above all, being readily decomposed by many substances, it is not surprising that chemists could not discover it, even under the most favourable circumstances, in the fluid contents

* Edinburgh Medical and Surgical Journal, vol. xxxiv. p. 434. from the *Archives Générales*. According to Rose, neither the peroxide nor perchloride of mercury, when mixed with organic matter, can be reduced to the metallic state, unless potash, either in its pure or carbonated form, be added to it: "without the addition of an alkali, the reduction to metallic mercury does not take place." It is suggested (Lancet, N. S., vol. viii. p. 33.) that this was altogether omitted in the experiments of Orfila.

of the stomach. In the experiments of Dr. Bostock on dogs, the very tests which proved the presence of corrosive sublimate in the most minute quantity, were unable to show its presence in the fluids of the animals which he had previously poisoned with this very substance, and they only indicated the existence of muriatic acid.* Drs. Henry and Roget examined the fluid vomited by a female who had poisoned herself, with all the tests mentioned in the chemical work of the former; but neither in this liquid, nor in that found in the stomach after death, were any traces of the poison discoverable.† "In vain (says Orfila), should we seek, in the general way, for corrosive sublimate in the liquids vomited; neither are the contents of the stomach more calculated to discover its presence. The decomposition which it has undergone by its union with other substances has rendered it insoluble. *It is in the solids, in the tissue itself of our organs, that it must be sought for.*" In confirmation of the latter remark, he mentions a case, in which he took a portion of the intestines of a cock, and put it in a solution of corrosive sublimate for three days. It was then boiled, dried in a capsule of porcelain, and finally calcined in a retort. Globules of mercury were soon seen condensed in its neck. The stomach of a dead rabbit, into which a solution of corrosive sublimate had been injected, was treated in the same way, with a similar result. Again, it is stated by Taddei, that in cases of corrosion, if the slough be examined before it is thrown off, it will yield mercury by chemical analysis.‡

It is evident from these facts, that the solid parts should be examined in all criminal cases.

I will conclude this part of my subject with a brief narrative of a few of these. And the first that may be noticed is interesting, from involving the decision of a curious question connected with the action of mercurial medicines, viz. *whether ptyalism is capable of a complete intermission?*

Jane Butterfield was tried at Croydon (England), in August, 1775, for the murder of Mr. Scawen. It appears that she had resided with him for many years as his mistress.

Mr. Scawen had been salivated with a quack medicine from the beginning till the middle of April. After that it ceased, and his health was decidedly improved. But in the middle of June he was again attacked with severe salivation, and its consequences; sloughs formed, and he died some weeks thereafter.

Against the prisoner it was urged, that the last sickness must have originated from the administration of corrosive sublimate in small doses, and that the previous medicine could not have induced these fatal consequences. Mr. Young and Dr. Sanders, witnesses for the prosecution, deposed that they had never known a salivation to recur after such an interval.

For the prisoner, on the other hand, Mr. Bromfield, surgeon of St. George's Hospital, testified that he had repeatedly seen cases in

* Edinburgh Medical and Surgical Journal, vol. v. p. 16.
† Ibid. vol. vii. p. 150. ‡ Christison, p. 389.

which the salivation had returned, after every effort had been made to evacuate the mercury from the system; that, in one instance, the interval had been three months; and that one of his patients was attacked periodically at intervals of six months or a month for a whole year. Mr. Howard, another London hospital surgeon, confirmed Mr. Bromfield's evidence, by declaring that he had frequently experienced the same, and that mercury was of so subtle a nature that it was not possible for any man to say for what length of time it might lie dormant before it reappeared. He had known fifty instances of persons discharged from the Lock Hospital, perfectly free of salivation, and upon some sudden change in the constitution, from a cold or some other cause, they were as bad again as while they were under a course of mercury. The prisoner was acquitted.*

Dr. Gordon Smith, in commenting on this case, cites similar ones from Drs. Mead and Male, and adds the following on his own authority: "Dr. Hamilton, professor of midwifery in the University of Edinburgh, related a case in his lectures, of a married lady, who had been under the necessity of going through a course of mercury, in consequence of her husband's imprudence, under the care of the late Mr. Bennet. This gentleman, from motives of delicacy, did not inquire very minutely into the particulars, but, according to the rule of the day, gave his patient a sore mouth. Four months afterwards, she miscarried, and salivation again came on. It was removed for a week, at the end of which it returned, and harassed her for about a twelvemonth."†

These narratives are not, however, universally credited. "Granting the ptyalism to be in every instance really mercurial, it would require much better evidence than any practitioner could procure, to determine the fact that mercury had not been given again during the supposed interval." Doubtless also, in some cases, the salivation has been independent of mercury.‡

Michael Whiting was tried and convicted at Ely in England, in 1812, for administering poison to his two brothers-in-law, minors, and in the event of whose death he expected some property. The corrosive sublimate was added to flour, from which it was intended to make dumplings; and it was in preparing these, that the mutual action of the gluten and salt was witnessed, which I have already quoted. The boys found the food so disagreeable, that they could not proceed in eating their dinner, and they were each taken ill. On analysis, corrosive sublimate was detected both in the boiled and unboiled dumplings, by chemists at Cambridge. The prisoner, before execution, confessed his guilt.§

Mr. Hodgson, a surgeon in Sunderland, was indicted in August,

* Gordon Smith on Medical Evidence, p. 234.; Dodsley's Annual Register, 1775.

† Forensic Medicine, p. 114. See also his third edition, appendix, p. 16. Dr. Graves, of Dublin, relates of a lady who has been subject for a length of time to occasional returns of salivation. (Lancet, N. S. vol. x. p. 176., from the Dublin Journal.)

‡ Christison, p. 372. Medico-Chirurgical Review, vol. v. p. 324.

§ Edinburgh Medical and Surgical Journal, vol. viii. p. 849.

1824, for administering poison to his wife, with an intent to murder her. Dr. Brown had been attending her for rheumatism, and had prescribed calomel and opium in repeated doses, with some relief to her complaints. On the 6th of June, she was attacked, immediately after taking the same medicine, with violent burning in the throat, gullet, and stomach. She supposed some mistake had been made, but was urged to take the other dose; and after doing so, was still more violently affected. Severe vomiting, with cold skin and feeble pulse, ensued; the pain also was extreme down to the pit of the stomach. Dr. Brown, on being sent for, prescribed an anodyne draught; but was astonished, on tasting the medicine which had been prepared by the prisoner, to find it acrid, like corrosive sublimate. Becoming now suspicious he prescribed whites of eggs, with immediate relief. The next day she had slight diarrhœa; and on the third, ptyalism; but she gradually recovered. The draught which Dr. Brown received from the prisoner was preserved and analyzed. Carbonate of potash produced in it a pale brick-red precipitate; ammonia, a brownish white one; lime water, a yellowish brown one; and when acted on by galvanism, it amalgamated gold. On the part of the prisoner, the principal plea was that he had made a mistake, in taking the wrong substance — having prepared a solution of corrosive sublimate for a patient. He was acquitted.*

It is of this trial that Dr. Christison remarks, that a medical witness would be justified in giving an opinion, from the symptoms alone, that poison had been taken. "No natural disease could produce a sense of burning from the throat to the epigastrium, *so very sudden, and so very acute.*"

Antidotes. Alkaline salts and earths were formerly in high repute as antidotes against corrosive sublimate, and cases are to be found in medical journals where they would seem to have cured the sufferers.† They have also failed, and the same remark will apply to the sulphurets, the infusion of Peruvian bark, and sugar.

We are therefore infinitely indebted to Orfila for introducing ALBUMEN as an antidote to this substance. If taken in sufficient quantity, it decomposes the metallic salt, forming a triple compound, consisting of albumen, muriatic acid, and calomel. Our author proved its efficacy in several experiments on animals. "It has the advantage of being always at hand, and there is no danger of giving it to excess. The practical rule, therefore, is, that as soon as we are called to a person suspected of having taken corrosive sublimate, we should make him swallow as many whites of eggs, well mixed with water, as the stomach can contain. It will immediately decompose the metallic

* Edinburgh Medical and Surgical Journal, vol. xxii. p. 438. I have also the London Courier of August 21. 1824, in which the report of the trial originally appeared.

† See a case in the Edinburgh Medical Essays, vol. vi. p. 432., from the *Commerc. Norimb.* 1735, where the *Oleum tartar per deliquium*, and mild drinks, appear to have been the principal agents in effecting a cure. The salt of tartar and salt of wormwood have each been recommended. (Medical Commentaries, vol. vi. p. 324. 415.)

salt remaining in the stomach; and if it excite fresh vomiting, so much the better. Along with this, blood-letting may be had recourse to, in order to overcome the inflammation already excited." * Mucilaginous drinks are also very useful as accessary remedies.†

Several instances of recovery through its means are on record, and in addition to those cited below, I will only mention that of Thenard the chemist. While lecturing at the Polytechnic School, in February 1825, he swallowed by mistake a glass of the concentrated solution of corrosive sublimate. In five minutes, whites of eggs were obtained and taken. He vomited repeatedly (more than twenty times), but never had any pain or other ill consequence.‡

Dr. Taddei, of Italy, has lately recommended wheat flour, or gluten, as an antidote. He was led to this from ascertaining that it reduced corrosive sublimate to the state of calomel, and that considerable quantities of a mixture of flour or gluten with corrosive sublimate might be taken by animals without any injurious effects. In this way, fourteen grains of corrosive sublimate were given, in less than twelve hours, to rabbits and poultry, without injury; whereas a single grain would have been fatal if taken alone. Twenty-five grains of fresh, or thirteen of dry gluten, or from five to six hundred grains of wheaten flour, are necessary to render a grain of corrosive sublimate innocent; and Dr. Taddei recommends that dried gluten be kept for the purpose in question in apothecaries' shops. When administered, it is only necessary to mix with it a little water.§

Dr. Duncan objects to the preparation of gluten as recommended by Dr. Taddei, as troublesome and tedious; and observes, that giving wheat flour diffused through water will prove equally efficacious.‖

When neither albumen nor flour is at hand, milk is a convenient antidote of the same kind.

In experiments on animals, Mylne Edwards and Dumas found that iron filings would decompose corrosive sublimate.¶ Meconic acid also will compose it, but this is hardly to be recommended for the human subject.**

The red precipitate and the red oxide of mercury. These substances, in considerable quantities, are violent poisons. Ploucquet mentions a case of an individual who, by accident, swallowed some red precipi-

* Edinburgh Medical and Surgical Journal, vol. xi. p. 132. Dr. Peschier, of Geneva, has ascertained that it requires an ounce of whites of eggs to neutralize four grains of corrosive sublimate, taken as a poison. (Lond. Med. Repos. vol. vi. p. 167.)

† A case in which the whites of eggs were given with perfect success is related by Dr. Lendrick, in the Transactions of the College of Physicians of Dublin. (London Medical Repository, vol. xv. p. 495.) See also another case in Ibid., vol. xiii. p. 480.

‡ London Medical Repository, vol. xxiii. p. 435.

§ Taddei, Recherches. Edinburgh Philosophical Journal, vol. iii. p. 406.

‖ Duncan's Supplement, p. 140.

¶ Medico-Chirurgical Review, vol. ix. p. 612.

** Cannot physicians unite in abandoning the terms *protochloride* and *deutochloride* of mercury, *protomuriate* and *deutomuriate* of mercury, and return to the old-fashioned and distinctive ones of *corrosive sublimate* and *calomel?* How many lives have been lost by mistakes in this way! Three children were thus poisoned at Paris in 1834. (Annales d'Hygiène, vol. xiii. p. 225.)

tate. He immediately experienced violent colics, copious vomitings, a trembling in all his limbs, and cold sweats.

There is a recent case recorded, of poisoning by red precipitate. It occurred at Guy's Hospital in 1833. The symptoms were cold surface, stupor, small and feeble pulse, eructation and frothy discharge from the mouth, with occasional vomiting of a red powder. There was no pain on pressure.

The stomach pomp was freely used, and afterwards flour and water and the whites of eggs were given. By these remedies, the patient recovered; but salivation ensued, and there was some pain in urinating.

The vomited matter was treated with dilute muriatic acid, and yielded metallic mercury.*

The red precipitate is readily ascertained by the application of heat to a little in a glass tube. Metallic globules are sublimed, and oxygen gas is disengaged.

Nitrate of mercury. There is also one fatal case of poisoning by this, given by Dr. Bigsley. An escharotic liquid used for the cure of "foot halt" in sheep, is made by dissolving seven parts of mercury in eight of nitric acid. Of this, a lad aged 16, at Newark upon Trent, took a tea-spoonful for the purpose of committing suicide. Vomiting and great pain soon followed. The throat and mouth were very sore, and he retched violently, and the pulse labouring and indistinct. Diarrhœa succeeded.

The stomach pump was used, and chalk given; but the pain continued from the mouth downward, and vomiting and purging recurred at intervals until his death, in three hours after taking the poison. His mind was unimpaired to the last.

On dissection, marks of inflammation were seen in the mouth, pharynx, and stomach. The mucous coat of each was of a deep rose red, with some eschars; but no perforation. The duodenum and colon were less strongly inflamed.†

Cinnabar or vermilion (sulphurate of mercury) would appear, from the experiments of Orfila on animals, to be innoxious when well washed.

According to the experiments of Barthez, the *deutobromide* of mercury is an active irritant poison. It produces high inflammation of the intestinal canal, and in some instances ulcers. When the experiment permitted, most of it was rejected by vomiting.‡

It is not necessary to notice the other preparations of mercury in detail, since their effects, in large quantities, and their modes of detection, are similar to those already mentioned. And I will only

* Mr. Brett, in London Medical Gazette, vol. xiii. p. 117.

† London Medical Gazette, vol. vii. p. 329. In a case where a saturated solution of nitrate of mercury was by mistake rubbed into the hip and thigh, suppression of urine for five days followed. Profuse ptyalism came on the third day, and the parts sloughed superficially. The patient however recovered. It is remarkable that no comatose symptoms ensued from the long-continued suppression. (Case by Professor Syme, Edinburgh Medical and Surgical Journal, vol. xliv. p. 26.)

† North American Medical and Surgical Journal, vol. vii. p. 219.

allude to the numerous cases which of late years have been described under the names of *hydrargyria*, *mercurial erithrismus*, &c. as proving that the mildest preparations of mercury may, under certain circumstances, and in peculiar constitutions, prove highly dangerous, and even fatal.

Mercurial vapours, and mercury in a state of extreme division. Mercurial vapours are undoubtedly to be deemed poisonous. Many cases are on record, which prove that workmen employed in mercurial mines, gilders, silverers of looking glasses, &c. are subject to serious accidents from their callings. This, however, is a point which I shall notice at length in another place, when treating of the *diseases incident to particular trades and professions.*

The usual consequences of a long exposure to them, are "trembling and paralysis of the limbs, vertigo, loss of memory and of the other intellectual faculties, salivation and ulceration of the mouth; colic, asthma, hæmoptisis, atrophy, apoplexy, and death."

The following is a remarkable illustration of the effects of mercury, in a volatilized state, on the human system. A large quantity of quicksilver (about thirty tons) was saved from the wreck of a Spanish ship about Cadiz, by the Triumph man of war and the Phipps schooner, both English vessels. It was placed in their spirit rooms. An alarming illness soon broke out among the crews, all of whom were more or less salivated. The surgeons, pursers, and three petty officers, who were nearest the place where it was stowed, felt its effects the most, as their heads and tongues were swelled to the most alarming degree. Every rat, mouse, and cockroach on board the Phipps were destroyed. And it was noticed, that those who slept close to where the quicksilver had flowed in consequence of escaping from the bags, suffered slightly in comparison to those who slept over the bags. Every thing metallic was whitened.

The explanation of this distressing event is not difficult. The quicksilver had lain for some time in salt water, and when on board, the leathern bags containing it rotted. Add to these, the effects of gases generated on board ships, and we have sufficient agents at hand to cause the rise, suspension, and oxidation of the metal. Dr. George Pearson suggested that sulphuretted hydrogen was probably the principal cause.*

When the effect of heat is added, the results are of the most marked kind. A conflagration broke out in the quicksilver mines of Idria in 1803, which resisted every effort for five weeks. As a last resource, the mine was laid under water. This succeeded, but it required two years to prepare an apparatus to pump out the water. "Even when the galleries had been cleared of the water, it was im-

* Philosophical Transactions for 1823. Dr. Burnett, who gives this account, ascribes it to the mercurial vapours. Edinburgh Medical and Surgical Journal, vol. vi. p. 513. A correspondent of the Philadelphia National Gazette newspaper of March 25. 1824, says that he was a witness of this occurrence, and that the sailors, imagining it to be silver, concealed it in their pocket handkerchiefs and every where around their persons. The ship was so contaminated with it, that she was finally condemned as unfit for service.

possible to work in them, partly from the heat they still retained, but still more from the fumes of sublimated mercury, which produced in the miners a violent salivation, accompanied with convulsions and trembling of the limbs. To produce an almost inhuman zeal, high wages were offered to such as would venture into places reckoned the most dangerous, to explore the consequences of the disaster, and collect the quicksilver which had been deposited in large quantities in the galleries. Many purchased this additional pittance with their lives; and altogether, the atmosphere which continued for months to infest the mine, was so baneful that it was difficult to muster a sufficient number of healthy men for ordinary occupations." *

Whether metallic mercury should be deemed a poison, is another question concerning which there is much diversity of opinion. We know that it has often been exhibited in large doses with salutary effects; and indeed in the days of Dr. Dover, two or three drachms of it were a common morning draught, as a preservative against gout and gravel. I apprehend that the proper distinction to be taken respecting it is, that when it can be so acted on as to be oxidated, even in the smallest degree (as for example, mixed with fat or oil, or even by friction alone), it *may* prove deleterious. Mr. Faraday has also contributed a valuable fact in illustration of this subject. He put some mercury in a clean dry bottle of about six ounces, which formed a stratum at the bottom, not one-eighth of an inch in thickness. A small piece of leaf-gold was fastened on the under part of the stopper to the bottle, so that when the stopper was put into its place, the leaf-gold was inclosed in the bottle. It was then set aside in a safe place, and after some time the leaf-gold was found, on examination, whitened by the mercury. He repeated this experiment several times with similar results, and he deduces from it the conclusion *that at common temperatures, mercury is surrounded by an atmosphere of the same substance.*†

ANTIMONY.

A great prejudice formerly existed against the use of metallic preparations, with the exception of iron; and this was carried to such a height as to the compounds of antimony, that the faculty of Paris (among whom Guy Patin was the most conspicuous) obtained an

* Edinburgh Journal of Science, vol. vi. p. 212., from Russel's Tour in Germany. Dr. Bright relates the fatal effects of extracting mercury by pressure out of the bags in which it is imported. (Medico-Chirurgical Review, vol. xx. p. 33.)

† Brande's Journal, vol. x. p. 354. This deduction will probably explain the following remarks of Dr. Falconer of Bath: "Instances (he observes) of the ill effects even of the external application of mercury, are sometimes found in the use of what are called quicksilver girdles, which are often worn for the itch, especially by females of the lower rank, as being cleanlier and more free from fœtor than a sulphureous application. Many of these cases have been admitted into the Bath Hospital. The general symptoms were a degree of general weakness approaching to palsy; great pain and tremor in the limbs, and often violent headache." (Edinburgh Medical and Surgical Journal, vol. viii. p. 214., quoted from the Transactions of the Medical Society of London.)

edict of the parliament of Paris, prohibiting their use as a medicin e Nor was it until one of their sovereigns had been cured by the use of antimony, that they (in 1666) demanded a sentence permitting its use.* It is to be feared, however, that the various preparations are often rashly and improperly employed at the present day.

TARTAR EMETIC. This substance in large doses must undoubtedly be deemed a poison. It is, however, far from being as certainly destructive as arsenic or corrosive sublimate.

The narrative of a few cases will properly precede the list of general symptoms.

A Jew, by mistake, took about twenty grains of tartar emetic in the morning, fasting. In a few moments after swallowing it, he experienced pain in the region of the stomach, which increased, and even brought on syncope. After this, excessive vomitings of bilious matter came on with alarming rapidity; aqueous stools occurred incessantly; the pulse was small and concentrated; the face pale; there was great prostration of strength, and the patient complained greatly of extremely painful cramps in the legs. By the use of proper remedies, the symptoms subsided after an illness of about six hours, and debility and painful digestion alone remained.†

A man, aged about fifty years, determined to poison himself, and for this purpose took about forty grains of tartar emetic on a Saturday morning. Vomiting, frequent stools, and convulsions soon succeeded. He was received into the Hotel Dieu on Sunday evening. On Monday morning he complained of violent pains in the epigastrium, which was distended. He could with difficulty move his tongue; he was, in fact, in such a state that he might be taken for a drunken man — he just spoke, and his pulse was imperceptible. During the day, his abdomen became inflated, the epigastrium was considerably tumefied, and became more painful; in the afternoon delirium came on. On Thursday, all the symptoms increased; in the evening there was furious delirium; convulsions supervened, and he died at night.‡

The following is a remarkable case: — An individual had collected about twenty-five grains of tartar emetic for the purpose of poisoning himself. He went into a coffee-house and asked for a glass of sugared water; and having dissolved the mineral in this, he drank it down. After leaving the coffee-house, which he did instantly, he had scarcely proceeded twenty steps, before he felt a burning pain in the epigastric region, accompanied by convulsive movements and a loss of his senses. He was carried in this situation to the Hotel Dieu, ten minutes after the accident. On coming a little to himself, he confessed his crime, and a decoction of bark was immediately administered in large quantities. The skin was cold and clammy, the breathing a little short, the pulse small and concentrated, and the epigastric region a little tumefied and very painful, hiccup tolerably frequent, but *no vomiting*.

* Philosophical Transactions, vol. ii. p. 710. See also Note to Abridgment, vol. i. p. 596.

† Case by Dr. Barbier of Amiens, from Magendie. Orfila's Toxicology, vol. i. p. 174.

‡ Case by Dr. Recamier, from Magendie. Orfila's Toxicology, vol. i. p. 177.

The symptoms gradually diminished in violence after taking the bark, and in two hours copious stools occurred, and continued for several hours. On the next day he vomited several times, and gastric symptoms were present for a week, but were removed by the usual remedies.*

From these and other instances, the following list of symptoms may be deduced: a rough metallic taste, nausea, copious vomitings, frequent hiccup, cardialgia, burning heat in the epigastric region, pains of the stomach, abdominal colic, inflation, copious stools, syncope, small, concentrated and accelerated pulse, cold skin, but sometimes intense heat, difficult breathing, vertigo, loss of sense, convulsive motions, very painful cramps in the legs, prostration of strength, and death. Sometimes to these symptoms is joined a great difficulty of swallowing, and deglutition may be suspended for some time.† The vomitings and alvine excretions do not always take place, and the consequence of this is an increase in the violence of the other symptoms.‡

There can be no doubt, from the marked local effects of the tartar emetic ointment, that its external application in large quantities must produce injurious consequences. Whether it would excite the usual symptoms of poisoning, is still a matter of doubt.§

* Case by Dr. Serres, from Magendie. Orfila's Toxicology, vol. i. p. 175. Additional cases will be found in Edinburgh Medical and Surgical Journal, vol. xix. p. 394. By Dr. Duffin; his own case from taking 20 grains through mistake.
Edinburgh Medical Essays, vol. iv. p. 35. By Mr. Stedman.
New-York Medical and Physical Journal, vol. viii. p. 302. By Dr. Charles Lee. A child a few weeks old swallowed fifteen grains in solution; vomiting and purging ensued, followed by convulsions and death.
Boston Medical and Surgical Journal, vol. iii. p. 592. By Dr. Usher Parsons. Three of the ward-room servants, on board the U. S. Squadron on Lake Erie in 1813, in meddling with the medicine chest, took by mistake for cremor tartar upwards of 40 grains of tartar emetic in solution. They were seized with vomiting and purging, weak contracted pulse, and cold clammy sweats. All, however, recovered after a few days by the use of proper remedies.

† Foderé quotes a case by Dr. Carron, where there was a suspension of deglutition for two days, vol. iv. p. 156.

‡ Orfila's Toxicology, vol. i. p. 178. Male mentions the case of a child who had taken a large dose, and in whom no vomiting occurred. He lay in a state of insensibility; the extremities were cold, the pulse languid and almost imperceptible; but by taking some strong brandy and water, these effects were removed, and violent vomitings succeeded, and the patient recovered: p. 166. See also Journal of Foreign Science, vol. i. p. 640.

§ The immunity experienced from large doses of tartar emetic, when given for inflammation of the lungs, and which practice had its origin in Italy, is now explained on the idea of a peculiar condition of the system that accompanies the disease. Twenty grains have thus been given every four or five hours, to the amount of five scruples, without causing either vomiting or diarrhœa. With the return of health, however, the exemption from the ordinary effects ceases.

In the autumnal fevers of our own country, and particularly those of the Western States, I have no doubt that a large majority of fatal cases have been owing to the too free use of tartar emetic. Such is the testimony of Dr. Drake and other physicians in that section of the Union. Cramp in the stomach is almost the earliest result; and if this be recovered from, inflammation (actual gastritis) often supervenes. Certainly the use of ipecacuanha is far preferable in these cases. (Western Medical and Physical Journal, vol. i. p. 297.)

Appearances on dissection. The mucous membrane of the stomach is usually red, inflamed, and covered with mucus. The duodenum is in a similar state, and occasionally the other small intestines. The lungs are often found more or less inflamed, and in some instances the brain is so also, and contains serous fluid. In a general way we may state, that the lungs and the mucous membrane of the digestive canal are the organs principally affected by this poison.*

In Dr. Lee's case, the mucous coat of the stomach was red and softened, and the duodenum of a deep red colour. The brain and the right side of the heart were distended with blood.

Effect on animals. Magendie and Brodie have each investigated the effects of this salt on animals.

The former ascertained that whenever the œsophagus was tied up in dogs, so as to prevent vomiting, four, six, or eight grains produced death at the end of two or three hours; while those who were able to get rid of it by vomiting often took a drachm, without experiencing any material bad effect. Large doses (as half an ounce), however, generally caused death in a few hours, or a few days, although instances did happen where no accident followed from their exhibition.

When a solution of tartar emetic of six or eight grains to three ounces of water was injected into the veins of a full-grown dog, vomiting and purging ensued, the breathing became difficult, the pulse frequent and intermitting, and great disquietude and trembling of the limbs preceded death. On dissection, the lungs were observed of an orange or violet colour, and distended with blood; while the mucous membrane of the intestinal canal, from the cardia to the rectum, was red and inflamed. A larger quantity, injected in a similar manner, produced an earlier death, and the inflammation was confined to the lungs; but a weaker solution took a longer period to develope itself, and the lungs and intestines were equally affected.†

It thus appears that, as a general rule, its first effect is almost always vomiting, in those animals who are capable of this function, and the poison is thus thrown off in many cases before it has had time to produce fatal consequences.

The results obtained by Mr. Brodie were similar in many respects. When applied to a wound in animals capable of vomiting, it usually, but not constantly, operated as an emetic. Paralysis, drowsiness, and at last complete insensibility, were among the symptoms that preceded death. The stomach sometimes bore the marks of inflammation, but he never saw any appearances of it in the intestines. These experiments were performed on rabbits; and the same symptoms were present, whether the tartar emetic was injected into the stomach or applied to a wound. The deduction drawn by Mr. Brodie from these results is, that this mineral does not produce its deleterious effects until it has passed into the circulation.‡

Tests. For these I shall follow Professor Turner, who has very

* Orfila's Toxicology, vol. i. p. 177. † Magendie, pp. 24. 36, 37.
‡ London Medical and Physical Journal, vol. xxviii. p. 126.

carefully and ably examined them.* I will, however, premise by observing that there is considerable discrepancy among chemists as to the solubility of tartar emetic. Dr. Duncan, junior, is said to have selected very pure specimens for this examination, and he states that one part is soluble in three times its weight of water at 212°, and in fifteen at 60°. Probably it would be proper, in ordinary cases, to add rather more than these proportions, and particularly as much of the salt in use is far from being pure.

(*a.*) Caustic potash precipitates it white, if the solution be strong. The first portions of the test have no effect, as the tartrate contains an excess of acid which must be neutralized. The precipitate thrown down, which is the oxide of antimony, is redissolved by an excess of potash.

(*b.*) Lime-water gives a white precipitate, but not if the solution contains only half a grain to an ounce.

(*c.*) Subcarbonate of potash is more delicate, and also gives a white precipitate.

(*d.*) Muriatic and sulphuric acids throw down a white precipitate, and take it up when added in excess.

(*e.*) Infusion of gallnuts gives a dirty yellowish white precipitate, but is not a minute test.

(*f.*) The most minute test, however, is sulphuretted hydrogen. In a solution containing only an eighth of a grain per ounce, it strikes an orange red colour, which, when the excess of gas is expelled by heat, becomes an orange red precipitate; and if the proportion of salt is greater, the precipitate is thrown down at once.

The juices of plants, the extractive decoctions of roots and barks, precipitate the solution of tartar emetic, and produce a reddish yellow deposit, consisting of oxide of antimony and a portion of vegetable matter. According to Dr. Paris, one ounce of the decoction of yellow bark is capable of decomposing one scruple of this salt, and rendering it completely inert.

Tartar emetic poured on milk produces no coagulation, and the mixture gives a clear red precipitate, with the hydro-sulphuret of ammonia. Broth and bile diluted with water do not alter the action of agents on the tartar emetic.†

In all cases of mixed fluids, Dr. Turner advises that the suspected fluid be acidulated with a little muriatic and tartaric acids. The former will coagulate various animal principles which may be present; and the latter possesses the property of readily dissolving all precipitates whatever, formed by reagents with tartar emetic, except that caused by sulphuretted hydrogen. The fluid so prepared is to be filtered, and a sulphuret formed and collected in the usual way. This may be placed in a horizontal tube, and a continued stream of hydrogen gas passed through it.‡

* On the Detection of Antimony in Mixed Fluids. Edinburgh Medical and Surgical Journal, vol. xxviii. p. 71.

† Orfila's Toxicology, vol. i. p. 166.

‡ This process was adopted from the known fact that hydrogen will separate sulphur from antimony at an elevated temperature. In performing the experiment, one

When all the oxygen of the atmosphere is expelled from the apparatus, heat may be applied with a spirit lamp to the sulphuret. The result is, that sulphuretted hydrogen is evolved, and metallic antimony is left, if the current of hydrogen is gentle, or it is sublimed if the current is rapid. This mode of proceeding was sufficient to detect the metal from only a tenth part of a grain of the sulphuret. If any doubt remain, dissolve the contents of the tube in nitric acid, and throw down again the orange sulphuret with sulphuretted hydrogen.

Antidotes. Vomiting, if not already present, should be excited by tickling the throat and the administration of warm water in large quantities; and even if it has taken place, warm water is adviseable to relieve the symptoms. If, notwithstanding the employment of these means, vomiting cannot be induced, we should exhibit the decoction or tincture of bark. This was proposed by Berthollet, and its value is great, from the fact of its decomposing the salt. Strong tea, the decoction of nutgalls, or of astringent roots and barks generally, will answer as substitutes, when the bark cannot be obtained.

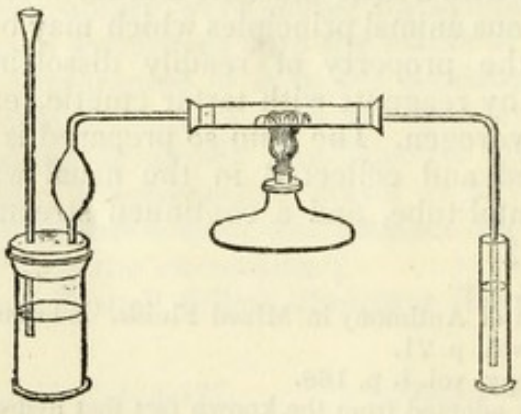
Opium may be employed in excessive vomitings, and the antiphlogistic treatment is generally necessary to remove the secondary symptoms.

THE OXIDE AND GLASS OF ANTIMONY. These substances are also poisonous, even in small doses. Hoffman mentions fatal cases, produced by the latter, where the symptoms were similar to those caused by tartar emetic; and Morgagni quotes instances, where men and animals died from its exhibition. Inflammation of the stomach was observed on dissection.*

Both the oxide and the glass, being mixed with charcoal and heated in an earthen crucible, furnish metallic antimony.

THE MURIATE (*butter of antimony*) AND SUBMURIATE OF ANTIMONY. These, like the former, are deleterious substances. Orfila quotes a case from Borrichius, where a few strong doses of the submuriate caused violent purging and vomiting, a copious salivation, and

end of the tube should be connected by means of a cork with a vessel from which the hydrogen is evolved, and to its other end a bent tube must be adjusted to open under water, so as to carry away the hydrogen and at the same time exclude atmospheric air. The following is the form of apparatus recommended by Drs. Turner and Christison.



* Morgagni, vol. iii. p. 370.

extreme debility. For some time previous to death, the patient was cold as ice, his pulse was scarcely perceptible, and he breathed with difficulty. He nevertheless enjoyed all his intellectual faculties.*

ANTIMONIAL WINE. The composition and strength of this preparation vary according to the purity of the solvent; and as this is liable to alteration, a degree of insecurity attaches to its exhibition.† And I have no doubt that children have often been injured by its administration without proper advice. I will only advert to the cases quoted by Orfila from Mangetus and Fabricius Hildanus, as proofs of the dangerous and even fatal effects of this substance. Certainly the solution of tartar emetic in water is a far preferable prescription.

For each of the above compounds of antimony, the tests already advised may be used.

ANTIMONIAL VAPOURS. Fourcroy (says Orfila) relates that he has seen fifty persons who were seized with a great difficulty of breathing, tightness of the chest, and a dry cough, gripings and purging, ten or twelve hours after having respired the vapours of sulphuret of antimony, which had been detonated with nitre. The prolonged action of these might undoubtedly lead to serious evils.

COPPER.

The preparations of this metal are seldom used as the instruments of crime, but they are frequently poisonous through accident; and this is owing to the circumstance of copper being extensively employed for domestic utensils.

I shall notice, first, the nature of metallic copper, and then the action of its various compounds.

METALLIC COPPER. The weight of testimony is decidedly in favour of this not being poisonous, when perfectly pure. Orfila cites several cases from authors, where masses were swallowed, and after some time voided by the natural passages, without producing any injury. Dr. Paris mentions an instance where six copper penny pieces were taken, with a view of self-destruction, and no inconvenience was experienced, except the effects of mechanical obstruction. They were voided after a lapse of five years.‡

* Orfila's Toxicology, vol. i. p. 190.

† Dr. Paris recommends that antimonial wine be struck from the list of officinal preparations.

‡ Paris's Pharmacologia, p. 250. Dr. A. T. Thomson mentions two instances in which half-pence were swallowed, and remained, the one six months and the other two months, before they were evacuated. In neither case was the health injured. (London Dispensatory, p. 273.) Dr. Corbett gives another, where a half-penny was retained three months. (Lancet, N. S., vol. ix. p. 294.)

On the other hand, the following seem to contradict the usual results, but it is probable that these peculiarities were owing to some previous oxidation of the metal. "A child, aged three years, swallowed two copper farthings by accident, at an interval of half a year after each other. After swallowing the first, he ate nothing for ten days, complained of great pain at his stomach, and drivelled as if he had been salivated. After the second, he began by degrees to lose his flesh, and had the appearance of consumption. He was, however, perfectly cured by the Bath waters."

It is not so certain that this substance in a state of minute division, as filings for example, is equally innocuous. Portal relates a case, where they were given to an individual labouring under ascites; and while the disease seemed to yield, colic, tenesmus, and vomitings suddenly supervened. * Experiments on animals, however, with large doses of copper filings, mixed with grease or oil, have produced no injury, and on dissection their metallic brilliancy was found untarnished.

But we have always reason to dread the effects of this metal on the human system, from the facility with which it oxidates. Copper exposed to a moist atmosphere becomes tarnished, and passes into a state of oxide, which soon after unites with the carbonic acid of the atmosphere, and forms a greenish carbonate. It dissolves in the principal mineral acids, with the aid of heat. Milk, however, although boiled for two hours in a clean kettle, did not contain any trace of copper; and the same result was obtained with tea, coffee, beer, and rain water. But if the water contained muriate of soda, it dissolved a notable portion of copper. These results were obtained by Mr. Eller, a chemist at Berlin, and he noticed a remarkable circumstance in connection with the last one. If, instead of a simple solution of muriate of soda (common salt), it was previously mixed with beef, bacon, and fish, the fluid resulting did not contain a trace of copper.† Fat bodies, assisted by the oxidising principle of the atmosphere, also act with celerity on copper.

We must remark, however, that vegetable acids generally dissolve the metal with difficulty, even although assisted by heat. And hence the boiling of sugar or syrups in vessels of this metal does not of itself produce any noxious compound, unless it be left to cool in them. In the latter case, the boiled substance acquires a bad taste and a green colour, and the copper forms an oxide on its surface.

These facts are sufficient to prove the necessity in all cases of tinning vessels intended for the preparation of articles of food. Numberless causes (says Proust) unite to accelerate the dissolution of the

(Communication by Dr. Edward Baynard, Philosophical Transactions, vol. xx. p. 124.)

A case is also mentioned by Dr. Jackson of Boston, where the swallowing of a half cent produced nausea and vomiting, with several other symptoms characteristic of the poison. (New-England Journal, vol. viii. p. 156.)

In a boy who swallowed a cent, severe vomiting followed, and in two days profuse salivation, which continued for some time. He discharged it at the end of five weeks perfectly bright, but the soreness of the mouth remained until that time. (Case by Dr. Budd, Coxe's Medical Museum, vol. ii. p. 178.)

Dr. Gloninger relates a similar case, also accompanied with salivation. (American Medical Recorder, vol. vi. p. 583; and also Dr. Percival in his Essays, vol. ii. p. 221.)

* Orfila's Toxicology, vol. i. p. 201.

† Orfila's Toxicology, vol. i. p. 202. Sir Humphry Davy, in his investigations on the preservation of the copper sheathing of ships, makes the following remark: "Weak solutions of salt act strongly on copper; strong ones, as brine, do no affect it: and the reason seems to be, that they contain little or no atmospheric air, the oxygen of which seems necessary to give the electro-positive power to menstrua of that class. (Annals of Philosophy, N. S., vol. ix. p. 299.)

copper, since the juices of all viands are fat, acid, and naturally saline. It is therefore evident, that tinning is indispensable for kitchen utensils.* And this author has also shown another advantage arising from this precaution. The usual alloy applied in tinning vessels consists of equal parts of tin and lead, and the tin being more oxidizable than the lead, is exclusively dissolved by any vegetable acid that may be contained in the viands, and thus prevents the latter from being attacked. These compounds of tin are known to be harmless. †

Copper and bell-metal mortars are evidently hazardous, for similar reasons, in the office of the apothecary. Not only will moisture affect them, but also many articles of the materia medica, and thus a dangerous compound may result. ‡

Oxide and carbonate of copper. The carbonate (natural verdigris) forms spontaneously on the surface of copper or brass vessels, pieces of coin, &c. when treated with ammonia or water, and is of a green colour. The oxide is of a blackish brown colour. Both of them are highly poisonous, and colic and vomiting are their usual symptoms.

From the remarks made in the previous section, it will be readily understood why copper utensils, when not properly cleaned, contaminate acid substances boiled in them. Vinegar dissolves the oxide with ease, as does also ammonia. Eller has proved that wine dissolves copper, doubtless in consequence of the acetic acid contained in it, and the oxidation of the metal by the air §; and we can explain in the same way, the production of the acetate in the cocks of the vessels from which wine, beer, or cider is drawn. "Drouard was affected for three days with colic and diarrhœa, in consequence of eating a ragout which had been seasoned with wine drawn out of a cask, the cock of which contained acetate of copper, which this liquor had in part dissolved." Fat bodies, such as fixed and essential oils, &c. dissolve the oxide and carbonate of copper with readiness; and hence Proust very justly condemns the use of copper measures for oil. ‖

* Cleanliness may, however, ward off any formidable injury. "In the orphan house at Halle, from 600 to 900 persons daily eat food dressed in large copper kettles, and yet I never heard there of any bad effects from them: here, however, I must observe, that the cleanliness was quite exemplary; that in the afternoon we observed, with pleasure and admiration, the kitchen perfectly clean and the copper vessels bright." (Michaelis's Commentaries, vol. iii. p. 338.)

† Mr. Proust's papers on *Tinning*, which appeared originally in the *Annales de Chimie and Journal de Physique*, I have consulted in the Repertory of Arts, second series, volumes vi. and ix.

‡ There is a useful paper on this subject in the Medical Commentaries, vol. vii. p. 311. The author first shows that bell-metal mortars are liable to abrasion, and that thus the particles may be united with medicines; and next, that some substances will act chemically on them.

§ Moseley relates, that in 1592, at a meeting of the great senate of Bern, the wine was put into copper vessels, and suspended in a well in order to cool it. In a few days, the legates and others who had drank were seized with violent pain in the abdomen, fever, and dysentery, and many died. (Moseley on Tropical Diseases, p. 331.)

‖ Orfila's Toxicology, vol. i. p. 203 to 206. In several cities in Europe, distillers, apothecaries, and others, are forbidden to use copper vessels unless they are tinned. (Ehrmann in Schlegel, vol. iii. p. 230.)

The tests of these compounds are similar to those of verdigris, which we shall now notice.

Verdigris. The compound substance known under this name, is the preparation of copper which most frequently produces deleterious effects. Orfila has collected numerous cases illustrating its action, and I conceive it will be useful to state the mode in which the respective individuals were poisoned. In one instance, a family consisting of nine persons were affected; the first of these by a cake made with melted butter, and skimmed with an instrument of copper, upon which the fat body had been allowed to cool; five from some broth and meat coming out of a saucepan, skimmed by the same skimmer; and the remainder by a fricassee of pigeons prepared in the same pan. The Jacobin friars in Paris, to the number of twenty-one, were poisoned in 1781 by eating some ray which had been cooked in a copper vessel. The cook, after taking out a part of the water, had poured vinegar on the fish to render them more firm, and in this state they had stood for some time away from the fire. Some veal placed in an earthen pot, to which there was a copper lid, and which lay directly on the meat, affected two individuals. So also eggs prepared with sorrel and butter in a copper vessel, which was covered with verdigris. Dupuytren mentions a case where a whole family was poisoned from eating lobsters, which had been cooked, and afterwards placed in a copper kettle, with vinegar poured over them. Even peas which remained for a day in the copper vessel have produced all the characteristic effects of poisoning from copper.*

* Medico-Chirurgical Review, vol. i. p. 158. quoted from a French medical journal. For similar cases, see Medical Observations and Inquiries, vol. ii. p. 146. Case by Mr. Ramsay, of a number of men on board the Vestal frigate in 1757, taken suddenly ill, with convulsions and delirium, pain and suffused eyes. Also of a boy violently attacked from eating peas that had remained a day in a copper vessel.

Annales D'Hygiène, vol. viii. p. 438. An enumeration of various cases of food thus becoming poisonous.

Percival's Essays, vol. ii. p. 221. A female ate three or four ounces of pickled samphire. A rash appeared in the evening, which disappeared on the next day. To this succeeded pain, thirst, costiveness, vomiting, hiccup. The discharges were extremely offensive, and the abdomen tender to the touch; the hiccup became almost incessant. Various remedies were given without benefit, and she died on the tenth day. Dr. Percival states that he has seen similar severe sufferings, but which did not prove fatal, in a young man, a brass-founder, who drank water out of an old tea-kettle, the inside of which was covered with verdigris.

Annals of Medicine, vol. vii. p. 402. Case by Dr. Yeats, of poisoning from eating pickled salmon seasoned with vinegar. The eyes were much affected in these individuals, and dimness of sight was followed by dilated pupils.

London Medical Quarterly Review, vol. ii. p. 93. Case quoted from Mr. Swan, of illness from eating hashed hare that had stood in a brass pan.

Boston Medical and Surgical Journal, vol. ii. p. 305. Case by Dr. Higginson; a large family poisoned with milk. In two hours after taking it, they were all seized with nausea and vomiting; proper remedies, however, soon relieved them. Dr. Charles T. Jackson analysed the milk, and found subacetate of copper in it.

Medical Facts and Observations, vol. i. p. 61. Case by Mr. Davidson, of a mother and four children suffering under an extensive cutaneous eruption, probably from dining on pease soup which was distributed with a ladle that had been long out of use, and was quite green.

Annales D'Hygiène, vol. x. p. 84.

Verdigris itself is also sometimes used as the instrument of suicide. A lace-worker at Paris put eight *sous* pieces in a glass of strong vinegar, and left them there for seven days. At 2 P.M. having made a good dinner, he drank first one half, and in fifteen minutes after the remainder of the potion. Not content with this, he washed the coins in more vinegar, brandy and anise-seed water, all of which he swallowed. Three hours afterwards, he was found insensible. The muscles were violently convulsed; the teeth set; the breathing interrupted; the pulse small, hard, and very slow; the pit of the stomach tender on pressure. He recovered his senses in half an hour, and then told what he had swallowed. Whites of eggs were immediately given in large quantities. The convulsions now ceased rapidly, but the hiccup continued for many hours. Next day, the abdomen was very painful; pulse full, slow, and intermitting; the convulsions partial and transient. Leeches were used, and the whites of eggs continued. In the evening, he had colic, hiccup, and a contracted pulse; but gradually recovered from this, and went on improving until the fourteenth day, when he was dismissed cured.*

It is not necessary further to copy the detail of any particular case, since the leading symptoms in all are generally very similar. They are thus stated by Orfila: "An acrid, styptic, coppery taste in the mouth; parched and dry tongue; a sense of strangulation in the throat, coppery eructations, continual spitting, nausea, copious vomitings or vain efforts to vomit; shooting pains in the stomach, which are often very severe; horrible gripes; very frequent alvine evacuations, sometimes bloody and blackish, with tenesmus and debility; the abdomen inflated and painful; the pulse small, irregular, tight, and frequent; syncope, heat of skin, ardent thirst, difficulty of breathing, anxiety about the præcordia, cold sweats, scanty urine, violent headach, vertigo, faintness, weakness in the limbs, cramps of the legs, and convulsions." All these, however, do not generally occur in the same individual, but vomiting and colic are very constant.

Gangrene sometimes takes place in the intestines, and this disease is then accompanied with its usual premonitory appearances.

Sulphate of copper. (Blue vitriol.) "The most dreadful case of convulsions I ever saw (says Dr. Percival) were produced by blue vitriol, on a young woman who swallowed about two drachms of it in a fit of desperation. By evacuants, demulcents, and such absorbents as have the power of decomposing the metallic salts, she happily recovered. In the interval of her fits, she was perfectly rational." †

Appearances on dissection. If death takes place very rapidly, it is probable that few, if any, diseased appearances will be observed. Such at least was the case with animals.

In protracted cases the alimentary canal is the organ principally diseased. The mucous lining of the stomach and intestines is found

* Edinburgh Medical and Surgical Journal, vol. xxxiii. p. 220. from Revue Médicale. Another case is quoted by Metzger, from Pyl, p. 396. The verdigris was found in the pylorus, and it had tinged the fæcal matter.

† Percival, Essays, vol. ii. p. 221. The sulphuret of copper would seem, according to the experiments of Orfila, to be innocuous.

to be inflamed and gangrenous, and this extends even to the rectum. In one instance, that intestine was found pierced at two points. Sometimes the inflammation extends to all the coats, and sloughs are formed, which leave openings through which their contents pass out, and are effused into the cavity of the abdomen.* Metzger remarks, that the green colour of the salt tinges all the fluids contained in the primæ viæ.† Inflammation of the brain has occasionally been noticed.‡

Effect on animals. The experiments of Drouard on dogs led him to the conclusion that verdigris acts immediately on the alimentary canal, in which it excites inflammation, without being taken up into the circulation by the lymphatic vessels. To a young dog twelve grains were given, which produced death in twenty-two hours. The stomach was found inflamed, and exhibited a black spot, which might have been taken for an erosion. The small intestines showed no marks of inflammation, but the rectum contained small ecchymoses, similar to those in the stomach. In another instance, the stomach and duodenum were inflamed, and the rectum natural.

When a small quantity in solution was injected into the jugular vein, death ensued in half an hour. The trachia and bronchia were filled with frothy mucosities, and the great vessels were distended with black and fluid blood. But in a dog who survived to the fourth day after this operation, nothing peculiar was observed either in the digestive organs or the vessels. Large doses indeed seem to produce sudden death, preceded by vomiting, convulsive motions, great insensibility, and paralysis, and present at the same time but slight alterations on dissection. Orfila considers these facts as invalidating the doctrine of Drouard, and conclusive in favour of the absorption of the poison, and its action on the nervous system.

Tests. The tests of copper in solution are, —

(*a.*) Ammonia gives a blue precipitate; but if added in excess, the precipitate redissolves, and the liquor is of a beautiful blue colour.

(*b.*) Sulphuretted hydrogen gas causes a brownish black precipitate, the sulphuret of copper.

(*c.*) Ferro-cyanate of potash gives a brown precipitate, the ferro-cyanate of copper.

(*d.*) A clean plate of iron held in a solution of sulphate of copper becomes covered in a few hours with a red powdery crust, which is the copper in a metallic state. The blue colour of the solution grows first green and then red. A sulphate of iron has been formed in it.

(*e.*) Caustic potash precipitate it of a sky blue colour, the hydrated peroxide of copper.

(*f.*) Oxide of arsenic, with the previous addition of a few drops of ammonia, gives a fine apple green precipitate, the arseniate of copper, or Scheele's green.§

* Orfila's Toxicology, vol. i. p. 224. Christison, p. 422. The skin was yellow in several cases related by Pyl and Wilberg.

† Metzger, p. 131.

‡ Male, p. 147.

§ Orfila's Toxicology, vol. i. p. 206; Christison, p. 402. A very delicate process

The following are mentioned by Orfila as the effects of animal and vegetable substances on it. The infusion of tea decomposes the solution of the acetate of copper, and a flaky precipitate of a reddish yellow colour is produced. If one part of a concentrated solution of verdigris be added to ten parts of red wine, the liquor preserves its transparency, and the hydro-sulphurets give a black precipitate; the prussiate of potash a brown, and ammonia a very dark brown. Seven parts of the solution of verdigris and ten of wine furnish a fluid with which the above agents produce similar results, except that the precipitate from the ammonia is of a black colour. It readily follows from these that this alkali is of no use in detecting verdigris if it has been mixed with wine.

If albumen be poured upon the acetate of copper, a bluish coloured precipitate will be obtained. Gelatine produces no effect, whatever may be the temperature of the mixture, and the tests act exactly as if the acetate of copper were alone. Broth furnishes no precipitate; but milk is coagulated by a large quantity of the solution of verdigris, and the coagulum when properly washed is of a deep green colour. Sugar by trituration with verdigris renders it nearly insoluble in cold water.

In cases where copper is mixed with animal and vegetable substances, Dr. Christison advises that the suspected matter be first boiled in acetic acid, and then filtered. What remains on the filter is to be washed and dried. Test the fluid portion with sulphuretted hydrogen, and boil it to expel the excess of gas. If copper be present, the brownish black precipitate will be thrown down. This, on being dried and burnt, may be converted into the sulphate by the action of a few drops of nitric acid, aided by heat. Test this with ammonia. The insoluble portion should be heated to redness in a crucible till it is completely charred. The copper is reduced to a metallic state, and may be treated with nitric acid, and the liquid tests then applied.

In certain cases, however, no vestige of the poison can be detected, from its having been vomited up during life. Orfila recommends that we should then scrape off the mucous membrane of the stomach and intestines, dry it, and submit it to the action of strong heat in a crucible. He has twice, he observes, obtained metallic copper by calcining in this manner a portion of the membranes of two dogs, poisoned by verdigris; and this effect particularly takes place when the mucous membrane is of a bluish colour, hard, and strongly adhering to the substance of the stomach.*

In Dr. Higginson's case, a lancet blade dipped in a solution of the poisoned milk, and to which a drop of nitric acid had been added to

for the detection of copper has recently been announced by M. Boutigny. It consists in suspending by means of a hair the half of a fine needle in the midst of the suspected liquid, previously acidulated with sulphuric acid. The apparatus thus disposed is placed under a bell glass, and allowed to stand for several days. Air bubbles are found to form on the needle, which gradually burst; and in a few days the copper, if any be present, is precipitated on the steel. The oxide of iron is dissolved in the sulphuric acid, and forms sulphate of iron, which remains in solution. (Edinburgh Medical and Surgical Journal, vol. xl. p. 488. Annales D'Hygiène, vol. ix. p. 228.)

* Vol. i. p. 231.

separate the curd and albumen, was immediately covered with a coating of metallic copper.

Dr. Jackson next evaporated a portion of the milk to a spongy mass, and then burnt it in a platina crucible. The ashes were treated with nitric acid. On adding ammonia, a fine blue colour without precipitate appeared. In another portion of the same a rod of polished iron was left over night, and the next morning half a grain of metallic copper was scraped from it.

In consequence of some excitement in Flanders and France, relative to the use of sulphate of copper by bakers in making bread, various analyses have been instituted of different vegetable and animal substances, and it is remarkable that several chemists have detected the presence of copper in many of these. Meissner showed that this metal exists in small quantity in many kinds of grain, and hence that its detection in them is not certainly, or at least always, a proof of adulteration.

Sarzean asserts that he has found traces of it in two hundred species of vegetables, and that it exists in gelatine and in butcher's meat in the proportion of one grain to every fifteen pounds. The quantity in all of these is, however, so minute as scarcely to be considered a serious objection to the conclusiveness of an ordinary medico-legal analysis.*

Besides the adulteration of bread, sugar plums, and other articles of confectionery (*bonbons*), have been largely coloured with the salts of copper, and in consequence serious disease, and even death, have followed from eating them. Arsenite of copper (Scheele's green), sulphate of copper, and chromate of lead, have each been detected by chemists.†

Antidotes. The investigation of M. Marcelin Duval, and the earlier experiments of Orfila, seemed to prove that *sugar* was the antidote for verdigris. It allayed the pain and other alarming symptoms, and produced a great number of liquid stools. Subsequent researches have however diminished the value of this substance. It is useful in calming the irritation, when the poison has been expelled by vomiting, but it exerts no chemical action on it; and animals in whom the œsophagus was tied died, notwithstanding large doses of syrup were administered. When *albumen* was given under similar circumstances, the animal survived several days, experienced no remarkable change, and after death no lesion was found.‡ It is hence the proper

* British Association, 2d Report, p. 482. Christison, p. 415. Boutigny is of opinion, that in the case of vegetables copper will be found in them only when it is contained in the soil in which they grow. Hence its presence may be considered not as the result of the act of vegetation, but only of absorption. (Edinburgh Medical and Surgical Journal, vol. xl. p. 489.)

† Annales D'Hygiène, vol. i. p. 420; vol. ix. p. 396; vol. x. p. 183.

‡ Orfila, vol. i. p. 466. Postel has made some comparative experiments with sugar and albumen, and found that the chances of recovery were as three to two in favour of sugar. He therefore deems it an antidote, and considers it capable of decomposing acetate of copper at the ordinary temperature of the atmosphere — more rapidly, however, at the boiling temperature. (Annales d'Hygiène, vol. x. p. 207; Medico-Chirurgical Review, vol. xxii. p. 528.)

A case is recorded in the Medico-Chirurgical Review, vol. i. p. 158., where sugar

antidote, while sugar and its preparations may be used to aid its operation.

Drs. Mylne Edwards and Dumas have also found, in their experiments on animals, that metallic iron is a good antidote. When fifteen, twenty, and even fifty grains of sulphate of copper, acetate of copper, or verdigris, were given to animals, and an ounce of iron filings administered, either immediately before or immediately afterwards, the gullet being tied to prevent the discharge of the poison, death did not ensue for five, six, or even eight days, and consequently proceeded from the operation on the gullet; and in one experiment, on the ligature being removed from the gullet, the opening healed up, and complete recovery took place.*

The ferrocyanate of potash is also recommended by Dr. O'Shaughnessy as an antidote, from its powers of decomposition.†

The use of vinegar should, in cases of poisoning, be strictly interdicted, since it must prove injurious from its solvent power over the salts of copper.

Should any inflammatory symptoms remain after the presumed evacuation of the poison, they should be treated like gastritis, and opium and antispasmodics may be indicated for the spasmodic affections that are apt to remain.

ZINC.

The *sulphate of zinc*, from its frequent use in medicine, may, by accident, be taken in improper doses. Its property, however, of readily exciting vomiting, will prevent in most cases any very serious consequences. In the experiments of Orfila, he found that when given to dogs in large doses it caused frequent vomitings, but they recovered in a short time. When, however, a solution of it was injected into the jugular vein, violent and often ineffectual attempts were made to vomit, and death followed in a few minutes. So also when the œsophagus was tied. The animal died on the third day, and on dissection the mucous membrane of the stomach was found of a deep red colour throughout its whole extent, and black spots were occasionally seen upon the muscular coat from extravasated blood. The lungs were less crepitating than usual, and their colour was rather dark.

Cases are also recorded of its effects on the human system. In a female, who by accident drank down a solution of two ounces, it produced an excessively astringent taste, a contraction about the throat, burning heat at the stomach, cold extremities, pale countenance, and convulsive pulse. Vomiting, however, soon intervened; and by the aid of proper remedies, the consequent irritation of the

apparently saved the life of the patient. After the second draught of sugar and water and whites of eggs, the vomitings and epigastric pains ceased: he fell asleep, and awoke quite well.

* Christison, p. 424; Medico-Chirurgical Review, vol. ix. p. 611.

† Lancet, N. S., vol. vii. p. 838.

nervous system was subdued. In another case, violent pain in the epigastric region came on, and was succeeded by vomitings and continual stools. These gradually diminished, and he recovered. *

From these cases we may consider the following as the chain of symptoms which will result from taking this salt in large doses: "An astringent taste, sense of strangulation, nausea, copious vomitings, frequent stools, pains in the epigastric region, extending afterwards over the whole of the abdomen, difficulty of breathing, frequency of pulse, paleness of the countenance, and coldness of the extremities."

Appearances on dissection. In an unequivocal case of poisoning by it, Mertzdorff found the stomach and intestines, but particularly the latter, contracted, the inner membrane of the stomach grayish green, with several spots of effused blood, and greenish fluid contents, and the inner membrane of the small intestines similarly spotted; the rest of the body quite natural. He detected the poison by chemical tests, not only in the contents, but likewise in the coats of the stomach and intestines. †

Chemical proofs. Sulphate of zinc is very soluble. As usually sold in the shops, it is often very far from pure, having an admixture of the sulphate of iron. This greatly modifies the action of the tests, and it will therefore be necessary to mention their effects, both on the pure and the impure substance.

(*a.*) The caustic alkalies, when added to the pure salt, throw down a white precipitate (oxide), which is soluble in an excess of ammonia; when added to the impure, a greenish white precipitate. Carbonate of ammonia also precipitates the pure salt white, the impure grayish white.

(*b.*) The prussiate of potash causes a white precipitate in the pure, and in the impure a deep blue one.

(*c.*) Sulphuretted hydrogen, a white precipitate in the pure and impure.

Tincture of galls may be used as a preliminary test, to ascertain the presence of iron; it merely renders the pure salt hazy, but gives a deep violet coagulum in the other.

When the sulphate is mixed with animal and vegetable substances, Dr. Christison advises that it be acidulated with acetic acid and filtered. The fluid is then evaporated, and treated with sulphuretted hydrogen gas. Expel the excess of gas by boiling, and wash and collect the precipitate. It has then to be dried and heated to redness in a tube. When cool, add nitric acid to it, which acts on the zinc, and leaves the sulphur. The nitrous solution must now be diluted and neutralized with carbonate of ammonia, after which the liquid tests will act on it. ‡

* Orfila's Toxicology, vol. i. p. 270. "A female partook accidentally and very moderately of a cake impregnated with white vitriol, which had been prepared for the destruction of an old man. He was seized with violent vomiting, but the woman died." (Metzger, p. 396.)

† Christison, p. 452.

‡ Christison, p. 447. Orfila, in his last edition, recognizes the variety of effects produced by tests on the pure and impure salt. He only stated the latter (which I copied) in the first.

Treatment. We should endeavour to produce vomiting by administering warm water and emollient drinks. Milk is particularly proper, from its power of decomposing the sulphate. We must guard against the approach of inflammation, and allay irritation by anodynes.

Oxide of zinc. This can hardly be considered a very deleterious substance. In large doses, it produced vomiting in animals, and probably would have the same effect on the human system. *

It is a problem of considerable interest, whether *metallic zinc* is a safe substance for domestic utensils. It has been repeatedly recommended for this purpose, by individuals on the continent of Europe, but the examinations made by chemists are decidedly unfavourable to it. Proust suggests several objections with reference to its manufacture, such as the effect of heat on it and the difficulty of soldering; but the most important is its facility of oxidation. The atmosphere alone produces this effect, while vinegar dissolves it and forms an acetate.† Several commissions have been appointed in France to examine into the propriety of employing this metal. Vauquelin and Deyeux reported to the medical faculty of Paris, that water, when suffered to remain in vessels of zinc, decomposed it, and produced a white oxide. Vinegar caused an acetate, which was ascertained by reagents. Citron juice and sorrel, each produced on boiling, their respective compounds with the metal. Muriate of soda in solution furnished a liquor which gave a precipitate of oxide of zinc. Lastly, butter heated in a saucepan of zinc destroyed the polish of the vessel, and there was even formed by the heat a small hole in the bottom of it. It is therefore impossible (they remark) to employ it for kitchen utensils, without incurring the hazard of its being united, either in the state of oxide or salt, with domestic viands.‡

The French Institute also appointed a committee, at the request of the ministers of the interior and of war, to inquire into the propriety of its use for the fabrication of measures for liquids, and for vessels and utensils for the use of military hospitals. It consisted of Portal, Berthollet, Deyeux, Vauquelin, and Guyton Morveau. They repeated several of the previous experiments with similar results. Even distilled water, heated in a sand bath, dissolved part of the zinc, and formed a hydrate, which possessed a distinct metallic taste.

The commission remark, that although the oxide itself may not be dangerous, yet if zinc vessels be used for domestic purposes, we shall have a variety of salts produced from the numerous ingredients that are employed for food. And it is impossible that these can be healthy; nor indeed can it be otherwise but that some will prove noxious. They therefore advise against the adoption of this metal. §

* Dr. M. Wendell relates a case where a female took by mistake for magnesia, thirty grains, two or three times a day, for a fortnight, without any effect, except a slight constriction of the fauces immediately after swallowing the dose. (Coxe's Medical Museum, vol. iv. p. 247.) Reil's experiments on animals with the oxide, are mentioned in the Annals of Medicine, vol. i. p. 171.

† See Proust's paper, already quoted.

‡ Repertory of Arts, second series, vol. xxiii. p. 178.

§ Ibid., vol. xxv. pp. 247. 313. A third report was made sometime previous

With this information on the subject, it is somewhat astonishing that the proposition should be entertained, of using vessels made of zinc in dairies. Yet an individual proposed to the London Society of Arts, to employ them for obtaining cream from milk. He allows from his own experiments, that milk subjected to this process, is more or less impregnated with the soluble salts of zinc. When asked by the committee of the society, what he had done with the milk after the separation of the cream, he replied, that he employed it wholly in feeding pigs, and that they thrived under it.*

In this country, great efforts have also been made of late years to introduce zinc pans into our dairies. I do not, however, hear of pigs, and it is very probable that the impure milk is distributed for human use. If we cannot call it poisonous, it is at least unhealthy, and should be forbidden.

TIN.

In its metallic state, this substance is not poisonous; but a preparation much used in the arts, is highly deleterious, viz.: —

The hydrochlorate of tin.† Three quarters of a grain dissolved in two drachms of water, and injected into the jugular vein of a small dog, produced a species of catalepsy, which gradually passed into complete paralysis and insensibility, and death followed in twelve hours after the application. Two grains, injected in a similar way, destroyed the animal in fifteen minutes — tetanic convulsions preceded the termination. Lastly, six grains caused vertigo and death in one minute after the injection. On dissection, the lungs were found more or less shrivelled, and partially gorged with blood; the blood itself was dark-coloured, and there was a slight redness of the mucous membrane of the stomach and duodenum. When muriate of tin was introduced into the stomach it excited violent vomiting and death, without convulsions or paralysis. The mucous membrane of the stomach, on examination, appeared of a dark-red colour, was hardened, horny, and, as it were, tanned. It was also ulcerated in various parts, and the intestinal canal contained much black, thick, ropy bile. The lungs were sound.

There are no cases on record, I believe, of death being produced on the human subject by the use of this substance; but from a nar-

by Chaussier, Gay-Lussac, and Thenard, on the question whether *canteens of plated zinc* were advisable for the French armies. They state, among other results, that common wine, vinegar, and even mixtures of vinegar and water, dissolve the metal and give out hydrogen. The plating of zinc vessels internally with tin has been attempted, but it was abandoned, from the acrid and disagreeable flavour given to the meat; and they add, that tin does not appear capable of coating zinc in such a manner as to guard it against the action of acids. Lastly, plates of zinc when soldered together, have too little solidity, and are apt to give way. They therefore gave a decided opinion against the introduction of either plated zinc or tinned zinc, for the above purposes. (New York Medical Repository, vol. xvii. p. 88.)

* Method of obtaining cream from milk by George Carter, Esq. (Repertory of Patent Inventions, vol. xv. p. 233.)

† There are two hydrochlorates (muriates) of tin. The protomuriate and permuriate.

rative given by Orfila, as to the effect of a small quantity taken by accident in food, it is evident that it may prove highly deleterious. Colic was produced in all the individuals, and diarrhœa accompanied this in two of them.

Among its *tests* are the following: —

(*a.*) The addition of corrosive sublimate in solution, produces a white precipitate.

(*b.*) The muriate of gold, a purple precipitate.

(*c.*) The hydro-sulphurets render it turbid, and separate from it a blackish powder.

(*d.*) The prussiate of potash causes a white precipitate, which soon becomes blue on exposure to the air.

The action of the muriate of tin on animal and vegetable fluids, is very distinct and powerful.

A strong infusion of tea, and the infusion of gallnuts in alcohol, give an abundant precipitate of a clear yellow colour. A small quantity of the muriate dropped into Burgundy wine, produces a violet coloured sediment. Albumen precipitates it of a white colour. Gelatine decomposes it, and produces a white flaky precipitate. Milk is converted by a few drops into thick curds, which, on being dried, are of a yellow colour, and friable. Human bile added to it, produces flaky curds.

Simple syrup (water saturated with sugar) seems to be the only substance that does not occasion any change in the solution.

These results invalidate the importance of tests, and it is therefore proper in all cases, according to Orfila, to dry the precipitates, and calcine them in a crucible with caustic potash. Metallic tin will be produced.

Antidote. It is evident from the experiments of Orfila, that *milk* acts as an antidote to this poison. It is completely coagulated, and the coagulum contains muriatic acid and oxide of tin, and is not deleterious. The antiphlogistic treatment may be subsequently necessary, if symptoms of inflammation supervene.*

The *oxide of tin* has also proved destructive to animals who have been made to swallow it.

SILVER.

NITRATE OF SILVER. (*Lunar caustic.*) A small quantity of this salt in solution, injected into the jugular, produced difficult respiration, the appearance of suffocation, efforts to vomit, pain, convulsions, and death. On dissection, the lungs were seen of a rose colour, the heart was distended with blood, and in one instance, the mucous membrane of the duodenum was of a bright cherry red. When the œsophagus was tied to prevent vomiting, and twelve grains in the solid form were introduced into the stomach, death followed in six days, without any previous symptoms, except debility, intense thirst, and frequency of pulse. The mucous membrane was perforated in a number of places, with small scars, of the size of a pin's head. The lungs were, how-

* Orfila's Toxicology, vol. i. pp. 247—261.

ever, sound. Again, twenty grains in solution were administered to a dog, and produced only uneasiness and dejection. On the third day thereafter, thirty-two grains more were given, which caused vomiting of a pulpy matter. Of this he again recovered. On the fifth day, the œsophagus was tied and thirty-six grains introduced. It was followed by excruciating pain, and he died on the night of the succeeding day. The examination after death presented the mucous membrane of the stomach dissolved into a pulp, and eschars of a greyish white colour were seen near the pylorus. The muscular coat was inflamed, but the lungs were healthy.

There are but few instances on record of injury done by the nitrate of silver to the human subject. Orfila relates from Boerhaave, that a student of pharmacy swallowed some lunar caustic, and excruciating pains, gangrene, and sphacelus were the consequences; and Metzger alludes to a case, where the most imminent danger followed, from a surgeon letting a piece drop into the throat of a patient, whose ulcers he was touching with it.* Its effects on the skin, are an illustration of its probable operation on the throat, stomach, &c.†

Tests. (*a.*) When thrown on burning charcoal, it is decomposed. Vapours of nitrous gas are given out, and the metallic silver remains upon the charcoal.

(*b.*) The solution stains the skin black.

(*c.*) Muriatic acid and the soluble muriates precipitate the corneous muriate of silver, which is white and curdled.

(*d.*) Potash, soda, and lime-water produce a deep brown precipitate.

(*e.*) Ammonia when added to a solution of nitrate of silver, forms ammoniaret of silver, and in consequence of the solubility of this new product, the solution is not disturbed; but if the solution of oxide of arsenic be now thrown in, a lively yellow precipitate is produced, which on exposure to the air becomes brown.

(*f.*) The hydro-sulphates give a black sediment.

(*g.*) Phosphate of soda produces a yellow precipitate.

(*h.*) Prussiate of potash, a white precipitate.

Of these, *c* and *e* are the best tests.

As to the effects of nitrate of silver on animal or vegetable substances, the following may be noticed: —

The alcoholic solution of gallnuts produces no change.

If ten parts of Burgundy wine be added to one of a solution of nitrate of silver, the fluids become slightly turbid and acquire a violet colour. The muriatic acid produces a white precipitate of this mixture, the hydro-sulphurets a greenish brown, and the phosphate of soda violet blue.‡

* Metzger, p. 397.

† It is a habit among the apothecaries of France to keep the fused nitrate of silver in linseed. Dulong has shown that they act on each other, and Deyeux saw a case in which death was produced by the internal use of linseed in which the nitrate had been kept. (North American Medical and Surgical Journal, vol. vi. p. 200.)

‡ Chlorine will not answer here as a decolorising application, since it decomposes the nitrate. Orfila, London Medical Repository, vol. xiv. p. 509.

When fifteen parts of an infusion of tea are added to two parts of a solution of nitrate of silver, a flaky precipitate occurs of a deep purple-red, bordering a little on black. When one part of nitrate of silver was employed, the mixture was of a yellow colour, but passed first to a red and then to a black colour, without affecting its transparency. In this state, muriatic acid gave a yellow sediment.

Albumen gives a copious white precipitate, broth a yellowish-white one, and bile an orange-yellow one. Gelatine causes no change. Milk is coagulated; a formation takes place of small white curds, and the fluid becomes transparent.

Antidote. Muriate of soda appears from the experiments of Orfila to counteract the effects of nitrate of silver. It produces an insoluble chloride, which has no power on the system. Hence salt water, aided by emollient and mucilaginous drinks is advisable.*

Fulminating silver, according to the experiments of M. Pagot Laforet, also acts as a violent poison on animals, in small doses. But if charcoal, mixed with water, was administered in quantity immediately after the exhibition of the poison, the symptoms ceased and no further injury was sustained.†

GOLD.

Nitro-muriate (hydrochlorate, now called chloride) of gold, injected into the jugular of animals, produced death apparently by causing suffocation. The succession of symptoms were vertigo, deep respiration, plaintive cries, and occasionally vomiting. They expired in a few minutes after the operation. On dissection, the lungs were seen gorged with blood; the heart was full of black blood, but the mucous membrane of the stomach and intestines was sound.

Death also followed from taking this substance into the stomach; and the mucous membrane was, on dissection, found abraded in several places.

We have no cases on record of poisoning by this salt, but it is evident from the preceding observations, and also from its effects as an article of the materia medica, that it exercises a powerful action on the human system. It has come within my observation, to have seen a case of dropsy removed by its use in a very short time.

Tests. (*a.*) When thrown on burning charcoal, it is decomposed, and converted into metallic gold, and the chlorine is given off.

(*b.*) It stains the skin of a purple colour.

(*c.*) Sulphate of iron produces a brown precipitate, and pellicles of gold are seen floating on the surface of the fluid.

(*d.*) Muriate of tin produces a purple precipitate.

(*e.*) The hydro-sulphurets cause a deep chocolate-coloured precipitate.

(*f.*) *The prussiate of potash produces no effect.*

Effects of animal and vegetable fluids. Muriate of gold is not

* Orfila. Christison.

† London Medical and Physical Journal, vol. xxv. p. 457., quoted from the *Journal Général.*

affected by syrup; is precipitated reddish-yellow by tea; red, chocolate-coloured, and afterwards metallic, by tincture of galls; deep purple and metallic by Burgundy wine; yellow by albumen and gelatine; and green, passing into purple and violet, by bile. It also instantly curdles milk.* Chlorine decolorises the mixture with wine, and leaves the tests to operate in their usual manner.

Antidotes. Dr. Thomson recommends the sulphate of iron for this purpose, from its property of decomposing the salt, and throwing down the gold in its metallic state.† Orfila recommends the antiphlogistic treatment generally, and in particular the use of emollient and mucilaginous drinks.

FULMINATING GOLD appears to have proved highly deleterious in several cases quoted by Orfila from Plenck and Hoffman. Vomiting, spasm, diarrhœa, faintings, and death, were the consequences of the administration of a few grains (three to six). Rivinus mentions having found holes in the intestines of a child poisoned with it.‡

PLATINA.

Twelve grains of the hydrochlorate, when administered to a dog, destroyed it, and violent inflammation of the stomach and intestines was produced; but when applied to a wound in the neck, no effect was produced on the general system, or on remote organs.§

The following may be a case of idiosyncrasy, but it is at all events curious: — "A person has been uniformly affected with erythema of the face, during the last six or seven years, every time he opens a bottle containing the liquid nitro-muriate (chloride) of platina, within two or three feet distance, and without touching the face. The same effect is produced by opening a bottle containing dry ammonia, or oxide of platina. If the smallest particle of these substances be brought into contact with the face — even the fingers, though they be carefully wiped after touching these preparations, if they come in contact with the face, the erythema is excited. It spreads rapidly over the skin of the face, feeling very hot, itching extremely, and causing a pale rose-red colour. In two, three, or at most four hours, this slight disease disappears."‖

BISMUTH.

Nitrate of bismuth, in its crystallised state, was boiled in distilled water, and the fluid afterwards filtered. When this was injected into the jugular vein, it produced retching, plaintive cries, convulsions of the limbs, palpitation, difficulty of breathing, and general depression and death. The lungs were dark-coloured, but tinged only in particular parts, or wrinkled. The left ventricle and arteries contained only a little black blood.

* Orfila's Toxicology, vol. i. pp. 288—296.
† Annals of Philosophy, vol. v. p. 385.
‡ Orfila's Toxicology, vol. i. p. 297.
§ Gmelin, Edinburgh Medical and Surgical Journal, vol. xxvi. p. 135.
‖ Edinburgh Medical and Surgical Journal, vol. viii. p. 524.

The *subnitrate of bismuth*, on being introduced into the stomach, produced a vomiting of white ropy matter, deep and difficult respiration, trembling of the limbs, and death. The mucous membrane of the stomach was either highly inflamed, or extensively ulcerated, so that the slightest friction separated it in the form of pultaceous scraps. Portions of the lungs were gorged with blood.

When the subnitrate (improperly called *white oxide**) of bismuth has not been prepared with sufficient care, it often happens that violent vomiting, diarrhœa, and other unpleasant symptoms will ensue from its administration. In one case, where the precipitate produced by adding water to the nitrate, did not undergo the repeated washings which are necessary, I have known it to cause the most alarming vomiting.

One fatal case is on record of poisoning by this substance. A man took two drachms by mistake. He was immediately attacked with burning in the throat, vomiting and purging, cramps and intermitting pulse; then with inflammation of the throat, and on the third day with hiccup, laborious breathing, and swelling of the hands and feet. Suppression of urine had existed from the first, and continued until near his death. This occurred on the ninth day, having been preceded by salivation, delirium, swelling of the tongue, and great enlargement of the abdomen. On dissection, every portion of the alimentary canal, from the throat to the rectum, bore marks of inflammation. The tonsils, uvula, epiglottis, &c. were gangrenous; the gullet livid; the stomach very red, with numerous purple pimples; the whole intestinal canal red, and here and there gangrenous. The inner surface of the heart was red. The kidneys and brain were healthy.†

Tests. (*a.*) Sulphuretted hydrogen causes a black precipitate.

(*b.*) The prussiate of potash, a pale yellow.

(*c.*) Ammonia causes a white precipitate.

(*d.*) The chromate of potash, a beautiful orange yellow.‡

(*e.*) The tincture of galls, a flaky pale yellow.

(*f.*) On the addition of water, the fluid becomes milky, and a white precipitate gradually subsides.

(*g.*) The precipitates, on being calcined with charcoal in a crucible, give out the metal.

Nitrate of bismuth is precipitated pale yellow by tea, yellow by bile, and white by albumen and milk; the last is curdled by it. Gelatine is not affected. Burgundy wine gives a rose-coloured precipitate, inclining to violet. The supernatant fluid preserves the red colour of the wine; but the hydro-sulphurets, on being poured into it, produce a black precipitate.§ Ammonia deprives it of its colour, without occasioning any sensible white precipitate.

* "There is no such thing as white oxide of bismuth. However much washed, the precipitate obtained by water from the nitrate of bismuth, is a sub-salt." TURNER.

† Christison, p. 444. Edinburgh Medical and Surgical Journal, vol. xxxiv. p. 216. The case occurred in Germany.

‡ So also, says Dr. Cooper, does corrosive sublimate with chromate of potash.

§ On the addition of chlorine, the mixture is rendered colourless, and the tests produce their ordinary effects. (Orfila, London Medical Repository, vol. xiv. p. 409.)

Antidotes. Milk, and mucilaginous drinks; and if symptoms of inflammation supervene, the antiphlogistic regimen.*

IRON.

The compounds of this substance are to be deemed among the least poisonous of the metallic salts. There is a diversity of result as to the

Sulphate of iron (green vitriol). In the hands of Dr. Smith, it proved an active poison. When applied in the dose of two drachms, to the cellular texture of the inside of the thigh of two dogs, it killed them in the course of twelve or fifteen hours. On dissection, the internal surface of the stomach of one of them was found covered with a multiplicity of petechial spots; the wrinkles of the rectum were numerous and black; the liver whitish, with livid spots on its convex surface; while the heart contained black grumous blood, and its ventricles had some slight livid blotches.

When introduced into the stomach in the dose of two drachms, it did not destroy life in less than twenty-six hours, and without any other apparent symptom than a general insensibility. The interior of the stomach exhibited red spots; the small intestines presented blackish puffy swellings, and the upper part of the rectum showed red folds.†

Gmelin, on the other hand, gave it in doses of two drachms to dogs, and it caused nothing but vomiting. Forty grains had no effect on rabbits, and its injection into the veins was not deleterious.‡

Muriate of iron. This is more active, owing to the excess of acid in it. Dr. Christison gives the following case, as communicated to him by Dr. Combe of Leith. A gardener took an ounce and a half of the tincture of the muriate of iron, by mistake for whisky. Pain and tension in the throat and stomach succeeded, with coldness; then a vomiting of an inky fluid, followed by profuse vomiting of mucus and blood, and bloody stools. He rallied under the use of remedies, and in three weeks returned to his occupation; but in two weeks more, Dr. Combe found him emaciated, cadaverous, with pain and costiveness. He died in five days after this. The pylorus was greatly thickened, with a cicatrized patch three inches long and two inches broad, and another large inflamed spot.§

LEAD.

I cannot too much impress on my readers the necessity of being well acquainted with the symptoms produced by the compounds of this metal, and the tests necessary to detect them. In the course of my remarks, it will be seen how often they have produced injurious

* Orfila's Toxicology, vol. i. pp. 298—307.
† Ibid., vol. ii. p. 468.
‡ Edinburgh Medical and Surgical Journal, vol. xxvi. p. 137.
§ Christison, p. 574.

or fatal effects from being united with very many articles of common food and drink.

The principal salts of lead are the following: —

Acetate of lead (sugar of lead). There is also a *sub-acetate of lead*, used most commonly as a medicinal application under the name of *Goulard's extract*. The distinction between these I shall presently notice.

As to the acetate, there are some cases on record of its effects. The following is related by Dr. Kerchhoffs. It occurred in the person of a soldier who drank a considerable quantity of the solution. He was soon seized with the most violent symptoms, indicative of gastric inflammation. A sense of suffocation, drawing in of the belly, costiveness, cold and clammy sweats, and trismus, were present. He died in great agony at the end of three days. On dissection, the lead was discovered by proper tests in the fluids of the stomach. The mucous membrane of that organ was abraded in several places, particularly near the pylorus; and the œsophagus, stomach, duodenum, mesentery, liver, and spleen, were in a state of high inflammation.*

Dr. Shearman has also observed fatal effects to follow from an adulteration of gin with sugar of lead. The symptoms were, occasional violent colic pains, chiefly occurring after meals, attended with an obstinate costiveness; and although these were for a time relieved by purgatives and other means, they almost universally recurred. The progress of the disease, he observes, even in those cases where it attained its utmost violence, was in almost every instance so insidious and slow, as to leave the observer unapprehensive of its true character, which, however, was at last brought to light.†

Mr. Iliff saw a case where an ounce of the salt in solution had been swallowed through mistake. It produced vomiting and violent pain in the stomach. Sulphate of magnesia, an emetic, and subsequently the stomach pump, were used. The patient recovered, but she experienced for some days an occasional rigidity of the abdominal muscles, and costiveness.‡

Instances are however stated on the other hand, where this salt in quantity has not produced any injurious effects. An apprentice of a cooper near Glasgow, had an ulcer on the tibia, accompanied with considerable inflammation, for which he was ordered a poultice with acetate of lead. As this article is much used by linen printers, he procured, in an adjoining print-field, a lump, which could not have weighed less than a pound, being, as he said, of the size of his fist. On coming down, he laid it on the kitchen table, and shortly after went away. His mistress, an old, short-sighted woman, soon after came in with cabbage for the family dinner, laid it on the table upon

* Transactions Coll. Phys. London, vol. vi. p. 39. The editors of the London Medical Intelligencer, in remarking on this case, observe that they once saw a gentleman die with similar symptoms, after swallowing about three ounces of solution given to him by a quack for an injection. (New England Journal, vol. x. p. 86.)

† Edinburgh Medical and Surgical Journal, vol. viii. p. 213., from Transactions Medical Society of London.

‡ London Medical Repository, vol. xxiii. p. 37.

the lead, without perceiving it, and cut them down with a knife. By this operation both were incorporated into one mass, and the whole was put into a pot, boiled with potatoes, and afterwards chopped together for dinner. This dish was eaten by the master and mistress, their daughter and her husband, and two apprentices. Soon after, the lad wished to prepare his poultice, but the materials could not be found. As a curious taste had been observed by all of them in their food, they became alarmed, and on examining the table, it was evident that the sugar of lead and the cabbage had been bruised together, as some of the former in a powdered state still adhered to it. Mr. Hunter of Dumbarton was immediately sent for. He gave to five of them an emetic, which operated well, and they experienced no disagreeable symptoms afterwards. The sixth person, an apprentice, refused to take any thing, as he felt no uneasiness, nor did he subsequently experience any disorder in his bowels.*

It is also within the experience of almost every physician, that large doses of this substance have been given as a medicine, without producing any primary or secondary bad effects.†

The diversity that is thus observed, has led to some inquiries and investigations concerning its cause. I will first state the result of comparative experiments on animals.

When a solution of the acetate of lead, containing from one to three grains, was injected by Orfila into the jugular of dogs, it did not appear to incommode them. Once or twice only, the animals made some slight efforts to vomit, and threw up a small qnantity of whitish stringy matter. Five grains did not at first appear to produce any effect; but on the third day, the animal became dejected and refused to take food. On the fourth, his gait was unsteady and difficult, his posterior extremities occasionally exhibited some convulsive movements, and he was extremely weak. He died on the fifth day, and the lungs and stomach were found healthy. Thirteen grains injected in this way, produced instant death without any signs of pain or convulsions. The blood in the left ventricle was fluid, and of a vermillion red colour.

When the acetate was taken into the stomach in a solid form, and in doses of from three drachms to an ounce or more, it excited vomiting, dejection, and death. The mucous membrane of the stomach was inflamed, and spots of a dark colour were observed on it; the intestinal canal and lungs were healthy. Its effects when given in solution, were a loss of muscular power, trembling of the limbs, and vertigo. The mucous membrane was of a grey ash colour.‡

Gaspard injected acetate of lead into the veins of animals with fatal effects, and the appearances on dissection were inflammation of the lungs and of the small intestines, but the stomach was generally

* London Medical and Physical Journal, vol. ix. p. 173. Case by Dr. Hunter of Dumbarton.

† See, among many others, Laidlaw's essay on the use of acetate of lead; London Medical Gazette, vol. iii. p. 721.

‡ Orfila's Toxicology, vol. i. p. 457.

sound.* Dr. Campbell is also mentioned by Dr. Christison, as having proved by experiment that death is caused by applying it to a wound. The symptoms were similar to those noticed by Orfila, but the appearances on dissection varied in so far that Dr. Campbell found the stomach red and corrugated, and the small intestines vascular.

Lastly, Dr. Wibmer, a German physiologist, poisoned a dog with sugar of lead, given daily to the amount of two drachms and twelve grains, in the course of seventeen days. Frequent vomiting and gradually increasing weakness, and stiffness of the legs, preceded death.†

All these experiments go to show the direct poisonous effects of the acetate of lead, and at the same time to suggest that the occasional exemption from illness in some cases may be owing to accident, constitutional strength, or some fortunate state of the stomach and bowels.

Dr. A. T. Thomson has however lately presented some new views on this subject. He is of opinion that among the salts of lead, the *carbonate* is the only direct poison, and that the seemingly poisonous properties of the other salts depend upon their conversion into this. From his experiments, it appears that the subacetate‡ and citrate of lead in solution, have so powerful an affinity for carbonic acid as to take it from the air; that the affinity of the acetate for this acid is comparatively weak, and that carbonic acid effects no change whatever on the nitrate, muriate, sulphate, phosphate, and tartrate of lead.

Dr. Thomson next proceeded to perform some experiments on animals with the three salts convertible into the carbonate. He gave dogs to the amount of several drachms, but without any effect. None of them died. In order to explain the results obtained by Orfila, he suggests that the quantities given were so large as to produce inflammation and death, like any other non-poisonous substance when administered in excessive doses. On rabbits, the nitrate, muriate, and acetate produced no effect; the subacetate slightly affected the animal, but it was alive a week after taking it. The carbonate, on the other hand, was decidedly poisonous.§

The deductions to be made from these results are not so positive or comprehensive as Dr. Thomson is inclined to put them. His experiments, I apprehend, explain very satisfactorily the diversity of effects induced by the ordinary sugar of lead. As used in commerce, and even by the druggist, it may contain the subacetate.‖ Other

* London Medical and Physical Journal, vol. xlviii. p. 155., from Journal de Physiologie.

† Christison, pp. 486, 487.

‡ "The subacetate of lead, commonly called *extractum saturni*, is prepared by boiling one part of the neutral acetate and two parts of litharge, deprived of carbonic acid by heat, with 25 parts of water." (Turner's Chemistry, 5th edition, p. 799.)

§ British Association, report of the first and second meetings of, p. 594. The experiments are given in detail in the London Medical Gazette, vol. x. p. 689.

‖ The following shows that even the subacetate may be innoxious. "During the campaign in Russia, several loaves of sugar had been enclosed in a chest containing

portions may be comparatively pure. And in this manner we may account for the exemption from dangerous symptoms in some cases. We can also grant that the carbonate is among the most active of the compounds of lead. But it is certainly going too far, to say that the noxious properties of the compounds of lead depend on the presence of the carbonate alone.*

As to the use of acetate of lead as a medicine, I may be permitted to repeat a remark made in the former edition.

I have too often witnessed the value and efficacy of acetate of lead in pulmonary and uterine hæmorrhages, not to feel a great partiality for it as an astringent medicine, I know of nothing that can be substituted in extreme cases. But I must stop here, and unequivocally condemn the practice which has occasionally obtained of late years, of administering this salt in diarrhœa. It is not necessary at this time to point out the reasons why it must prove injurious; it is sufficient to say, that death, preceded by all the symptoms of acute poisoning, has been the consequence of its exhibition. We have the authority of my friend Dr. Mann, late hospital surgeon in the United States' army, in asserting, that during the war of 1812 several officers of rank fell victims to its use.†

As the chemical proofs of all the preparations of lead are in many respects similar, we shall notice them at the conclusion of this article.

Carbonate of lead (*cerusse or white lead*). We have a remarkable case on record, of the noxious effects of this substance on the human system.

Mr. Deering, a surgeon in London, was requested on the 21st of October, 1808, to visit Mrs. R., the wife of a respectable tradesman in Aldersgate-street, who complained of violent pain in the scrobiculus cordis, with great soreness of the epigastric region when pressed upon. She had vomited a considerable quantity of bilious matter, and at the same time her bowels were constipated; the pulse was calm and regular, the tongue clean and moist, and there was no symptom of fever present. A cathartic was administered, which operated, and an opiate given in the evening. The following morning she appeared relieved; but in the evening the pain and vomiting recurred, and these symptoms continued for some successive days, in so distressing a degree, that it was deemed advisable to consult the family physician, which was done on November 4. 1808. At this time, these symptoms continued as already intimated, without any appearance of fever, and hence the physician was induced to consider the affection as of a rheumatic and spasmodic nature.

some flasks of extract of lead. One of these flasks having been broken, the liquor escaped, and the sugar became impregnated with it. During the distresses of the campaign, it was necessary to have recourse to this sugar; but far from producing the fatal accidents which were expected, it proved a salutary article of nourishment." (London Medical Repository, vol. xx. p. 441.)

* "The theory that I have advanced, that there is only one direct poison among the salts of lead, and that the other salts become poisonous only when they are converted into that one." (Dr. Thomson in London Medical Gazette, vol. x. p. 694.)

† New England Journal, vol. xi. p. 19. Dr. Thomson advises that when the sugar of lead is given internally, a dilute acetic acid be added to it.

In a few days, in consequence of the amendment of the patient, he discontinued his visits. In about a week after this period, a boy in the same family, nearly sixteen years of age, was seized with symptoms exactly similar to those of the preceding case, and similar remedies afforded only partial relief, till at length he was removed into the country, and thereby recovered his health.

A week after the attack of this youth, the eldest child, a boy six years old, was also seized with analogous symptoms, and the mother having relapsed into her former state, the physician was again consulted on the 19th of November. At this time, three other persons in the family laboured under similar affections, and suspicions were now entertained that some poisonous substance might have caused this general indisposition of the family; but after minute investigation, no one circumstance was discovered to confirm this suspicion, or to elucidate the source of so extensive a calamity.

The sickness and pain continued unabated in Mrs. R.; but the son, after the period of a fortnight, was deemed in a state of convalescence by his physician, who discontinued his attendance; he was, however, soon after seized with convulsions, and expired within a few hours. Unexpected and severe as this shock was, Mrs. R. afterwards gradually grew a little better. She had hitherto continued to suckle her child, which, it being fifteen months old, she was advised to wean; to this she reluctantly consented. In about ten days afterwards the child became somewhat costive, without any other apparent indisposition; but at this period it was seized with vomiting and convulsions, and suddenly expired. The unhappy parent now experienced a return of her complaints, and, under a persuasion of the inefficacy of professional aid, she was prevailed upon to consult an empiric, whose attendance, though continued to the end of the year, proved unavailing; and on the 3d of January, 1809, she had the advice of Mr. Chevalier, an experienced surgeon, who considered the patient's complaint to be chronic rheumatism; and by the use of clysters of warm water, oily mucilaginous medicines, fomentations, and vesicatories, she appeared to experience more relief than at any period since the first attack; but although the vomiting and sickness were less violent and frequent, the pain and soreness of the abdomen, first complained of, never entirely subsided: she was, however, able to sit up and amuse herself with a little needlework, and to go about the domestic concerns of the family, and Mr. Chevalier had proposed to pay his final visit on the 21st. On the morning of this day she rose at ten o'clock, and within the space of an hour afterwards, whilst standing near the desk of drawers, she suddenly exclaimed, "I am dying!" She was seized with convulsions, which continued till five o'clock in the afternoon, when she expired.

On the subsequent day, Mr. Chevalier, whose anatomical skill is well known, examined the body by dissection. Neither the thoracic and abdominal viscera, nor the brain, upon the most minute examination, exhibited the least appearance of disease; in short, not the least trace could be discovered of any morbid affection.

With respect to the three other persons already mentioned to have been indisposed, the servant maid, one of them, was conveyed to her friends, and recovered. A sister-in-law of Mrs. R. also recovered; but the third, who was her mother-in-law, died, after lingering under disease till March.

These circumstances having been cursorily communicated to the medical society, Dr. Adams, Dr. Hamilton, and Mr. Lawrence, were requested to visit the house of this unfortunate family, and to endeavour to ascertain the cause of the calamity. Every culinary article, and the whole premises, were accurately examined, but without its leading to any discovery.

It appeared, indeed, that Mr. R., the husband of the deceased lady, had purchased a cask of sugar at a sale, a considerable part of which had been disposed of to some friends in the country, who had used it without inconvenience, and hence no suspicion was entertained of this article having produced the fatality in Mr. R.'s family.

In this state of uncertainty, Dr. Laird, another member of the medical society, visited the house; and, on examining the cask which had contained the sugar, he observed a white powder adhering to its inner surface, and which, on being heated by the blow-pipe on charcoal, afforded globules of lead in the metallic state.

The mystery was thus at length developed. The sugar had been injudiciously put into a cask which had previously contained white lead. That part of the sugar which was sent into the country had probably been taken out of the middle of the cask, and had never come in contact with the lead; whilst that which was used by the family, having been taken from the side, was impregnated with this metal, and doubtless was the source of the fatal events described.

Of nine persons in this family, who were more or less indisposed, four died, and the effects of the poison appear to have been nearly in the ratio of their respective ages.

The infant, fifteen months old, was attacked and expired within the space of twenty-four hours; the child, six years of age, survived a fortnight: Mrs. R. aged forty, lingered three months before the fatal event took place; and the mother-in-law, aged sixty-seven, died four months after the attack.

The symptoms in each were very similar. The vomiting, pain in the stomach, and costiveness, marked the attack of the disease; and the soreness of the epigastric region in those who recovered, was not removed by medicine, but seemed rather gradually to wear away by time or change of air. The matter vomited was usually of a dark-yellow colour, though sometimes green; the fæces were in general dark coloured; but in the case of Mrs. R. they were completely white during the space of twenty-four hours only.

There was a considerable sameness in the medical treatment. The opiates which were given afforded no mitigation of the symptoms, unless joined with cathartics, and aided by fomentations, &c. The countenances of all the patients exhibited a pale, sickly, wan aspect. The pulse in each was slow and regular, rather indeed sluggish, and

generally below the natural state; but in no instance were there any symptoms of paralysis.*

I have given the details of this case because it is a most instructive one to the practitioner, as well as the medical jurist. Other instances of the poisonous effects of the carbonate of lead mixed with sugar have occurred in our own country. Thus, at Concord in New Hampshire, the State Medical Society were requested to examine the cause of general illness in a family. They had suffered under nausea and vomiting for several weeks, accompanied with costiveness, pain, and great weakness. The disease gradually became very violent, and assumed all the appearances of colica pictonum. Suspicion was at length excited, and white lead was detected in the sugar. One person, a female, died after having laboured under partial paralysis and frequent and violent convulsions.

On dissection, the colon was found contracted in some parts, the gall-bladder filled with bile, and the vessels of the brain turgid. The skin was of a deep yellow, As the appearance of the stomach is not mentioned, it is to be presumed it was healthy.†

Dr Drake of Cincinnati, experienced in his own person the effects of its application to an abraded surface. He was severely burnt on both hands, and among the treatment early used, was wrapping the parts in rags dipped in a painter's solution of linseed oil and white lead. A real saturnine colic was the result in about four days after its use.‡

Litharge and red-lead. The former is the protoxide of lead in a state of semi-vitrification, and has a greyish-red colour; the latter is the deutoxide, and is of a bright red. Both are poisonous. Red wafers coloured with red-lead are destructive to birds who pick them up, and the same paste is sold for the purpose of destroying beetles, in which it succeeds very effectually. Many toys are also painted with this substance, and thus children have been injured by putting them frequently into their mouths.§ Sir George Baker states, that twelve infants died successively in convulsions, at Dartmouth (Eng.) in consequence of an ointment, which had litharge in its composition, being applied to the nipples of their nurses.‖ Dr. Charters relates of a Fakeer in India, who administered to two soldiers, six drachms of litharge in divided doses. The result was a very violent colica pictonum.¶

The muriate of lead (oxychloride of lead, Turner's yellow, or patent yellow) is also very poisonous according to Dr. Paris.

Action of air and water upon lead. It was noticed as early as the days of Cæsar and Augustus, by the Roman architect, Vitruvius, that

* Eclectic Repertory, vol. ii. p. 402., from the Transactions of the Medical Society of London, vol. i. part 1st.

† New England Journal, vol. xii. p. 256.

‡ Western Journal of Medical and Physical Sciences, vol. iv. p. 51.

§ Paris's Medical Jurisprudence, vol. ii. p. 352.

‖ Transactions of the College of Physicians of London, vol. iii. p. 423.

¶ Transactions of the Medical and Physical Society of Calcutta, vol. v. p. 155.

cerusse was formed on this metal by water passing over it, and he therefore forbade its use for water-pipes. *

Chemical investigations in latter times have proved the correctness of this opinion, and the only question has been, in what condition it is present, and under what circumstances it is most freely produced. The following may be taken as the present state of our knowledge:—

Lead exposed to the *air* becomes tarnished, and the crust thus formed is a carbonate. It will be produced most rapidly if the air be moist. As to the action of spring waters, Dr. Lambe was of the opinion from his experiments, that they possessed the power of dissolving and corroding lead, to such an extent as to render them dangerous to man. Dr. Thomas Thomson, on the other hand, while he assented to the opinion of their acting on lead, nevertheless maintained that the metal was only held in suspension and not in solution, and that the quantity suspended in such waters, after they had passed through lead pipes, pumps or cisterns, is far too minute to prove injurious. Dr. Christison, in order to reconcile, if possible, these discrepancies, performed a series of experiments. He found that *distilled* water, deprived of its gases, and excluded from contact with the air, has no action whatever on lead. If this water contains the customary gases, the surface of the metal soon becomes white, but this soon ceases, if the surface of the water be not exposed to the air. In that case, and if the air has free access, a white powder soon forms around the lead, and this increases until after a few days, a large number of white pearly scales are produced, which partly float in the water, but are chiefly deposited on the bottom of the vessel. These scales are, on analysis, found to be a carbonate. He also ascertained that, during this experiment, a very minute quantity of lead was actually dissolved in the water. †

Our common spring water, however, contains more or less of neutral salts, and to make the inquiry practically useful, it becomes necessary to ascertain their influence in promoting or impeding the action on the lead. Guyton Morveau found that if he added a solution of either sulphate of lime or muriate of soda (salts very common in spring water) to distilled water, its power of attacking lead was destroyed. Dr. Christison extended this investigation to many other salts, and found that they all impaired the power of the water, and that even when the carbonate was formed in very minute quantities, it was deposited so slowly, and adhered so closely to the lead, that it could hardly be supposed to diffuse itself through the liquid. ‡

Captain Philip Yorke has recently examined the subject, and also performed a number of experiments on the action of distilled and spring water. His results in the main correspond with those of Dr. Christison, but he supposes that beside the carbonate, an hydrated oxide of lead is formed, soluble in the water. §

With these facts, it will not be difficult to answer the question, whether it is safe to carry water over lead, or to collect it in cisterns

* Christison, p. 459. † Ibid., p. 460. ‡ Ibid., p. 462.
§ London and Edinburgh Philosophical Magazine, vol. v. p. 81.

lined with lead. The probability certainly is, that a portion of carbonate of lead is either dissolved or diffused through it, and renders the liquid measurably deleterious; and we have abundance of accounts to illustrate this opinion. Lead colic was unknown at Amsterdam, until the metal was substituted for tiles on the roofs of dwelling houses; it then raged with great violence. Dr. Yeats, in a paper on the waters of Tunbridge Wells, mentions that, in 1815, lead colics were very frequent at that place. A Mr. Taylor had laid down, in 1814, several thousand feet of leaden pipes, to convey water to the different houses. In the following year, the lead colic occurred in those houses to which this water was distributed; and all doubt as to the existence of the poison in it, was removed by the examinations of Dr. Lambe and Mr. Brande. They detected the carbonate, in a very minute state of division, in the water. *

A somewhat similar case is related of officers on board a packet bound to the East Indies. They put their allowances of water in a leaden cistern, furnished with a stop-cock; and in about three weeks, every one of them was affected with all the symptoms of colica pictonum, in the most violent degree. On arriving at St. Helena, they gradually recovered. †

It is an evident deduction from the researches of Dr. Christison, that in proportion to the purity of the water, and the presence of carbonic acid, will be the action on the metal. ‡

Different articles of food or drink may be contaminated with this substance.

If the *food* contain any free vegetable acids, or saline preparations, it will attack utensils made of lead, and oxidate, and indeed in some cases dissolve them. This circumstance seems to have been known to the ancients. Their tin was all adulterated with lead; and Galen, assigning this as a reason, cautions against the use of tinned vessels, and recommends the preservation of medicines in glass ones. §

* Brande's Journal, vol. xiv. p. 352.

† Medical Commentaries, vol. xix. p. 180. The presence of lead in the water was demonstrated by the application of a solution of sulphuretted hydrogen. Additional cases of the injurious effects of water impregnated with lead, may be found in the Transactions of the College of Physicians of London, vol. ii. p. 419, &c. The *dry bellyache*, so common in the West Indies, has been ascribed by some to the water passing over their frequently painted roofs, and then being collected in tanks. See London Medical Gazette, vol. xi. p. 78, 795, 873.

‡ In the water of the river Thames, though it flows in leaden pipes, no lead can be detected; and this may be explained by the fact, that the animal matters which constantly accumulate in it, prevent any dissolution or suspension of the metal: they combine with it, and form a bulky, insoluble precipitate. "If you add nitrate of lead to Thames water you will find that it becomes milky, and that a white powder falls to the bottom, which dissolves without effervescence in nitric acid; it is, therefore, a combination of oxide of lead with some animal matter. Thus it is the impurity of Thames water, that prevents it from containing lead. Probably hard waters, containing sulphate of lime in solution, may also be free from lead. But, with these exceptions, we may lay it down as a general fact, that all waters which pass through leaden pipes, or which are kept in leaden cisterns, contain small particles of carbonate of lead." (Dr. T. Thomson, Edinburgh Medical and Surgical Journal, vol. xii. p. 495.)

§ Beckmann on Inventions, vol. iv. p. 29. The question has sometimes been asked,

Earthen vessels, glazed with lead, are also very apt to be acted on by vegetable acids. Vinegar corrodes them, and if there be any particle of food within, the oxide or acetate that is produced will mix with it*; so also weaker acids. A case occurred some years ago at Northampton, Mass., where a family, consisting of eight individuals, were all seized with colic pains, strong convulsive spasms of the intestines, frequent vomitings, and obstinate costiveness, in consequence of eating stewed apples which had been kept for some months in a large earthen vessel. On examination, the glazing was found corroded, and a solution from the stewed apples exhibited the chemical proofs indicative of the metal.† Dr. Eberle also states that he saw four cases in 1815, arising from apple butter being in these vessels. On examining one of them, a thin crust of acetate of lead was seen covering its internal surface.‡

Milk has also acted on vessels of this description.

The adulteration of *wines* by lead appears to be an old device; and it has been much used, since it destroys their austerity, gives them a sweet taste, and renders them saleable.

Beckmann supposes that the ancients were acquainted with the fact that lead rendered harsh wines milder; for Pliny remarks, that when the Greek and Roman wine merchants wished to try whether their wine was spoilt, they immersed in it a plate of lead, which could only be to observe whether by corrosion the colour of the lead was changed.

It was not until the fifteenth century, that the use of lead in wines became so notorious as to call for prohibitions on the part of governments in Germany; and the adulteration of this article appears to have been a subject of deliberation at the diet of Rothenburgh in 1487, and the diet of Worms in 1495.§ In France, this species of villany was carried to a great excess. The Duke of Wirtemberg, by a decree dated March 10, 1690, declared it capital to mix litharge in wine, or even to sell litharge in the shops‖; and individuals were punished with death for the infraction of this decree. At the present

Whether the sheet lead which is wrapped round the tea obtained from China, may not prove injurious? Dr. Thomson has satisfactorily determined this point. He found it, on analysis, to consist of lead 95·5 parts, and tin 4·5 parts in the hundred. This alloy is not so liable to tarnish as pure lead, and it possesses this peculiar advantage, that when it comes in contact with articles of food, the tin is always acted on in preference to the lead. (Annals of Philosophy, vol. iv. p. 155.) Proust established the fact just mentioned, by numerous experiments. See his paper on Tinning, copied from the *Journal de Physique*, in the Repertory of Arts, 2d series, vol. ix. p. 38 & 145.

* Transactions of the College of Physicians of London, vol. i. p. 257, etc.

† An account of the poisonous effects of the use of glazed earthen vessels, by Dr. Meade. (New-England Journal, vol. ii. p. 258.) A similar case is related in ibidem, vol. xii. p. 253. The apple sauce, when made, is turned hot into these pots, and the glazing is readily acted upon. In the present instance, nearly one-third was found decomposed.

‡ American Medical Recorder, vol. i. p. 504. See also a paper on the danger of using vessels of lead, copper or brass, in dairies, by Mr. Thomas Hayes, Surgeon, Hampstead, in the Repertory of Arts, 1st series, vol. vii. p. 116.

§ Beckmann on Inventions, vol. i. p. 396.

‖ Transactions of the College of Physicians of London, vol. i. p. 346.

day, we have every reason to believe that sugar of lead is frequently employed by unprincipled dealers.*

Cider, adulterated by lead, has also frequently proved injurious, and indeed to such an extent, that the disease known by the name of the *Devonshire colic* has been deemed to originate from this cause. I am aware that other causes have been assigned, but it is sufficient for my present purpose, that this fluid, among others, has excited the symptoms in question; and it is certainly well established, that cider boiled in leaden vessels has produced death to those drinking it, and that the racking of it in a leaden cistern, or even the grinding of the apples in troughs which are united by lead, has been the origin of serious illness.†

Rum is also another liquor which may act on lead. Dr. John Hunter mentions, that a violent colic prevailed extensively among the soldiers at Jamaica in 1781–2. They were in the habit of drinking rum, and, suspecting its purity, he was led to examine it. The result of his experiments induced him to believe that it was contaminated with lead.‡ Dr. Franklin also communicated a curious fact to Sir George Baker on this point. About forty years previous (Sir George's paper was read in 1767), leaden worms were used at Boston for the distillation of rum. The consequence was so violent to drinkers, and the illness so common, that government forbade their use, and ordered the worms to be constructed of block tin. The dry bellyache was much less heard of afterwards.§

Even *syrups* have been clarified by the acetate of lead, and thus contain a notable portion of the metal.‖

Cheese has sometimes been coloured with red lead; and several cases are on record, of families being poisoned by its use. In one instance, a dog, who had eaten the rind, was convulsed, and died in a day.¶

Sugar, apart from the actual intermixture of a salt, has been contaminated by lead. A remarkable instance has occurred in our own country, at Calais, in the State of Maine. Nearly one hundred persons were almost simultaneously seized with violent colicky affections; out of that number three died, and several remained extremely ill

* Thirty-two cases occurred in the Duke of Newcastle's family, then in Hanover, in 1752, occasioned by their using, as a common drink, a small white wine, adulterated with calces of lead. (Dr. Warren, Trans. Coll. Physicians of London, vol. ii. p. 86.)

† See the papers of Sir George Baker and Dr. Warren, in the Transactions of the College of Physicians of London, vols. i. ii. iii.; Lond. Med. Gazette, vol. x. p. 314.

‡ Transactions of the College of Physicians of London, vol. iii. p. 227. Medical Commentaries, vol. xiii. p. 138. When the new rum in the West Indies, thus impregnated, has been kept in a cask for twelve months, it loses its deleterious qualities. This fact is mentioned by Mr. Sylvester, and by him applied to the discovery of a new test—the gallic acid. See Eclectic Repertory, vol. iv. p. 454; Paris's Medical Jurisprudence, vol. ii. p. 342.

§ Transactions of the College of Physicians of London, vol. i. p. 286.

‖ Orfila's Toxicology, vol. i. p. 454. The same salt was detected by Labarraque and Pelletier, in the orange water sold in Paris in 1829. (Annales d'Hygiène, vol. iv. p. 55.)

¶ American Medical Recorder, vol. vii. p. 660.

—many suffering also under paralysis of the extremities. On examination, it was found that all who used sugar obtained from a certain mercantile house were ill, and none other. This led to a chemical investigation by Dr. Charles T. Jackson of Boston, and he demonstrated the presence of lead. The sugar in this instance came from Barbadoes; and Dr. Jackson suggests, that probably leaden reservoirs were used in preparing the syrup, and that the free acids of the juice acted on them.*

Saturnine emanations are well known to produce dangerous disease; and these, of course, most readily affect workers in lead, as plumbers, painters type-founders, printers, and potters. I shall not, however, enter on this subject at present, as it can hardly, if ever, be a subject of legal investigation, and particularly because it can be examined with most advantage when we treat of the *diseases of manufacturers*, in the part relating to MEDICAL POLICE.†

It will be proper, however, to give a short sketch of the symptoms produced by the gradual introduction of small quantities of lead into the system. This will illustrate the effects of adulterated food and drink, and also those produced by emanations, or by working in the metal.

Colic is among the earliest symptoms, and from this circumstance the complaint has been styled, for a length of time, *colica pictonum*. It is not acute at first, nor of long duration, but frequently returns, and at last becomes intolerably severe. The mouth is dry; there is generally an absence of fever: sickness of the stomach is present, and sometimes vomiting, which will last for several days. The abdomen is drawn inwards towards the navel; and this sinking in is the more observable as the pain becomes more intense. Costiveness is very common, and the alvine excretions are discharged with pain and difficulty. The urine presents no particular character.

Paralysis of the fingers, hands, and wrists, is also a frequent accompaniment of this disease, and it occurs most severely in those who are in the constant practice of handling preparations of lead. Convulsive motions, prostration of strength, a dry cough, and a gradual wasting, generally attend this stage of the complaint.

It has been observed by some writers, that the appearances found on dissection in those who have fallen victims to saturnine emanations, are strongly indicative of disease — exhibiting inflammation or obstruction of the mesentery and its glands; affections of the liver, spleen and lungs, and inflammation of the intestines. Most of these are, however, contradicted by modern examiners; and it is denied that, in general, any inflammation is found in the digestive canal. A contraction of the diameter of the great intestines, particularly of

* Boston Medical Magazine, June, 1835.

† The following, however, deserves quotation in this place. It is extracted from the late work of Dr. Cooke on Palsy. "Dr. Cooke was consulted by a gentleman who had a paralytic affection of one side of his face, without any assignable cause. On inquiry, however, it was found that he had slept two or three nights in a room where the bed was placed near a closet, the door of which had been recently painted what is called a dead white." (Medico-Chirurgical Review, vol. i. p. 736.)

the colon, is the only morbid appearance that was noticed in numerous dissections.*

Chemical proofs. A multiplicity of tests have been proposed for the detection of the acetate, or any other of the soluble salts of lead. I shall follow Dr. Christison in stating some of the most unequivocal.

(*a.*) Sulphuretted hydrogen causes a black precipitate, the sulphuret of lead. This is a very delicate test.

(*b.*) Chromate of potash gives a beautiful canary yellow precipitate, the chromate of lead.

(*c.*) Hydriodate of potash causes also a beautiful yellow precipitate, the iodide of lead. If, however, an excess of nitric or acetic acid be present, these acids will cause a yellow colouration, even though there be no lead in the solution.† It is important to use each of these tests, since sulphuretted hydrogen produces a black precipitate with other substances.

(*d.*) If the solution of lead be not too diluted, a piece of zinc suspended in it for some time will produce the usual crystalline arborescence.‡

(*e.*) Sulphate of soda. This is recommended by Dr. T. Thomson as a very minute and unequivocal test. It will produce a white precipitate in water, containing one hundred thousandth of its weight of lead. "The precipitate," says Dr. Thomson, "is a fine dense powder, which speedily falls to the bottom, and is not redissolved by nitric acid: no other precipitate can be confounded with it, except sulphate of barytes, and there is no chance of the presence of barytes in solution in water."§

The action of animal and vegetable fluids on the acetate of lead, must also be mentioned. A strong infusion of tea produced a yellowish white precipitate. Burgundy wine decomposes the solution, and the mixture thus obtained, gives the characteristic tests of acetate of lead, with the sulphuric and chromic acid, the hydro-sulphurets, the subcarbonate of soda and zinc. Ammonia, however, produces a dirty yellow turbidness, instead of a white precipitate, and it is therefore not to be depended on in testing adulterated wines. Albumen produces an abundant white precipitate. Gelatine does not affect it, while milk and bile are copiously coagulated by it.‖

The reduction of the sulphuret may be accomplished by putting it into a small hole scraped in a piece of charcoal, and applying the flame of the blowpipe to it. The metal almost immediately appears.

* Among late writers on Colica pictonum, I may refer to Dr. Stokes's Lectures at Dublin, and Copland's Dictionary. Mr. Dunn, a manufacturer of white lead, detected the metal in the atmosphere of his manufactory. (London and Edinburgh Philosophical Magazine, vol. vii. p. 77.)

† To prevent any uncertainty with this test, Mr. R. Johnson has recommended the following modification. Dissolve the sulphuret obtained by (*a.*) in nitric acid; add carbonate of soda; dissolve the precipitated carbonate of lead in acetic acid with a gentle heat. To this acetic solution, add the hydriodate, and the characteristic colour will be produced. (Lancet, N.S. vol. vii. p. 671.)

‡ Christison, p. 456.

§ Paris's Medical Jurisprudence, vol. ii. p. 363.

‖ Orfila's Toxicology, vol. i. p. 448.

If any doubt exists as to its nature, the charcoal may be withdrawn, and the flame again applied, "when two beautiful concentric circles of red and yellow remain, being the yellow and red oxide of lead."

Insoluble matters may be evaporated to dryness, and burnt in a crucible; but, generally speaking, nitric acid will dissolve the lead from most of its compounds that are insoluble in water.*

Dr. Charles T. Jackson used the following process in examining the suspected sugar. Five hundred grains were burnt to cinders in a platina crucible, and these cinders again to ashes in a capsule. The ashes were digested with nitric acid, and then evaporated to dryness. They were then treated with water and filtered. A current of sulphuretted hydrogen was now passed through it, which produced the black sulphuret of lead. This, when collected and dried, weighed 1·6 gr. = 1·38 gr. of metallic lead = 2·337 grs. of oxide of lead, or nearly 38 grs. of oxide of lead in one pound of sugar.

Antidotes. From the experiments of Orfila, it appears that the sulphates of soda and magnesia are the most useful remedies against the noxious effects of the salts of lead. They decompose the acetate in particular, and transform it into an insoluble sulphate of lead, which Orfila considers innoxious. The phosphate of soda is also an antidote. He recommends the same treatment for the other preparations. We should aid their operation by diluents and purgatives, and prevent any tendency to inflammation by the antiphlogistic treatment.

The treatment of colica pictonum does not require a notice in this place.

The sulphuret of potash should never be administered as an antidote, since it is (as we have already shown) itself a poison.

CHROME.

Several of the compounds of this metal are coming into extensive use in the arts, and their effects both on man and animals are found to be extremely active.

Professor Gmelin, of Tubingen, performed numerous experiments with the chromate of potash. When one grain was injected into the jugular vein of a dog, it produced no effect. Four grains induced constant vomiting, and death in six days, without any distinct symptoms except weakness, and without any obvious morbid appearance. Ten grains caused instant death by suddenly stopping the action of the heart.

When introduced under the skin, its effects are still more remarkable. It seems to cause general inflammation of the lining membrane of the air passages. Thus, when a drachm in powder was inserted under the skin of the neck of a dog, the symptoms were want of appetite, vomiting, a purulent matter discharged from the eyes, palsy of the hind legs, difficulty of swallowing, and death on the sixth day. On dissection, the wound was seen not much inflamed, but the larynx, bronchiæ, and ramifications of the air tubes

* Christison, p. 483. Lancet, N.S., vol. vii. p. 386.

contained fragments of fibrinous effusion, and the nostrils were full of similar matter.

When swallowed, the salts of chrome cause inflammation, but not of a violent kind.*

The workmen in Glasgow, who use the bichromate of potash in dyeing, early observed injurious effects from immersing their hands in its solution. Troublesome sores soon broke out on the parts touched by it, and these gradually extended deeper and deeper, without spreading, until they in some cases actually made their way through the arm or hand altogether.†

Dr. Cuming of Glasgow, and Dr. Baer of Baltimore (in which latter place the bichromate of potash is largely manufactured), confirm the frequency of these effects on the workmen. The former remarks, that the first effect of the habitual application to the skin, is to cause a papulous eruption, and this after a little time becomes pustulous. If the exposure be continued, deep sloughs form under the pustules. To prevent these effects, an apparatus was constructed so as to require only the immersion of the tips of the fingers; but even here the eruption made its appearance in susceptible individuals.‡ Dr. Baer has seen these ulcers on parts of the body where he is sure the solution did not come in contact, and he is therefore disposed to ascribe them to the effects of vapours charged with chromic acid. He, however, observed no impression on the skin from the most concentrated form of the solution, when the cuticle was not abraded.

Several fatal cases have occurred in Baltimore, of poisoning with the saturated liquor of the bichromate of potash. The following was communicated by Dr. Baer to Professor Ducatel. A labourer, ætat. 35, on attempting to draw off from a refiner a solution, in the effort to exhaust the siphon by suction, received a small quantity of the solution into his mouth. His first impression was that he had spit it out; but only a few minutes elapsed before he was seized with great heat in the throat and stomach, and violent vomiting of blood and mucus. The vomiting continued until just before his death, which occurred in five hours. On dissection, the mucous tissue of the stomach, duodenum, and about one-fifth of the jejunum, was found destroyed in patches. The remaining parts of it could be easily removed by the handle of the scalpel.§

Antidote. Dr. Ducatel recommends the exhibition of a solution of the carbonate of soda or potash, for the purpose of neutralizing the excess of acid to which the injury is mainly to be ascribed. The snbsequent inflammation is to be treated on general principles.

The rarer metals have also been made the subject of experiments, particularly by Professor Gmelin. A brief notice of their effects will be sufficient.

* Edinburgh Medical and Surgical Journal, vol. xxvi. p. 133.

† Ibid. vol. xxvi. p. 134.

‡ Ibid. vol. xxviii. p. 301.

§ Prof. Ducatel, in Baltimore Medical and Surgical Journal, vol. i. p. 44. Ducatel's Manual of Toxicology, p. 144.

Molybdenum, in the form of molybdate of ammonia, appears to be a feeble poison. Half a drachm killed a rabbit in two hours, causing strong convulsions before death. In dogs, it produced merely vomiting and diarrhœa, and ten grains injected into the jugular vein did not prove fatal.

Tungsten, in the form of tungstate of ammonia, and in the dose of a drachm, had no effect when swallowed by a dog. The tungstate of soda caused some vomiting. With rabbits, however, the salts of this metal, if given in large quantities, are fatal. They die in convulsions, and some inflammation is found in the stomach.

Tellurium. Of this he had not sufficient to make a complete set of experiments. Ten grains of the oxide killed a rabbit in ten days without any particular symptoms.

Titanium appears innoxious.

Osmium is an active poison. The muriate causes immediate, violent, and long continued vomiting, even in small doses. Rabbits were soon destroyed, and the stomach, intestines, and œsophagus were black, rough, and hard on the inside, owing to a reduction of the salt by animal matter. A grain and a half of metallic osmium killed a dog in an hour with vomiting and convulsions.

The hydrochlorate of *Iridium* caused vomiting and diarrhœa in dogs, and death in rabbits, apparently through inflammation. Six grains injected into the jugular of a dog produced death in four minutes.

The double muriate of soda and *Rhodium* had no effect in doses of fifteen grains on rabbits; and even when ten grains were injected, the immediate prostration was recovered from, and the animal died in five days without any particular symptoms.

The muriate (hydrochlorate) of *Palladium* is a very active poison. Three grains injected into the jugular vein of a dog killed it within a minute, by destroying the irritability of the heart and causing partial coagulation of the blood. A few grains taken into the stomach caused vomiting, diarrhœa, and weariness in dogs. In rabbits, it produces no particular symptoms, but loss of appetite and death take place in three days from general and violent inflammation of the stomach.

Nickel. The sulphate is inactive. Twenty grains given to a dog, produced no effect except vomiting and weariness. The same quantity, however, caused convulsions and death in a rabbit. When inserted into the cellular tissue, although the whole of the salt was absorbed, no deleterious effect was induced.

Cobalt. This is more active. Thirty grains of the muriate, when swallowed, killed a rabbit within a day. Twenty-four grains inserted under the skin caused frequent vomiting, but the animal recovered. Three grains of sulphate injected into a vein proved fatal in four days.

Uranium. Three grains of the nitrate, when injected into a vein, caused instant death; but dogs swallowed fifteen and from that to sixty grains, without any effect, except slight vomiting.

Cerium is quite inactive. A drachm caused no inconvenience in a dog, nor half that quantity on a rabbit.

Manganese presented some peculiar effects. A drachm of the sulphate killed a rabbit in an hour, but thirty grains swallowed by a dog, or two drachms inserted into the cellular tissue, were without any effect. Twelve grains injected into a vein induced death in five days, and the stomach, duodenum, and liver were much inflamed. The latter organ particularly was mottled with inflamed streaks, that penetrated into its substance.*

At a subsequent period, Professor Hunefeld, of Griefswalde, found that analogous effects were produced on the liver by manganesic acid, but that it could hardly be called a poison. Although large doses were given to a rabbit, it survived them; but on being killed, the liver was found soft, and one part bright red, while elsewhere it was of a dark brownish red. When this organ was incinerated, its ashes gave unequivocal indications of manganese.†

Oxide of *Cadmium*, in a dose of twenty grains, made a dog vomit, but ten grains had no effect at all. ‡

BARYTES AND ITS SALTS.

All its soluble salts are poisonous, and on this account the sulphate, being insoluble, is not so. The muriate is generally deemed a more active agent than the pure or the carbonated barytes.

Barytes, whether pure or carbonated, when introduced into the stomach, produces vomiting, hiccup, insensibility, convulsions and death. The stomach was found inflamed throughout its whole extent, and extravasations of black blood were seen near the pylorus. The lungs and intestines were natural. §

Mr. Parkes mentions, that he visited the mine of carbonate of barytes at Anglezark, in the county of Lancaster, and was informed by Mr. Derbyshire, who occupies the estate on which the mine is situated, that some years since he lost three cows at one time, which had strayed from their pasture, and were found licking some lumps of the spar, which at that time lay about the mouth of the mine in abundance. It was also stated, that it was impossible to keep any fowls upon the farm, as they mistook the barytes for white sand. They were sure to die on the first day that they got out upon the land. Mr. Parkes also adds the following quotation from Leigh's History of Lancashire: "Some have been hardy enough to take a drachm at one dose, particularly one James Barnes's wife and child, and in about nine hours afterwards they expired. The like quantity in about three hours will kill a dog." ‖

A recent case of poisoning by the carbonate has been described by Dr. Wilson. A young female took half a teacupful of it, to which she previously added water. Soon after, she took some medicine, which induced vomiting.

* Gmelin, Edinburgh Medical and Surgical Journal, vol. xxvi. p. 134 to 138.
† Edinburgh Medical and Surgical Journal, vol. xxxvi. p. 460.
‡ Christison, p. 453.
§ Orfila's Toxicology, vol. i. p. 396.
‖ Parkes's Chemical Essays, London, 1815, vol. ii. p. 217.

In two hours, double vision, pain in the head, and weight in the epigastrium, followed. Pain and cramps over the whole body next occurred. Repeated doses of sulphate of magnesia were given, but the pain and cramp continued for several weeks, and her recovery was protracted.*

Muriate of barytes, when injected into the jugular vein, caused great agitation and convulsions, and death ensued in six minutes after the operation. On dissection, the heart was found distended with coagulated blood, the stomach was natural, while the lungs were crepitating, and rather denser than usual.

When applied to a wound in the state of powder, Mr. Brodie found that it produced vertigo, paralysis of the posterior extremities, general insensibility, dilated pupils, convulsions, and death. The stomach and intestines were not affected. The lungs were exactly in the same situation as in the previous experiment.

Orfila and Brodie have each introduced this substance into the stomach of animals. It excited vomiting and purging, violent convulsions, and greatly accelerated the pulse. Insensibility generally ensued previous to death. The mucous membrane of the stomach was of a livid red colour, and it could be easily rubbed off. The muscular coat exhibited two broad patches of a cherry red colour. The lungs were natural, but the left ventricle of the heart contained black fluid blood.†

We have also some instances of its effects on the human system. An over-dose (probably seventy or eighty drops) excited violent purging and vomiting, loss of muscular motion in the limbs, and coldness of the extremities, from which the patient did not recover in some days.‡ An ounce in solution, which was taken by mistake for Glauber's salts, produced instant vomiting, convulsions, pain in the head, and deafness, and death supervened within an hour after the exhibition of the poison.§

Chemical tests. Sulphuretted hydrogen does not produce any change in barytic solutions.

In case the antidote which we shall presently mention has been given, additional difficulties will be presented in endeavouring to detect the poison. Probably the most satisfactory process will be to add nitric acid, and then filter and convert the whole to sulphate of barytes, by adding sulphate of soda. Heat the precipitate for half an hour, which will convert the sulphate to a sulphuret. The sulphuretted hydrogen will be disengaged by adding muriatic acid, and the earth remains for examination with its tests as given in all works on chemistry.‖

* London Medical Gazette, vol. xiv. p. 488.

† Chaptal mentions, that MM. Huzard and Biron gave to some horses the muriate and carbonate of barytes in doses of 118 grains every day, and these animals died suddenly after having taken them for a few days. (Chemistry applied to the Arts, vol. ii. p. 74.)

‡ Medical Commentaries, vol. xix. p. 151.

§ Brande's Journal, vol. iv. p. 382.

‖ Christison, p. 509.

Antidotes. From the experiments of Orfila, it appears that the sulphate of soda or magnesia is the proper remedy, when early administered. These decompose the poison, and produce an insoluble sulphate of barytes. Vomiting must always be encouraged.

The salts of *Strontia,* according to Gmelin, are very feebly poisonous.*

* Edinburgh Medical and Surgical Journal, vol. xxvi. p. 132.

CHAPTER XIX.

IRRITANT POISONS (*concluded*).

4. VEGETABLE AND ANIMAL IRRITANTS. *Vegetable acrids.* Bryonia dioica. Momordica elaterium; elatine. Cucumis colocynthis. Euphorbia officinarum, and other species. Ricinus communis. Jatropha curcas, manihot, and other species. Hippomane mancinella. Croton tiglium. Ranunculus acris, and other species. Anemone pulsatilla, and other species. Caltha palustris. Delphinium staphysagria. Clematis vitalba. Chelidonium majus. Daphne gnidium, and mezereum. Convolvulus jalapa, and scammonea. Narcissus pseudo-narcissus. Pedicularis palustris. Gratiola officinalis. Gamboge. Savine. Rhus radicans, and other species. Sedum acre. Rhododendron chrysanthemum. Cyclamen europæum. Plumbago europæa. Lobelia syphilitica, and other species. Pastinaca sativa. Hydrocotyle vulgaris. Phytolacca decandra. Calla palustris. Arum maculatum. Sambucus ebulus. — Treatment. — ANIMAL IRRITANTS. Cantharides — symptoms; cases; appearances on dissection; treatment. Lytta vittata. *Poisonous Serpents.* Viper. Rattlesnake; symptoms of its bite; appearances on dissection; treatment. Scorpion. Tarantula. Spider. Bee. Humble bee. Wasp. Hornet. *Poisonous Fishes.* Catalogue of these; cause of fish poison; effects; treatment. Mussels — oysters — crab — lobster — mackarel; dangerous effect of these at certain seasons of the year. Physalia. Toad. Pheasant or partridge — its poisonous nature at certain seasons. Poisonous honey — cause — effects — treatment. Wounds received during dissection — consequences — treatment.
5. MECHANICAL IRRITANTS. *Glass* and *enamel* in powder — effects — cases.
6. IRRITANT GASES. Chlorine — effects — antidotes. Nitrous acid vapour — effects — cases. Muriatic acid gas. Sulphurous acid gas. Seleniuretted hydrogen gas.

IN noticing the VEGETABLE ACRIDS or IRRITANTS, which constitute the fourth class of Irritant Poisons, I shall consider those that belong to the same natural order of plants in connection with each other. Beyond this, it would hardly be useful to follow a botanical arrangement. The following catalogue will therefore serve as an index.

Cucurbitaceæ,
Bryonia,
Momordica,
Cucumis.
Euphorbiaceæ,
Euphorbia,
Ricinus,
Jatropha,
Hippomane,
Croton.
Ranunculaceæ,
Ranunculus,
Anemone,
Caltha,
Delphinium,
Clematis.
Papaveraceæ,
Chelidonium.
Thymeleæ,
Daphne.
Convolvulaceæ,
Convolvulus.
Amaryllidæ,
Narcissus.
Scrophularineæ,
Pedicularis,
Gratiola.
Guttiferæ,
Stalagmites.
Coniferæ,
Juniperus.
Anacardiaceæ,
Rhus.
Ficoideæ,
Sedum.
Ericeæ,
Rhododendron.
Primulaceæ,
Cyclamen.

Plumbagineæ,	*Umbelliferæ*,	*Aroideæ*,
Plumbago.	Pastinaca,	Calla,
Lobeliaceæ,	Hydrocotyle.	Arum.
Lobelia.	*Phytolacceæ*,	*Caprifoliaceæ*,
	Phytolacca.	Sambucus.

Bryonia dioica, L. (Bryony.) The administration of bryony root has caused vomiting, fainting, violent pain, profuse alvine evacuations, &c. When administered to dogs in whom the œsophagus was tied, death ensued without any previous remarkable symptoms; but the mucous membrane of the stomach was of a bright red, and the great intestines were highly inflamed.*

Pyl mentions a fatal case from taking two glasses of an infusion of the root to cure an ague. Tormina and purging soon followed, and the patient sunk under it.

Brandes and Firnhaber discovered a principle in the root, which is denominated *bryonine*. It acts, according to the experiments of Collard de Martigny, like the plant itself, inducing inflammation and thickening of the coats of the stomach. When twenty grains were injected into the pleura, it caused death in seven hours, and all the marks of true pleurisy were present — serous effusion, pseudo-membrane, and gorging of the lungs.†

Momordica elaterium, L. (Wild or squirting cucumber.) The expressed juice of the fruit of this plant, on standing, deposits a substance, which has been variously styled an inspissated juice, a fecula, and an extract, but is strictly speaking neither of them. It is dried, and in that state forms the medicinal article. Among cathartics, to which class it belongs in the materia medica, it is deemed the most violent; and indeed the severity of its operation is such that it has for a long time been banished from the practice of medicine. Its active principle is now, however, understood, and its operation can therefore be regulated.

Elaterium, when given to the amount of three drachms to a dog whose œsophagus had been tied, produced nausea and efforts to vomit, moaning, insensibility, and death. The mucous membrane of the stomach was found highly inflamed, as was also the rectum, but the other intestines were not altered. Similar effects were produced by inserting the extract into a wound.‡

A female in Boston took, by the advice of a quack, four pills of the extract of elaterium and rhubarb (the total being $2\frac{2}{3}$ grains of the extract, and 16 of rhubarb). They produced incessant vomiting and purging, and without yielding to the use of remedies, she sunk in thirty-six hours after the last pill was taken. On dissection, the mucous membrane of the stomach was found to be highly injected;

* Orfila's Toxicology, vol. ii. p. 13.

† Edinburgh Medical and Surgical Journal, vol. xxix. p. 215.

‡ Orfila's Toxicology, vol. ii. p. 14. Dr. Parsons did not find the inflammation of the rectum, in an experiment performed by him on a dog. (American Medical Recorder, vol. xiv. p. 356.)

the colon contracted, and all the intestines inflamed. The other viscera were healthy. *

Drs. Clutterbuck and Paris were supposed to have discovered the active principle of this substance some years since: it was styled *elatine*. This, however, was a compound; and Dr. Morries of Edinburgh, and Mr. Hennel of London, nearly at the same time, obtained the peculiar crystalline principle which deserves that name. A tenth of a grain will purge a man; and a fifth of a grain, in two doses, killed a rabbit after some hours. †

Cucumis colocynthis, L. (Bitter apple.) The only part of this plant which is used in medicine is the dried spongy or medullary part of the fruit. It is well known as a drastic cathartic. Stalpart relates a case, where an individual took some of it, and was shortly after seized with the most excruciating pains in the abdomen, bloody evacuations, and violent spasms. ‡ He also quotes cases from Tulpius, Schenkius, and Platerus, indicating its powerful operation; and mentions that, in one instance, death followed from an enema, in which not more than a drachm of colocynth had been infused.

An individual labouring under hæmorrhoids, and affected with indigestion, took two glasses of a decoction, which subsequently proved to be that of colocynth. Frequent alvine evacuations, accompanied with colic, were among the first effects; and some hours afterwards, he complained of great heat in the bowels, dryness in the fauces, and unquenchable thirst. The pulse was small, and extremely rapid; the tongue red; the abdomen intolerant of pressure, and there was a very violent fixed pain in the vicinity of the umbilicus. The evacuations by the bowels had now ceased. The antiphlogistic regimen was employed, but without success. Coldness of the extremities succeeded, and he gradually sunk, after a previous diminution of the abdominal pain. On dissection, the abdominal viscera exhibited marks of the most violent inflammation. The peritoneal cavity was filled with a whitish fluid, containing flocculi of the same colour. The intestines were reddened, and thickly studded with black specks; most of them were either adherent, or covered with adventitious membrane. The mucous membrane of the stomach was detached and ulcerated, and the peritonæum in an almost putrid condition. Traces of inflammation existed also in the liver, kidneys, and bladder. §

A coroner's inquest was held in London in 1823, on the body of a woman, who died in twenty-four hours with incessant vomiting and purging, in consequence of having swallowed by mistake a teaspoonful and a half of colocynth powder. ‖

* Boston Medical Magazine, vol. iii. p. 25.

† London Medical Repository, vol. xii. p. 5. Paris's Pharmacologia, p. 270. Edinburgh Medical and Surgical Journal, vol. xxxv. p. 339. Journal of the Royal Institution, vol. i. p. 532.

‡ "Fateor," he observes, "profecto nunquam me tam horrenda in quoquam conspexisse symptomata." (Stalpart, vol. i. p. 173.)

§ Orfila's Toxicology, vol. i. p. 696. 3d edit. Case communicated by M. Carron D'Annecy.

‖ Christison, p. 524.

The symptoms produced on animals by the introduction of this substance into the stomach, are in general similar to those experienced in the human subject. Dissection exhibits an inflammation of the *stomach* and *rectum*, while the great bulk of the intestines are in a natural state. No eschar was noticed.*

The active principle of this plant was discovered by Vauquelin, and is termed *colocynthin*.

Euphorbia officinarum, L. The stalk of the various species of the genus Euphorbia furnishes a milky juice, which, on being dried, is called *euphorbium*. It is a gum-resin, and obtained principally from the above plant.† Its medicinal use is solely as an errhine, and farriers employ it for blistering horses.

A female in Lincoln (Eng.) took by mistake, eighteen days after delivery, two ounces of tincture of euphorbium, prepared with camphor, alcohol, and euphorbium. She immediately experienced a violent suffocation, burning, and pain in the throat and stomach. On the administration of warm water, copious vomiting was induced, but the pain continued for some time, nor was it relieved until after the repeated application of suitable remedies.‡

In another instance, a teaspoonful was administered by a farrier in the dark, through mistake for rhubarb. A burning heat in the throat and fauces was immediately felt, which soon extended to the stomach — an incessant vomiting of watery fluid took place; the tongue was covered with thick mucus; the pulse was very irregular, and at least 150 in a minute; and the patient was in a cold perspiration, and unable to speak intelligibly. An emetic was given, but it brought away only a small quantity of a thin black fluid; and mucilages and anodynes, when exhibited, were almost instantly rejected. The patient lived nearly three days; and on opening the body eight hours after death, there were found in the stomach several gangrenous spots, and its coats tore on the slightest touch. The spleen was much enlarged and rotten, while the vessels of the internal coat of the aorta were beautifully injected with blood, and showed marks of the highest degree of inflammation.§

When introduced into the stomach of animals, it produced violent pain and death; and the stomach, on dissection, contained a red, bloody fluid, mixed with powder of euphorbium; its coats were all of a very deep red, and the colon and rectum were highly inflamed.‖

Several chemists have examined this substance, and found in it a resin, in which its active principles reside. This again has been ascertained to be a compound, and the leading ingredient extracted from it is styled *euphorbin*.¶

* Orfila's Toxicology, vol. ii. p. 17, 21.

† This species is a native of the Cape of Good Hope, and the recent juice is so corrosive as to erode the skin wherever it touches. The people who gather it, tie a cloth over the mouth and nostrils, to protect them from the acrid dust of the withered branches. (Thomson's London Dispensatory, p. 297.)

‡ Case by Dr. Willis. Philosophical Transactions, vol. li. p. 662.

§ Brande's Journal, vol. iii. p. 51. Case communicated by Mr. Furnival.

‖ Orfila's Toxicology, vol. ii. p. 43. ¶ Christison, p. 518.

Many other species of euphorbia are poisonous, as the *E. lathyris*, L., the *E. cyparissias*, L., and the *E. tirucalli*, L. The second of these excoriated a man's face, on being rubbed with it; and Lamotte mentions that a glyster prepared with this plant proved fatal. In a person who allowed his closed eyelids to be rubbed with the juice of the *E. esula*, L., inflammation followed, and it was succeeded by the loss of the eye.* Hyder Ali, in his ferocious wars against the English in India, ordered the wells to be poisoned with the *E. tirucalli*, L. † The juices of the *E. antiquorum*, L. and *E. heptagona*, L. are each said to be employed by the inhabitants of the countries where they are natives, in poisoning their spears and arrows. ‡

A case of poisoning with the *E. peplus*, L. (petty spurge) occurred in England. A boy, six years old, ate it by mistake. It induced vomiting and purging, spasms, small pulse, inability to swallow, insensibility, cold extremities, and death. On dissection, the tonsils, fauces, and pharynx were seen much inflamed; the mucous membrane of the stomach and small intestines was altogether red, but the large intestines were healthy, except that their muscular coat was slightly vascular; the bladder was greatly contracted; the epiglottis and larynx highly inflamed, and containing some tenacious green mucus; the lungs were healthy; the blood fluid, or only partially coagulated; the veins of the dura mater distended, but the substance of the brain healthy. §

The *E. corollata*, L. of this country appears, according to Dr. Zollickoffer, to possess epispastic properties. ‖

Ricinus communis, L. (Palma Christi, castor oil plant.) The castor oil used in medicine, is obtained by expression from the seeds of this plant. They act in the most powerful manner on the system, and produce violent vomiting and purging: such was also the effect observed by Orfila on animals. Thirty grains produced death in a small dog, whose œsophagus was not tied. Inflammation and ulceration were noticed in the stomach. ¶

Jatropha curcas, L. (Indian nut. Tuva tree of the Philippine Islands.) The seeds of this plant act as a violent poison, and excite vomiting, insensibility, great weakness, and death. Violent inflammation was found in the mucous membrane of the stomach and intestines. It was more active in its operation, when introduced into the stomach, than when applied to the cellular texture. **

* Scopoli, quoted by Orfila.

† Quarterly Review, vol. xviii. p. 47. American edition.

‡ Ainslie's Materia Indica, vol. i. p. 123. History of British India (Family Library), vol. iii. p. 122.

§ Medico-Chirurgical Review, vol. vii. p. 275.

‖ American Journal of Medical Science, vol. xii. p. 76. Hannibal, when pursued by the Romans, took some poison which he had carried about with him in a ring, and died immediately. It is a conjecture of the eminent Mr. Hatchett, that this may have been the inspissated exudation of the Euphorbia officinalis. (Sir Henry Halford's Essays, p. 156.)

¶ Orfila's Toxicology, vol. ii. p. 29.

** Mr. Bennet says that the seeds are used as a purgative by native doctors of the Phillippine Islands. In an over-dose they produce vomiting, and purging, and

The fresh root, or the juice of the *Jatropha manihot*, L. (*Janipha manihet*, Kunth.) has been long known as a violent poison.* It produces swelling of the body, nausea, vomiting, and purging; pain, tenesmus, loss of sight, coldness of the extremities, faintings, and death.† Dr. Clark, of Dominica, knew a strong negro to die in little more than an hour after drinking half a pint of the juice. Thirty-six drops were administered to a criminal. They had scarcely reached his stomach when he writhed and became convulsed, and died in six minutes. On dissection, no alteration was found, except that the stomach was shrunk to half its natural size.‡

The *Jatropha multifida*, L. is probably equally poisonous.§

Hippomane mancinella, L. (Manchineel tree.) Dr. Peysonnel relates that a soldier, who was a slave with the Turks, ate some of the apples of this tree, and was soon seized with a swelling and pain of the abdomen. His lips were ulcerated with the fruit, and a cold sweat came over him. Having taken some remedy (the avellana purgatrix), vomiting and purging were induced to a violent degree. He, however, gradually recovered.‖

The wood of this tree, when green, will excite inflammation on the skin when rubbed against it¶; and it affords a most beautiful article of furniture, being interspersed with green and yellow veins, like marble: but the dust is of so acrid and poisonous a nature, that the sawyers and carpenters are forced to work with gauze masks, to protect them from its injurious effects.**

Dr. Ricord Madianna, in his experiments on animals, found that the juice excited inflammation, even when applied to the sound skin.††

Orfila and Ollivier applied it to a wound in the cellular tissue with fatal consequences, and when given internally it destroyed the animal. On dissection, the stomach and intestines were found highly injected.‡‡

Croton tiglium, L. (Purging croton.) The seeds of this plant have

violent pain. The only antidote of the native practitioners is repeated draughts of cold water. (London Medical Gazette, vol. ix. p. 8.)

* See Piso, quoted by Orfila, vol. ii. p. 73., and Philosophical Transactions, vol. ii. p. 634.

† Humboldt states that there are two kinds of *juca*, which furnish the cassava or manihot. The root of the *juca dulce* is perfectly innocent, but that of the *juca amarga*, or bitter manihot, conceals a deadly poison. Heat, however, will destroy its noxious qualities. (Edinburgh Review, vol. xvi. p. 245. American edition.)

‡ Medical Facts and Observations, vol. vii. p. 289.; Edinburgh Journal of Geographical and Natural Science, vol. iii. p. 384., from Hooker's Botanical Magazine. From a late analysis of Henry, it would appear that the juice of the Jatropha manihot contains hydrocyanic acid, or something akin to it. (Philadelphia Journal of Pharmacy, vol. vii. p. 134.)

§ Brande's Journal, vol. xx. p. 95.

‖ Philosophical Transactions, vol. l. p. 772.

¶ Ibid., vol. iii. p. 824.

** Edinburgh Review, vol. xvii. p. 374. American edition.

†† New York Medical and Physical Journal, vol. iii. pp. 309. 439.

Dr. Ricord thinks that the feuillea cordifolia alone deserves the name of an antidote for this poison.

‡‡ Orfila's Toxicology, 3d edition, vol. i. p. 719.

an acrid, nauseous, and burning taste. They were formerly employed as hydragogue purgatives, but on account of the violence of their operation were completely laid aside. One seed is sufficient for a dose, and even this sometimes excites violent purging and vomiting.*

Within a few years past the expressed oil of this plant has come into considerable use as an article of the materia medica. From one to three drops is a dose.†

Ranunculus acris, L. (Butter cups.) Its leaves are an acrid and irritating external application, producing inflammation and ulcers. Internally given, the juice of its leaves produced inflammation of the mucous membrane of the stomach.

Ranunculus sceleratus, L. (Water crowfoot,) excited severe pains and convulsive movements in Krapf, although he took only a single flower, which he had well pounded. Its leaves and juice excoriated the tongue and mouth, and produced burning pain in the œsophagus. Plenck destroyed a dog with its juice, and found the stomach red and corroded, and the pylorus tumefied. Externally applied, it produces extensive ulcers.

Ranunculus flammula, L. has often destroyed whole flocks of animals, from grazing on it in the spring.

Ranunculus arvensis, L. poisons sheep; and three ounces of its expressed juice killed a dog in four minutes.‡

Several other species are equally poisonous, as the *bulbosus*, *ficaria*, *alpestris*, *aquatilis*, &c.§

Anemone pulsatilla, L. (Wind flower.) Bulliard relates the case of an old man with rheumatic gout, who applied the root of this plant bruised, to the calf of his leg, on going to bed. Cruel sufferings succeeded for ten or twelve hours, and the whole limb became gangrenous, nor was it restored until after the application of vigorous remedies. The dried root on being pounded has excited irritation of the eyes, itching and vomiting. Lastly, animals to whom the extract or the juice of the leaves had been administered, sunk under it, and exhibited the marks of violent inflammation in the stomach and rectum. The dried powder produced no inconvenience to them.‖

The *Anemone pratensis*, *sylvestris*, and *nemorosa*, are also deemed poisons. The latter produces dysentery in sheep when they feed on it.¶ The inhabitants of Kamschatka make use of this plant to poison their arrows, and the wounds are most commonly fatal.**

* See Edinburgh Medical and Surgical Journal, vol. xiii. p. 256.

† According to Dr. Nimmo of Glasgow, the kernels of the seeds of the croton are composed of 37 parts of acrid purgative principle, 33 of fixed oil, and 40 of farinaceous matter in the hundred. The oil itself consists of 45 acrid principle, and 55 fixed oil. (Brande's Journal, vol. xiii. p. 62.)

‡ London Medical and Physical Journal, vol. xxi. p. 12.

§ The ranunculus acris, sceleratus, flammula, bulbosus and aquatilis, are natives of the United States. According to Dr. Pulteney (Transactions Linnæan Society), several species are eaten by animals without injury. See his observations in the Philosophical Magazine, vol. vi. p. 210.

‖ Orfila's Toxicology, vol. ii. pp. 43, 44.

¶ London Medical and Physical Journal, vol. xxi. p. 12.

** Orfila's Toxicology, vol. ii. p. 46. Mr. Robert extracted a fluid of an acrid

Caltha palustris, L. (Marsh marigold,) is said by Christison to be extremely acrid. A family of five persons in Germany took some of it for food. They were all seized in half an hour with sickness, pain in the stomach, vomiting, dysuria, and diarrhœa, and on the next day with swelling of the whole body and a copious eruption. They however all recovered.*

Delphinium staphysagria, L. (Palmated larkspur, stavesacre.) An ounce of this substance introduced into the stomach of a dog, whose œsophagus was tied, caused dejection, but neither vertigo or convulsions, and death suceeded in fifty hours. The mucous membrane of the stomach was inflamed, but the other organs presented no alteration. When applied to a wound in a moistened state, it induced dejection, vertigo, and finally death. The wound was inflamed, and the limb greatly swelled, but the digestive canal was sound. Its local effects are evidently the most striking.

Lassaigne and Fenuelle discovered the alkaloid, *delphine*, in this plant. It is described as extremely acrid.†

Delphinium tricorne, Mx., is one of the plants, according to Professor Short, which are indefinitely called *Staggerweed*, and from eating which the diseases of cattle are sometimes attributed in the western states.‡

Clematis vitalba, L. (Virgin's bower.) *Clematis flammula*, L. *erecta*, L. and *integrifolia*, L. These are all acrid and caustic. When applied to the skin, they produce redness, pustules, and excoriations; introduced into the stomach, they occasion an inflammation, which destroys the animal.

Chelidonium majus, L. (celandine,) produced death in animals, both when introduced into the stomach and when applied to wounds, by Orfila. In the former case, the stomach was found inflamed, but not in the latter. The wounds, however, were inflamed and livid; and from both modes of application, the lungs were seen livid and distended with blood. This plant is naturalised in this country. The *Chelidonium glaucium* has caused delirium and purging in a family, who ate of a pie in which it had by mistake been put.§

Daphne gnidium, L. (Spurge flax. Flax-leaved daphne.) The bark of this substance, like the poisons already noticed, excited vomiting, local inflammation, and death, and the stomach also presents an appearance similar to what has been already described.

Daphne mezereum, L. (Mezereon,) acts in a similar manner. Linnæus relates of a young lady, who died from hæmoptysis, occa-

taste and pungent odour, from the flowers of the *Anemone pratensis*, L., which acted like a caustic on the tongue. Vauquelin examined and confirmed his experiments, and deems the substance a peculiar one, which is probably common to the clemates and ranunculi. It should be arranged, according to him, with the concrete oily substances. (London Medical Repository, vol. xiv. p. 403.)

* Christison, p. 257. from Rust's Magazine.

† Annals of Philosophy, vol. xvi. p. 32.; Edinburgh Medical and Surgical Journal, vol. xlii. p. 234.

‡ Florula Lexingtoniensis, in Transylvania Journal, vol. i. p. 411.

§ Philosophical Transactions, vol. xx. p. 263.

sioned by taking twelve berries of this plant.* Several other species are deemed poisonous. In animals poisoned by the *Daphne laureola*, L. (Spurge laurel,) Orfila observed a sanguineous effusion below the mucous coat of the stomach.†

Convolvulus jalapa, L. (Jalap.) In large doses this is an acrid poison. Mr. Hume and Drs. Buchner and Herberger appear to have established that its active properties reside in a resinous principle.‡

Convolvulus scammonea, L. (Scammony.) The experiments of Orfila contradict the opinion of some toxicologists, that the juice of this plant is poisonous. He frequently administered four drachms of it to dogs, who had the œsophagus afterwards tied, and he only observed alvine evacuations. They lived six or seven days.

Narcissus pseudo-narcissus, L. (Meadow narcissus, daffodil.) The extract of this plant whether externally or internally applied, produced violent vomiting or attempts to vomit. Death shortly ensued, and in every instance the mucous membrane of the stomach was inflamed, and in several, that of the rectum.

Pedicularis palustris, L. has an acrid burning taste, and is said by Gleditsch and Gunner to have injured sheep and oxen.

Gratiola officinalis, L. (Hedge hyssop.) Death followed after a considerable interval, from the introduction of the extract of this substance into the stomach of animals, and the mucous membrane was inflamed. The same result followed from inserting it into a wound, but the stomach was sound.§

Stalagmites cambogioides, Murr. *Garcinea cambogia*, D. C. (Gamboge.) This gum-resin, when introduced in quantity into the stomach of animals, whose œsophagus was tied, produced violent efforts to vomit, purging, dejection, and death. The mucous membrane of the stomach was inflamed, and some reddish spots were seen in the rectum. When this operation was not performed, and dogs were suffered to vomit, it did not cause any serious accident.

Juniperus sabina, L. (Savine.) A native of Canada. Found also in the Rocky Mountains by Lewis and Clarke.

This is well known as a powerful stimulant. When administered to animals in doses of four and six drachms, it caused death, and left inflammation of the mucous membrane of the stomach, with a small ulcer near the pylorus. The rectum was somewhat inflamed. And this last was observed in every experiment.

The abuse of the substance, both in the form of oil and powder, in producing abortion, has been noticed in another place, and the case communicated by Mr. Cockson of Macclesfield, to Dr. Christison, referred to.‖ I may add the remaining particulars. The female

* Orfila's Toxicology, vol. ii. p. 27.

† Andral, quoted in Journal of Foreign Science, vol. iii. p. 402. Vauquelin and Dublanc have analysed the plants of this species. Brande's Journal, vol. xviii. pp. 177. 401. Christison, p. 528.

‡ Christison, p. 529.

§ Dr. Whiting announced, at a meeting of the London Medico-Botanical Society, that *veratrine* had been discovered in this plant. (Burnett's Medical Botany, vol. i.)

‖ See *antè*, p. 234.

miscarried in about fifty-four hours (on Saturday), and she died on the Thursday following. Mr. Cockson, on dissection, found extensive peritoneal inflammation, and the inside of the stomach of a red tint, checkered with patches of florid extravasation.*

Rhus radicans, L. *toxicodendron*, L. *vernix*, L., *R. venenata*, D. C. All these are natives of the United States, and the R. radicans and toxicodendron are by some deemed merely varieties of the same species.

The watery extract of the *radicans*, when internally administered, or applied to the cellular texture, produced a local irritation and inflammation, and after death, the mucous coat of the stomach was seen inflamed.

The juice of the *Rhus toxicodendron*, (poison oak, poison ivy,) is said by Fontana to have proved innocent to animals who were made to swallow it; but a very small portion of the milky juice applied to the human skin, excited swelling not only in the part touched, but also over the face, eyelids and ears. This was the case with our author himself. A severe burning and itching continued for several days, and small vesicles, filled with a transparent sharp humour, formed in various places over his hands. Nearly the same symptoms occurred from touching the leaves.† I may add, that similar effects are very common in this country from touching this plant. Dr. Alderson even states, that sphacelation has followed, in some cases in England, of such parts of the skin as the acrid juice had touched.‡

The *Rhus vernix, venenata*, D. C. (poison sumach), produces similar effects. Blindness has been caused by merely handling it.§ And Dr. Bigelow mentions, that he has known individuals badly poisoned in winter, from the wood of the rhus vernix accidentally burnt on the fire.‖

* Christison, p. 532.

† Medical Commentaries, vol. xii. p. 110. "The juice of the rhus toxicodendron produced enormous swellings on some labourers in the Jardin des Plantes, wherever it touched them." (Sage. Edinburgh Medical and Surgical, Journal, vol. ix. p. 378.)

‡ Medical Commentaries, vol. xx. p. 10. Mr. Van Mons has advanced an opinion that the hurtful effects of this plant depend on a gas which it exhales, during the night or in the shade, rather than on its milky juice. He seems to have proved the irritating effects of this gas. (Orfila, vol. ii. p. 42.) We have, however, too great a mass of testimony proving the nature of the juice, to allow us to consider it innoxious. Dr. B. S. Barton's account of its effects on himself is alone sufficient. It excited itching, swelling, and vesicles, which desquamated. (New York Medical Repository, vol. viii. p. 200.)

§ See an account of the poison wood tree in New England, by the Hon. Paul Dudley, F.R.S. (Philosophical Transactions, vol. xxxi. p. 145.; and Dr. Cutler in Memoirs of the American Academy of Arts and Sciences, vol. i. p. 429.)

‖ Bigelow's Medical Botany, vol. i. p. 109. Cases are related by Dr. Bigelow, pp. 103—107. of the poisonous effects of the exhalations and juices of this plant. See also Dr. Horsfield's Inaugural Dissertation on the Rhus vernix, radicans, and glabrum, 1798, in Caldwell's Medical Theses, vol. i. p. 128.

On the treatment of the disease excited by these plants, and which is almost identical with the *diffuse inflammation* of Dr. Duncan, junior, see Dr. Fountain in New

Several other species of the rhus are poisonous, particularly the *R. pumila*, Mx. of Carolina, and the *R. veneficera*, D. C. *perniciosa*, Kunth.*

Sedum acre, L. (Houseleek. Wall pepper.) This produced death when given internally, and the mucous membrane of the stomach was seen of a fiery red colour.

Rhododendron chrysanthum, Pall. The decoction of this plant has an acrid, burning taste; it is emetic, drastic, and inflames the texture to which it is applied. The *Rhododendron ferrugineum*, L. is said to be equally poisonous. Welsch speaks of a meal which became fatal to the guests, from having eaten of a hare which had been fed upon its leaves.

The *R. maximum*, L. (Pennsylvania mountain laurel. American rose bay) is, according to Dr. B. S. Barton, undoubtedly a poison.†

Cyclamen europæum, L. A violent cathartic, and it also excites vomiting. Bulliard states, that its root produces cold sweats, dizziness, and convulsive movements; the patient voids blood by vomiting and by stool; and a super-purgation supervenes, which proves fatal.

Plumbago europæa, L. Sauvages observes, that the workmen who make use of the decoction of this plant for the purpose of obtaining a yellow dye, are tormented by a severe headache if they work longer than six hours. Its taste is acrid and almost caustic. Dulong has discovered a peculiar principle in the root, which is called *plumbagine*.‡

Lobelia syphilitica, L. (Cardinal flower.) A native of the United States. This is an acrid plant, and acts as an emetic and purgative.

The *Lobelia longiflora*, L. possesses still more energetic properties. In Spain, according to Orfila, it is called *Rabienta cavallos*, because it kills horses.

Lobelia inflata, L. (Indian tobacco. Emetic weed. Eyebright.) A native of the United States. This is a powerful emetic, and distressing and long-continued sickness often accompanies its operation. "A melancholy instance of death, occasioned by the use of this plant in the hands of a quack, is detailed in the sixth volume of the Massachusetts Reports, in the trial of Samuel Thompson, an empiric practising in Beverly, for the murder of Ezra Lovett. In this trial it appeared that the patient, being confined by a cold, sent for the pretended physician, who gave him three powders of lobelia in the course of half an hour, each of which vomited him violently, and left him in

York Medical and Physical Journal, vol. v. p. 409.; Dr. Christy in ditto, vol. viii. p. 21.; Dr. Dakin in American Journal of Medical Sciences, vol. iv. p. 98.; Boston Medical Magazine, vol. i. p. 282.; vol. ii. p. 75.

* The Indian varnishes appear to produce similar effects on the skin. One of them is made from the *Melanorrhæa usitata* of Wallich, the varnish tree of Munipur, and an allied plant to the rhus. Sir David Brewster received from Mr. Swinton several specimens, and it was found that the slightest touch to the skin induced swelling and great pain. One of the servants was nearly killed by the sylhet varnish. (Edinburgh Journal of Science, vol. viii. p. 101. Ibid., N.S., vol. ii. p. 71.)

† Barton's Materia Medica, part i. p. 18.

‡ Brande's Journal, vol. vi. p. 192.

a great perspiration during the night. The next day two or more powders were administered, each of which operated by vomiting, and occasioned great distress. In like manner, two other powders were given the subsequent day, leaving the patient in a state of great prostration. Several days after this the physician came again, and finding his patient still worse, administered several more powders, which occasioned great distress, and at length ceased to operate. Finding that the stomach was not sensible to the emetic effect of the lobelia, the physician repeated the dose; and when the patient complained of great distress at the breast, and said he was dying, the doctor assured him the medicine would soon get down, or operate as a cathartic. However, on the same evening, the patient lost his reason, and became convulsed, so that two men were required to hold him. To relieve which, the doctor forced down two more of his powders, and the patient, as was to be expected, grew worse, and continued so until he expired.

"The doctor, who had thus terminated the disease and the patient at once, was arrested and put upon trial for murder; but the homicide proving a legitimate one, from the want of a sufficient evidence of malice prepense, he was acquitted and set at liberty." *

Horses and cattle have also been killed from eating this plant.

Professor Colhoun, of Philadelphia, has made some experiments on the active principle of this plant.†

Pastinaca sativa, L. The root of this plant is said by Murray to have produced delirium, vertigo, heat at the stomach, and in the mouth and eyes, with tumefaction of the lips. It is a native of the United States.

Hydrocotyle vulgaris, Mx. (Marsh pennywort.) This plant has an acrid taste. It is a native of the United States.

Phytolacca decandra, L. (Poke. Pigeon berries.) A native of the United States. Its juice is acrid, and acts as a violent emetic and purgative. Prostration of strength and convulsions have also been induced by it. On a dog, to whom two ounces of the liquor distilled from the berries were given, Dr. Schultz, of Pennsylvania, found it to produce nausea and drowsiness, with slight spasmodic motions, but no vomiting. This last is, however, a common effect.‡

Calla palustris, L. (Water arum.) A native of the United States. The root of this plant has a burning taste.

Arum maculatum, L. (Wake robin.) *A. dracunculus*, L. *dracontium*, L. *triphyllum*, L. and other species. The third and fourth are natives of the United States.

These are all acrid, and have produced dangerous effects. When the fresh root of the A. maculatum was given by Orfila to dogs, they died at the end of from twenty-four to thirty-six hours, without any other symptom than dejection, and the digestive canal was found

* Bigelow's American Botany, vol. i. p. 181. Tyng's Massachusett's Reports, vol. vi. p. 134. Commonwealth v. Thompson.

† Philadelphia Journal of Pharmacy, vol. v. p. 300.

‡ Bigelow's American Medical Botany, vol. i. p. 48.

somewhat inflamed. Bulliard relates the following case: "Three children ate of the leaves of this plant. They were seized with horrible convulsions, and with two of them all assistance was unavailing, as they could not be made to swallow any thing. They died, one at the expiration of twelve days, and another at the expiration of sixteen. The third was saved with difficulty. Its tongue was greatly swelled, and hence deglutition was painful and difficult."*

Sambucus ebulus, L. (Elder.) Dr. Christison saw a case of poisoning in a boy from eating the flowers and leaves. In a few hours he was seized with griping and great tenderness of the abdomen, and these continued for three days, when medical advice was asked. It was now found to be a case of enteritis, which required active treatment, and on the fifth day from eating the leaves he passed them by stool. Another boy, who had eaten the flowers only, suffered under severe narcotic symptoms, and particularly giddiness.† The *S. nigra,* L. (dwarf elder,) has undoubtedly similar properties.

The treatment, in cases where vegetable acrids have been taken, must be directed to the removal of the noxious substance, unless spontaneous vomiting occurs. Emetics are hence required in some cases. The diarrhœa consequent on irritation and inflammation of the mucous membrane of the intestines must be considered as an active disease, and requires the antiphlogistic regimen. The most difficult and dangerous cases are those in which there is a general prostration of the powers of the system.

ANIMAL IRRITANTS. — CANTHARIDES.

Cantharis vesicatoria. (Spanish fly.) Cantharides, according to Robiquet, consists of various substances; a green fluid oil; a black matter, soluble in water and insoluble in alcohol; a yellow matter, soluble in both; a fatty matter, insoluble in alcohol; phosphates of lime and magnesia; acetic and uric acids. None of these are vesicatory, but the epispastic principle is a white crystallisable substance, insoluble in water, (soluble, however, in it when mixed with the yellow matter,) soluble in boiling alcohol and the oils. This is styled *Cantharidin.*‡

We are, however, to treat of it as it is ordinarily administered; viz. in the form of powder and of tincture, and the usual symptoms are the following: When taken internally, cantharides excite a disagreeable and nauseating smell, acrid taste, retchings, copious vomitings, which

* Orfila's Toxicology, vol. ii. p. 83.

† Edinburgh Medical and Surgical Journal, vol. xxxiii. p. 73.

‡ Orfila's Toxicology, vol. ii. p. 422. The experiments of Robiquet are quoted in detail in the Eclectic Repertory, vol. ii. p. 405. Previous to the examination of Robiquet, I believe, Beaupoil had made some imperfect researches. (See his Recherches Medico-Chimiques.) For the latest observations on cantharidin, see Carpenter, in Silliman's Journal, vol. xxi.; Thierry, London and Edinburgh Philosophical Magazine, vol. vi. p. 318. Dr. Paris states, that boiling the Spanish fly in water deprives it of its power of acting on the kidneys (strangury), but does not diminish its vesicating powers. This has been confirmed by Dr. Bearly of Philadelphia. (Philadelphia Journal of Pharmacy, vol. iv. p. 185.)

are often tinged with blood, alvine evacuations, also more or less bloody, burning heat in the stomach and other parts, accompanied with griping and excruciating pains; great heat in the bladder, difficulty in making water, and the urine often bloody, sometimes totally suppressed; obstinate, and sometimes painful and excessive priapism, satyriasis, the pulse frequent and hard, while in some cases the jaws are closed; and convulsions, general rigidity of the limbs, and delirium, precede the death of the patient.* All of these, however, are not always present, and very frequently "no venereal appetite is excited, sometimes even no affection of the urinary or genital organs at all, and the kidneys and bladder may be powerfully affected without the genital organs participating."†

In many instances this substance has been administered with a view to stimulate exhausted passions, or to accomplish the seduction of females. It will be seen from the above remarks, and from subsequent cases, how incorrect the common opinion among the vulgar may prove.

Julia Fontanelle relates the case of a person who, by mistake, took half an ounce of powdered cantharides. The result was burning pain in the throat, vomiting, ardor urinæ, and, in a few hours, bloody urine and priapism. By the use of appropriate remedies, continued for some days, these symptoms gradually diminished, but it was a fortnight before he could leave the hospital.‡

Other cases are quoted by Dr. Christison, from Biett and Rouquayrol. In these, in addition to the more common symptoms, there was difficulty of swallowing and violent tenesmus; and in the last, much salivation, and towards the end of the second day, a large cylindrical mass of the inner membrane of the gullet was discharged by vomiting.§

Four labourers, who found a flask of tincture of cantharides in a warehouse, and drank it for spirits, were seized with great heat and pain of the alimentary canal, vomiting of blood, impossibility of swallowing, a frequent small pulse, and coldness of the extremities. Dr. Graaf of Cologne, who visited them, used antiphlogistic and emollient remedies with success but a distressing strangury continued in two of them for several days.‖

Dr. Ives, of New York, relates of a youth aged seventeen, who, in a paroxysm of anger, swallowed an ounce of the tincture, supposing it to be laudanum. He was seen in an hour and a half afterwards. The respiration was hurried; there was profuse ptyalism, convulsive trembling, acute pain in the regions of the stomach and

* Orfila's Toxicology, vol. ii. p. 430.; Le Clerc, p. 74.; New England Journal, vol. xi. p. 18.

† Christison, p. 535.

‡ Medico-Chirurgical Review, vol. viii. p. 272. from *Revue Médicale*.

§ Christison, Edinburgh Medical and Surgical Journal, vol. xxxiv. p. 214. This patient was a fortnight in recovering.

‖ London Medical and Physical Journal, vol. xlvii. p. 437., from Hufeland's Journal. Two cases are related by Mr. Williams of Bewdley (Midland Medical and Surgical Reporter, vol. ii. p. 360.), where the ordinary affections of the stomach and bladder occurred from taking some of the powder in raspberry brandy.

bladder, and such exquisite sensibility that the slightest pressure produced convulsions. Emetics and venesection were used, followed by mucilaginous drinks and castor oil. The convulsions occurred occasionally, accompanied with painful priapism. The proper remedies were continued, and although delirium interposed for a time, he appeared gradually to recover. On the seventh day, however, after taking it, he was seized with pain in the head, trembling, and universal spasms: coma followed. From this again he revived, and appeared to improve; but on the fourteenth day, violent convulsions recurred, followed by insensibility and death. *

There are two cases recorded, in which the administration of this substance was made the subject of a criminal prosecution. One (for the reference to which I am indebted to Dr. Paris) occurred in the reign of Elizabeth. One Vaux recommended its use to an impotent person, who died in consequence on the twenty-sixth day after taking it. Vaux, although he plead that he was not present at the taking of it, was found guilty, and sentenced to be hung.†

The other case occurred in 1825. A drachm of the powder had been given in some ale. It caused immediate vomiting; but ulceration of the tongue and throat, with copious salivation, pain, and frequent desire to urinate, with febrile symptoms succeeded. The patient, however, recovered. On the trial, Dr. Dyce, of Aberdeen, stated that he had given ten grains of the powder of cantharides at a dose, as a medicinal prescription. The criminal was convicted. ‡

The external application of cantharides sometimes gives rise to similar consequences, but in a more mitigated form.

As to its effects on animals, Orfila found, that when injected in the form of tincture into the jugular veins, it produced vertigo, stupor, and death. The blood in the left ventricle of the heart was fluid and reddish; that in the right was black, and contained coagula. On using alcohol alone, however, he observed precisely the same effects. He then tried oil digested upon cantharides. The animal was soon deprived of sensibility and muscular power, and tetanus, convulsions, difficult respiration, and death supervened. The lungs were found very bulky, and distended with a great quantity of reddish serosity; in some parts, they were livid and compact. The mucous membrane of the bladder was slightly red, while that of the stomach and duodenum was natural. When cantharides in powder were introduced into the stomach, they produced vomiting, the discharge of much bloody mucus, pain, great dejection, extraordinary insensibility, and death. The mucous membrane of the stomach was of a fiery red; that of the duodenum less so, but also inflamed. The bladder was sometimes seen inflamed and thickened, and the œsophagus also was occasionally inflamed. §

As to the appearances on dissection in man, they are generally similar to those from other corrosive poisons — inflammation of the

* American Journal of Medical Sciences, vol. i. p. 368.

† 4 Coke's Reports, p. 44.

‡ Dr. Torrie, London Medical and Physical Journal, vol. liv. p. 463.

§ Orfila's Toxicology, vol. ii. p. 424.

stomach and intestines. Fungous tubercles, erosions, and small ulcerations have also been noticed in these parts: the bladder has been inflamed or ulcerated, and in some cases the external organs of generation have been gangrenous.

In a fatal case mentioned by Orfila, where the powder had been taken for the purpose of suicide, the brain was gorged with blood; the omentum, peritoneum, gullet, stomach, intestines, kidneys, ureters, and internal organs of generation were inflamed, and the mouth and tongue were stripped of their lining membrane.

In Dr. Ives's case, the brain exhibited a similar appearance. The mucous membrane of the stomach was whiter than usual, pulpy, and easily detached. The kidney was also inflamed.*

If, on dissection, or in the matter vomited, any portion of this poison remain, it may be detected by its shining points, which are of a beautiful green colour. This, however, can only be hoped for when it has been taken in the form of powder. When the tincture has been administered, we cannot expect to identify the substance, and must rely solely on the symptoms and the dissection.

Barruel was recently requested to examine some chocolate, of which a whole family had become very ill. On the first view, it exhibited, when held in the light of the sun, numerous shining spots. He, however, tested it for mineral poisons, but could detect none. He then treated some of the powdered chocolate with sulphuric ether, and applied heat to the mixture: it was then filtered and evaporated. The whitish matter obtained blistered the lips; and it presented the brilliant points so common in the powder of cantharides. To render the fact more certain, he applied some of the adulterated chocolate to his arm by means of a compress: in six hours, it drew a blister.†

Treatment. Oil is recommended by Orfila, but later experiments have demonstrated its injurious effects. According to Dr. Pallas, it increases the danger. Cantharides macerated in cold oil, and afterwards given to dogs, was found to destroy them in a few minutes‡; and this is owing to the oil dissolving the active principle. Mucilaginous drinks are preferable, to excite vomiting, and to remove the irritation from the bladder. The warm bath, friction, and diluents are proper; and the antiphlogistic treatment is necessary, when, as is usually the case, appearances of inflammation present themselves.

The *Lytta vittata*, (*Meloe americana*, potato fly,) and the many other allied species of our own country, appear to possess properties analogous to cantharides.§ Some European insects have a similar

* An interesting case, supposed to be of poisoning by cantharides, but probably referable to internal disease, is related by Dr. Hastings, in the Transactions of the Provincial Medical and Surgical Association, vol. i. p. 402.

† Annales de Hygiène, vol. xiii. p. 455.

‡ London Medical Repository, vol. xix. p. 259. Quarterly Journal of Foreign Medicine and Surgery, vol. v. p. 304.

§ See the papers of Dr. Chapman and Dr. Woodhouse, in the New York Medical Repository, vol. ii. p. 163.; vol. iii. p. 213.; of Dr. Schott, in Eclectic Repertory, vol. ii. p. 193.; of Dr. J. F. Dana, in Silliman's Journal, vol. ii. p. 137.: this contains an analysis of the potato-fly, showing that cantharides exist in it. For

character, as one or two species of *Bombyx*, and the *Mylabris variabilis*, or *chicorii*. Bretonneau found in this last a vesicating principle, identical probably with cantharidin.*

POISONOUS SERPENTS.

On these I intend to be very brief, and shall merely give a short notice of those that are found poisonous in other countries. Somewhat more of detail will be proper in reference to such as are peculiar to the United States,

The viper, (*Coluber berus*, *Vipera berus*,) is the most common poisonous serpent of England and the European continent. Its bite is not uniformly fatal to man or the larger animals, but the season of the year appears to increase its intensity, being most venomous in summer. The symptoms are acute pain in the part wounded, which extends over the limbs, and even to the external organs; tumefaction and redness, which afterwards passes to a livid colour; syncope, frequent, small, concentrated and irregular pulse; difficulty of breathing, copious and cold sweats, disturbance of vision and of the intellectual faculties, bilious and convulsive vomitings, and followed generally by yellowness of the skin. Gangrene is apt to occur in the wound, when the disease is about to terminate.†

The *poisonous snakes of India* have been noticed by Russel in a great work, and his experiments are still the most valuable we yet have on the subject.‡ Notices are interspersed in abundance in various literary and scientific works, concerning the venomous serpents of other countries.§

In general, the animal is most poisonous, and its effects most rapidly destructive, in warm climates. Hence the serpents of India and South America are distinguished above all others for their venomous nature.

an account of the numerous species found in this country, see New England Journal, vol. xiii. p. 243.; Say's Entomology, and his paper on the Coleoptera, in the third volume of the Journal of the Academy of Natural Sciences; Dr. Barton's Materia Medica; and Durand in Philadelphia Journal of Pharmacy, vol. ii. p. 276.

* Bulletin des Sciences Médicales, vol. xiv. p. 92.

† On the effects of the venom of the viper, see Morgagni, vol. iii. p. 410. Orfila's Toxicology, vol. ii. p. 380. Edinburgh Medical Essays, vol. vi. p. 420. Fontana in Philosophical Transactions, vol. lxx. p. 163. Redi in ditto, vol. i. p. 160. Atwell in ditto, vol. xxxix. p. 394. Also London Medical Repository, vol. xiv. p. 522., Configliacchi's experiments. New England Journal, vol. vi. p. 311., Mangili's experiments.

‡ An analysis of these is contained in Orfila's Toxicology, vol. ii. pp. 387—403. See also the Eclectic Repertory, vol. ii. p. 318.; and Dr. Rankin's experiments in Edinburgh Medical and Surgical Journal, vol. xviii. p. 231. Also the Asiatic Researches, and Transactions of the Medical and Physical Society of Calcutta.

§ An extraordinary case is related by Dr. Pascalis, in the New York Medical Repository, vol. xix. p. 78., of an individual who was bitten by a snake at St. Domingo. He survived the effects many years, but the leg and thigh swelled to an enormous size, and this remained permanent until his death. The only relief he experienced, was to open one or other of the capillary vessels on the swelling, and discharge four or five ounces of blood from it.

Dr. Harlan, in his Genera of North American Reptilia, enumerates the following as the poisonous serpents of this country: —

Crotalus durissus, banded rattlesnake. Northern and middle states.
Crotalus horidus, diamond rattlesnake. Southern states, Antilles.
Crotalus miliarus, ground or little rattlesnake. Southern states.
Crotalus confluentis, *Say*. Rocky mountains.
Crotalus tergeminus, *Say*. Western territories.
Cenchris mockeson, hog-nose snake, Mockeson.
Viperia fulvia. Southern states.
Scytale piscivorus, water viper. South Carolina. *

To these, if not included above, must be added the copper-head, called Boa crotaloides by Professor Gibson, and Scytalus cupreus by Rafinesque. †

Crotalus horridus, and *durissus*. (The rattlesnake.) This is probably the most venomous snake known in our country, but its effects vary greatly; and this is doubtless, as has been suggested by Sir Everard Home, owing to the greater or less intensity of the poison.

"When the poison is very active, the local irritation is so sudden and violent, and its effects on the general system are so great, that death soon takes place. On examination after death, the only alteration of structure met with is in the parts close to the bite, where the cellular membrane is completely destroyed, and the neighbouring muscles are very considerably inflamed.

"When the poison is less intense, the shock to the general system does not prove fatal. It brings on a slight degree of delirium, and the pain in the part bitten is very severe; in about half an hour, swelling takes place from the effusion of serum in the cellular membrane, which continues to increase with greater or less rapidity for about twelve hours, extending during that period into the neighbourhood of the bite; the blood ceases to flow in the smaller vessels of the swollen parts; the skin over them becomes quite cold; the action of the heart is so weak that the pulse is scarcely perceptible, and the stomach is so irritable that nothing is retained on it. In about sixty hours these symptoms go off; inflammation and suppuration take place in the injured parts; and when the abscess formed is very great, it proves fatal.‡ When the bite has been in the finger, that part has immediately mortified. When death has taken place under such circumstances, the absorbent vessels and their glands have undergone no effects similar to morbid poisons, nor has any part lost its natural appearance, except those immediately connected with the abscess.

In those patients who recover, the symptoms go off more readily

* Journal of the Academy of Natural Sciences of Philadelphia, vol. v. p. 364, &c.

† Silliman's Journal, vol. i. p. 84. Say would seem to consider the mockeson and copper-head identical. (Ibid. vol. i. p. 256.)

‡ A case strongly illustrative of this class of symptoms, is related by Mr. Breitnal of Philadelphia, the actual sufferer himself, in the Philosophical Transactions, vol. xliv. p. 147. He survived the bite and recovered, but an abscess formed several months afterwards in the injured part.

and more completely than those produced by a morbid poison, which has been received into the system.*

A case is related by Sir Everard Home, which illustrates the above views. Thomas Soper, aged twenty-six, was accidentally bitten twice in the hand by a rattlesnake. The snake was kept for the purpose of exhibition in London.

The first symptom observed was an incoherence in language and behaviour, resembling intoxication. In less than half an hour the hand began to swell; next the fore-arm, and afterwards the pain extended to the axilla. In two hours after the bite, Mr. Brodie saw him. The skin was cold, the man's answers incoherent, his pulse one hundred in a minute, and he complained of sickness. Ammonia and ether were exhibited internally, and applied to the wound. He rejected the first draught, but retained the second. Fits of fainting supervened, with coldness of the skin. On the next day, blood was extravasated under the skin as low as the loins, and vesications had formed on the wounded arm. Depression and faintings continued. These symptoms were present for several days, with greater or less severity. The arm sloughed in various places, and abscesses formed, accompanied with purging. Finally, mortification and delirium occurred, and he died on the fourth of November, 1807, eighteen days after being bitten.

On dissection, the body externally was found natural, with the exception of the arm that had been bitten. The wounds made by the fangs were healed; the lungs were healthy; the cavities of the heart contained coagulated blood; the cardiac portion of the stomach was moderately distended with fluid, while the pyloric portion was much contracted; the internal membrane had its vessels very turgid with blood. The intestines and liver were healthy. The vessels of the brain were turgid, and water was effused in it.†

Mr. Drake, a person who took rattlesnakes from this country for exhibition in England and France, was unfortunately bitten by one in Paris. He died in nine hours. On dissection, all the internal organs were found healthy, except that the membrane covering the brain and spinal cord had a reddish tinge, and the venous blood on the affected side was curdled or clotted.‡

Dr. Harlan, in a case where death ensued in about twenty-four hours, found the usual external appearances, the blood-vessels of the head filled, the spinal cord healthy, the mucous membrane of the stomach of a red pink, owing to the loaded state of its vessels, and marks of inflammation in the mucous membrane of the intestines.§

The effects of the bite of the rattlesnake on animals are so well known, and in general resemble so closely those produced on man, that it is not necessary to recapitulate them. ‖

* Home in Philos. Transactions for 1810. Eclectic Repertory, vol. i. p. 320.
† Eclectic Repertory, vol. i. p. 312.
‡ Edinburgh Journal of Science, vol. vii. p. 86.
§ American Journal of Medical Sciences, vol. viii. p. 397.
‖ See on this point, Philosophical Transactions, vol. xxxv. pp. 309. 377. Dr. B. S.

The mockeson and copper-head snakes are equally venomous with the rattlesnake.*

As to antidotes, and the treatment proper for bitten persons, we may remark, that these are numerous and diversified. Humboldt and Bonpland mention a New Grenada plant, the *Guaco* (Mikiana guaco), the juice of which seems to deter snakes from biting persons on whom it is applied, and even when they are bitten, the application of the leaves prevents the usual effect.†

Arsenite of potash (Fowler's solution) has been used with great success by Mr. Ireland, in the West Indies, to counteract the effects of the bites of snakes.‡ The pill of Tanjore, also an arsenical preparation, was sometimes used by Dr. Russel with apparent success on animals; but several, however, to whom it was administered, died in the same way as if nothing had been taken.§

Ammonia and *Eau de Luce* have many testimonies in their favour, while some, as Sir Everard Home and Orfila, doubt their specific virtues.‖ They are, however, useful in promoting perspiration. Alcohol in large and repeated doses (in the form of whisky, &c.) has also been used.¶

Besides these, many plants have acquired a temporary reputation in our own country and in South America. Of the former, are the Aristolochia serpentaria, Prenanthes alba, and Polygala senega; and in South America, the Eupatorium ayaparia, the Algalia or Yerba del sapo, and the Raiz petra.**

Barton mentions two cases of rabbits bitten by rattlesnakes. One recovered gradually in three days, the other died in seventy-four minutes. On dissection, the great curvature of the stomach was seen inflamed. Around the bite, blood was effused, and the solids were in a gelatinous, bloody state. (Barton's Medical and Physical Journal, vol. i. part i. p. 167.) Harlan in American Philosophical Transactions, N. S., vol. iii. p. 300.

* Cases are given by Dr. Brickell in New York Medical Repository, vol. viii. p. 441.; by Dr. Drake (cured by cupping and ammonia) in Western Journal of Medical and Physical Sciences, vol. i. p. 60.

† Orfila's Toxicology, vol. ii. p. 441. See also a translation of a Spanish tract on this plant, from the Jamaica Physical Journal, in United States Medical and Surgical Journal, vol. i. p. 66. Silliman's Journal, vol. xxiv. pp. 280. 388.; vol. xxvii. p. 171.

‡ Medico-Chirurgical Transactions, vol. ii. p. 396.

§ Orfila's Toxicology, vol. ii. p. 446. See also New York Medical Repository, vol. vii. p. 12. Dr. Phillips' American Journal of Medical Sciences, vol. viii. p. 540. Dr. Miller of Ohio. Boston Medical and Surgical Journal, vol. ix. p. 240.

‖ Testimonies in favour of these may be found in the Medical Commentaries, vol. xiv. p. 297. London Medical Repository, vol. viii. p. 73. New York Medical Repository, vol. ix. p. 109. Edinburgh Medical and Surgical Journal, vol. xviii. p. 231. London Medical and Physical Journal, vol. xxix. p. 120., Dr. D. Ramsay, a case cured by ammonia. Tilloch's Philosophical Magazine, vol. xvii. p. 125. Numerous cases of the bite of the rattlesnake and mockeson are said to have been cured with ammonia, by Dr. Moore of Mississippi, and Dr. Heustis of Alabama. American Journal of Medical Science, vol. i. p. 341.; vol. viii. p. 83.

¶ See two cases of the bite of the rattlesnake cured by it in American Medical Recorder, vol. vi. p. 619.

** Dr. Brickell states, that Prenanthes alba is a famous Indian cure for the bite of serpents. (Barton's Medical and Physical Journal, vol. ii. part i. p. 101.) On the Prenanthes altissima. (Harpalyce altissima, of Don.) See Dr. James Hubble, New York Medical and Physical Journal, vol. iv. p. 484.

The Uvularia grandiflora has very decisive testimony in its favour*, and the Hieraceum venosum has lately been offered as an antidote, but its effects are not superior to many other plants already noticed.†

Caustics are valuable, but often prove ineffectual, and the treatment at present most relied on is the use of *cupping glasses*, and the application of ligatures above the part bitten, but not too tight, nor too long continued. Then cauterize the wound with lunar caustic, and afterwards apply compresses to the part. Perspiration and sleep should be encouraged by small doses of ammonia, wine, or ether, and the patient should be kept in bed well covered. Local inflammation must be combated by the usual means.

In many cases, there is no doubt that if left to nature, they would cure themselves, with however more or less of local diffuse inflammation.‡

The *Scorpion* is most venomous in southern countries. Instances are recorded, of its sting producing grievous local inflammation, and occasionally fever, trembling, and pain, on man, in France and Italy. Animals, as dogs and cats, generally survive, though some have died from its poison.§

The *Tarantula* produces similar effects, local rather than general; and the fabulous stories respecting it are now well understood and duly appreciated. It would seem, however, that there are species whose sting may prove fatal. Dr. Graperon states, that he saw two fatal cases in the Crimea; one proved so in forty-eight hours, another in six days. The first was that of a peasant, who was stung while

Dr. Barton's paper in the American Philosophical Transactions, vol. iii. p. 100. contains a long list of supposed vegetable antidotes.

On the Eupatorium ayaparia, see New York Medical Repository, vol. vii. p. 16.; and Tilloch's Philosophical Magazine, vol. xxi. p. 286.

On the Algalia, New England Journal, vol. iii. p. 322.

On the Raiz petra (Chiococea racemosa, Kahinca,) of Brazil, Edinburgh Philosophical Journal, vol. i. p. 218.; Dr. S. L. Mitchill, New York Medical and Physical Journal, vol. viii. p. 208.; Spix and Von Martius' Travels, vol. ii. p. 131. Dr. Baxter of New York has translated the chemical researches of Pelletier and Caventou on this substance. (New York Medical Journal, vol. i. p. 164.)

* See Mr. Tracy's paper in the Transactions of the Albany Institute, vol. i. p. 32. New York Medical and Physical Journal, vol. vii. p. 65.

† See Dr. Harlan's experiments in the Transactions of American Philosophical Society, N. S., vol. iii. pp. 300. and 400. Dr. Harlan mentions that the state of South Carolina bought from a negro the secret of a supposed antidote, at the expense of his freedom and an annuity of 100*l*. It proved to be the Alisma plantago.

Dr. Williams of Massachusetts has lately mentioned the Viola ovata as a cure. American Journal of Medical Sciences, vol. xiii. p. 310.

Besides these, many other remedies have apparently proved successful. Oil has been thus given. (New York Medical Repository, vol. ii. p. 242.) A living fowl applied to the wound. (Silliman's Journal, vol. i. p. 259.)

Most of these illustrate the remark of Sir Everard Home, that "the violent effects which the poison produces on the part bitten, and on the general system, and the shortness of their duration, have frequently induced the belief, that the recovery depended upon the medicines employed."

‡ I copy this remark from Dr. Harlan, who makes it at the conclusion of an interesting case, in North American Medical and Surgical Journal, vol. xi. p. 227. See also Hancock on snake poisons. (Brande's Journal, N. S., vol. vii. p. 330.)

§ Orfila's Toxicology, vol. ii. p. 411.

OPIUM.

This substance is the inspissated juice of the *Papaver somniferum*, or common white poppy, obtained by incision into its capsules when they have arrived at a certain state of maturity. Its appearance and character are so well known, that it is not necessary to enlarge upon them; but it must be mentioned, that within the present century, it has been ascertained to be a very compound substance. For our knowledge of this, we are indebted to Derosné, Sertuerner, Robiquet, Magendie, and several other French chemists.

By various manipulations, there have been obtained from opium — *morphine, its alkaloid, narcotine;* a peculiar acid, termed the *meconic;* and a *resinoid substance.* To these, of late years, are added the *codeine* and *paverine* of Robiquet, the *narceine* of Pelletier, the *meconine* of Dublanc and Couerbe, and various other ingredients.*

From the circumstance that opium contains so many distinct principles, and that two or more of these may unite in producing its ordinary effects, while some of them separately have been used as instruments of poison, it becomes somewhat of a task to present this subject distinctly to the reader. I can, however, devise no better mode than to treat of the symptoms and effects on animals, the appearances on dissection, and the chemical proofs successively — and notice under each head, first, opium and laudanum, and next, the various principles contained in them.

Symptoms and effects of opium. When opium or laudanum is taken in large quantities, the following symptoms are usually observed within a short time; giddiness, insensibility and immobility; respiration scarcely perceptible, and a small and feeble pulse, which sometimes becomes full and slow. The eyes are shut, the pupils contracted, and the whole expression of the countenance is usually that of deep and perfect repose. As the effects increase, the lethargic state becomes more profound, deglutition is suspended, the breathing is occasionally stertorous, the pupils are insensible to the application of light, the countenance is pale and cadaverous, and the muscles of the limbs and trunk are in a state of relaxation. Vomiting sometimes supervenes, and there is an occasional glimpse of returning animation; but the comatose state soon returns, and death, which is sometimes preceded by convulsions, rapidly follows.

The period which elapses between taking the poison and the commencement of the symptoms is various. The tincture of opium (laudanum) in large quantities and on an empty stomach, may probably

* Johnson's Report on Chemistry, Proceedings of British Association, 1832, p. 513. Philosophical Magazine and Annals, vol. xi. p. 395. London and Edinburgh Philosophical Magazine, vol. ii. p. 153. 156. An analysis of Pelletier's paper (from Journal de Pharmacie of November, 1832) is given in Lancet, N. S. vol. xi. p. 334.

Pelletier is also stated to have discovered a crystalline substance, which he calls *paramorphia.* It has a very marked action on the animal economy; and in very small doses, it kills a dog in a few minutes. Magendie found it to act on the brain, and to cause convulsions. (London and Edinburgh Philosophical Magazine, vol. iv. p. 77.)

begin to act in a few minutes. From a comparison of cases by Dr. Christison, it would appear that several individuals were found soporose in a quarter of an hour after taking it. When swallowed in the solid form, the action of opium is usually delayed for an hour. It may operate before that time, but the interval is seldom extended.

When noticing the diseases that might be confounded with narcotic poisoning, I mentioned the distinction between the coma produced by apoplexy and by opium. In the latter case, unless the fatal termination is near, the individual may be roused by brisk agitation, tickling the nostrils, or loud speaking. This state of restored consciousness is, however, always imperfect, and is speedily followed again by lethargy when the exciting cause is withheld.*

Although convulsions and spasms are not common, yet when they do occur, they are usually extremely severe. It is probable that in some instances, the use of remedies may aid in causing their occurrence.

There are also occasional varieties noticed, as to the state and frequency of the pulse, the appearance of the pupils, and the expression of the countenance.†

The bladder is sometimes unable to contract on its contents, and attempts to empty it prove useless.‡ While again, in cases of recovery, such a weakness will be left in the lower extremities, and approaching so near to paralysis, that it cannot retain its contents.§

Two instances are mentioned in which vomiting was *the sole effect* induced from taking large quantities of opium. In one case, an ounce of laudanum was swallowed at midnight; the individual went to sleep, and shortly after rising began to vomit, and continued doing so during the day. The next day he was well. In the other, three ounces produced, after a few hours, a similar result.‖

Constipation of the bowels is the usual result of opium taken in large quantities; yet, in one or two cases, it has produced colic or diarrhœa.

According to Dr. Christison, the ordinary duration of a fatal case of poisoning with opium is from seven to twelve hours. There is, of course, variation in this; but the majority of instances come within the period now stated.¶ The dose requisite to cause death must

* Christison, p. 619.

† Orfila has shown that *contraction* of the pupils is most common in the early stages. The difference of opinion between him and Chaussier on this point will be noticed in the details of the trial of Castaing.

‡ See case by Mr. Cornish, London Medical and Physical Journal, vol. xxxi. p. 193; and also a case, ibid., xxviii. p. 80.

§ An instance of this kind by Mr. Murley, is quoted in the Eclectic Repertory, from the London Medical Review for October, 1811.

‖ London Medical Repository, vol. ix. p. 525; vol. x. p. 175. Dr. Christison mentions some additional cases.

¶ The extremes mentioned by him are, a case from the London Medical and Physical Journal, vol. xxxi., which proved fatal in three hours, and another which occurred to Alibert, in twenty-four hours. Christison, p. 623.

In a case tried before the Court of King's Bench, in 1832 (Kinnear *v.* Borrodaile) here an insurance company contested the payment on the ground of the probability

necessarily be more a matter of uncertainty. From thirty to sixty grains have, in many instances, produced it; and Dr. Christison mentions a case which was furnished to him by Dr. W. Brown, of Edinburgh, in which even so small a quantity as "four grains and a half, taken by an adult along with nine grains of camphor, was followed by the usual signs of narcotism and death, in nine hours. The man took the opium for a cough, at seven in the morning; at nine, his wife found him in a deep sleep, from which she could not rouse him; nothing was done for his relief till three P. M., when Dr. Brown was called to him, and found him labouring under all the usual symptoms of poisoning with opium, contracted pupils among the rest; and death ensued in an hour, notwithstanding the active employment of remedies. On examining the body, no morbid appearance of any note was found, except fluidity of the blood."*

The effects of habit, however, render the system for a time insensible to large and repeated doses; and in this way only can we explain why enormous quantities are daily taken by individuals, without any of the symptoms of poisoning, as now stated.

That injurious consequences finally occur, would appear to be established by the concurrent testimony of travellers in the East. The Turks, as is well known, are of all nations the most generally attached to its use; and the following description of the *Teriakis*, or opium eaters, of Constantinople, fully explains the result: "Pale, emaciated, and ricketty, sunk into a profound stupor, or agitated by the grimaces of delirium, their persons are, after the first view, easily to be recognised, and make an impression too deep to be speedily erased. The increasing attachment for wine has diminished the consumption of opium, but there are still Teriakis who will swallow in a glass of water three or four lozenges, amounting to one hundred grains."†

Mr. Madden, a recent medical traveller, fully confirms this account; and he adds, that a regular opium eater seldom lives beyond thirty years, if he commence the practice early. ‡ This will be found, I apprehend, most conformable to the result of ordinary experience.

If the reader will refer to the Chapter on *Insurance upon Lives* (page 385.) he will see a case there stated, which is connected with the subject. The individual in question had been in the practice of taking laudanum, in large quantities, for thirty years, and it was contended by the insurance office that this was a *habit tending to shorten life*, and ought to have been stated by him. The consequent discus-

of narcotic poisoning, the servant positively swore that he heard the room-bell ring at 9 A. M., and was further certain that no one but the individual in question could have rung it. He was found dead at 11 A. M. The countenance was pale, the trunk warm, but the extremities were cold. The vessels of the brain were rather full, and blood to the amount of three pints was found in the stomach. There was no smell of laudanum, nor any marks of vomiting. This individual went to bed late on the preceding evening in his usual health. The jury found for the plaintiff, and thus negatived the inea of poisoning. (Lancet, N. S., vol. x. p. 468.)

* Christison, p. 624. † Hobhouse's Albania, vol. ii. p. 944.

‡ Madden's Travels in Turkey, vol. i. p. 27. American edition. Dr. Dekay, in his recent work on Turkey, states that the opium eaters are no longer to be seen in Constantinople.

sion led Dr. Christison to make some inquiries, and he found that in most of the cases of opium eating, which he could obtain, the expected result of shortening life had not occurred. It must, however, be recollected, that in many instances the quantity consumed is very gradually increased — that its immediate bad effects must be early counteracted by remedies, or, what is probably most common, that the bowels become accustomed to its action, and preserve, in a measure, their healthy condition; and thus that many individuals, if their original stamina be good, may linger on without any striking results, to the verge of old age. The effects, at all events, may be chronic; but I have equally no doubt that life is shortened, and particularly in young females who give themselves up to this habit. Besides the peculiar effects of the substance, its reiterated operation has an influence in inducing local excitement, and a predisposition to organic affections. The cases on which these remarks are founded are unfortunately quite too numerous; and at a more convenient period, I hope to be enabled to present some proofs of the alarming extent to which this pernicious habit is carried.*

Besides its administration by the mouth, opium has occasionally proved dangerous when used in the form of injection, or when applied to the abraded skin. Dr. Christison mentions the case of a friend, who, in order to allay the irritation caused by a blister, applied an opium poultice to the scrotum. He fell into a state of profound sopor, which was luckily interrupted by a visitor. Sir Astley Cooper says he has known a solution of opium applied to an extensive scald on a child, to destroy it.†

As to *Animals*, crude opium, or its watery extract, when introduced into the stomach of dogs, caused, within a few hours, a weakness and paralysis of the posterior extremities, and convulsions of the muscles of the trunk and face. The pupils of the eye were not, however, more dilated than natural; and there was no moaning, but an extreme dejection. The paralysis and convulsions increased until death supervened. Similar effects were produced when the œsophagus was tied, except that death ensued earlier, from large doses.

When the watery extract was inserted into the cellular tissue of the thigh of a dog, paralysis of the posterior extremities, convulsions and accelerated circulation, with trembling of the head and twitches of the lower jaw, occurred, and death followed in a much shorter time than in the previous series of experiments. The injection of the extract into the anus produced the earlier symptoms of the poison, but the animals recovered.

* For Dr. Christison's remarks on this subject, see his Toxicology, 2d edit. p. 626; and Edinburgh Medical and Surgical Journal, vol. xxxvii. p. 123. Dr. Domeier mentions the case of an individual who has taken opium for 24 years, and is now 51 years old. He is, however, sallow, listless, and weak. (London Medical Quarterly Review, vol. iv. p. 482. See also Lancet, N. S., vol. ix. p. 710; vol. xvi. p. 685.)

† Lectures, vol. i. p. 79. A case is mentioned as occurring at La Charité in Paris, where twelve drops of laudanum, used as an injection to allay the pain consequent on cauterisation for a strictured rectum, produced all the symptoms of narcotic poisoning and death in 17 hours. (Lancet, N. S., vol. xi. p. 639.)

Dissections generally presented the digestive canal in a sound state. The lungs, however, were usually livid and distended with blood, and the blood in the ventricles was often black and coagulated.*

"According to the most recent inquiries, those of M. Charet, which were extended to every class of the lower animals, opium produces three leading effects. It acts on the brain, causing congestion and consequently sopor; on the general nervous centre as an irritant, exciting convulsions; and on the muscles as a direct sedative. It is poisonous to all animals, man, carnivorous quadrupeds, the rodentia, birds, reptiles, amphibious animals, fishes, insects, and the *mollusca*. But of its three leading effects, some are not produced in certain classes or orders of animals. In the mammalia, with the exception of man, there is no cerebral congestion induced, and death takes place amidst convulsions. In birds, there is some cerebral congestion towards the close, but still the two other phenomena are the most prominent."†

Symptoms and effects of Morphine, Narcotine, &c. — Morphine. The action of morphine is nearly the same as that of opium, but it is more energetic. On its first discovery, Sertuerner supposed that in the solid state it had little effect, being nearly insoluble. This, however, is denied at present, and its insolubility is ascribed to its impurity, having contained more or less of narcotine.

According to Orfila, the following are the effects of pure morphine and its salts on animals: When the alkaloid is introduced into the stomach, it is dissolved, apparently by the acid juices contained in that viscus. In large doses, it produces vertigo, dimness of sight, and in a great majority of cases contracted pupils. A dose of two or three grains causes severe vomiting, pain in the stomach, diminished or suppressed urine, and, according to Dr. Bally, a severe itching of the skin.

If from 40 to 100 grains of the acetate of morphine be given to dogs and cats, the hind quarters are observed in a few moments to be weakened, and the gait becomes unsteady. The animals fall into a state of rest or sleep, but are easily roused by the least noise. The pulse is slow and intermittent; the pupil is either contracted, dilated, or natural; vomiting and purging occur, and there is more or less of salivation. At the end of an hour, convulsions ensue, and the mouth is full of froth. When the dose proves fatal, a few paroxysms usually precede death. No changes are detected in the alimentary canal, or in other organs, on dissection.

If thirty or forty grains of acetate of morphine are injected into the cellular tissue, the animal dies in five or six hours, with symptoms similar to those already enumerated.‡

There are a few cases in which its effects on man have been noticed. In 1829, a young Brazilian student of medicine at Paris

* Orfila's Toxicology, vol. ii. p. 110.

† Christison, p. 615., quoted from the *Revue Médicale*.

‡ Orfila's Toxicology, 3d edition, vol. ii. p. 62. Deguise, Depuy, and Leuret have also published a series of experiments with acetate of morphine. Paris, 1824.

took twenty-four grains of the acetate to destroy himself. In ten minutes he felt heat in the stomach, with excessive itchiness; in three hours and a half, dimness of vision occurred; and in an hour more he felt approaching stupor, and from this he sunk into a state of profound insensibility. He was visited by Orfila, who found him cold, comatose, and affected with lock-jaw; the pupils were slightly dilated, the pulse 120; the breathing hurried and stertorous; the abdomen tense and tympanitic, and there were occasional convulsions. He was bled to forty ounces, sinapisms were applied, and stimulant enemas given. By means of these and cold applications, the symptoms were mitigated; the trismus diminished, so that strong coffee could be given. On the next day he had difficult and scanty micturition, with pain in the kidneys and bladder, and difficulty in swallowing. These went off during the second night.*

In another case related by Castara, where fifty grains of acetate of morphine were taken, symptoms of coma supervened in twenty minutes. The limbs were flaccid, the pupils contracted, the face and lips livid, the skin warm and moist, the pulse full and hard, and deglutition impossible. Tartar emetic could not be given. He was then bled, upon which he started, as from sleep, but could not see any one. He complained chiefly of intense itching and a general sense of bruising. In an hour, by being constantly roused, his consciousness was almost restored, and vomiting and purging followed from the exhibition of tartar emetic. After this, he gradually recovered, the sleeping continuing all next day, and the itching of the skin even longer.†

Julia Fontanelle mentions the case of a child five years old, who was poisoned by the sulphate of morphine, given in an enema. The dose was ten grains; sleep followed in ten minutes, and shortly after it was seized with violent convulsions. The error was now discovered, but remedies proved in vain, and death happened in eleven hours.‡

The famous case of Dr. Castaing, which occurred in France, belongs also to this division of our subject. He was supposed to have poisoned two brothers with the acetate. I shall give the particulars at the conclusion of the present article.

Narcotine, according to Orfila, in dogs whose gullet is not tied, incites vomiting, and the poison is discharged. But on the other hand, if it be tied, death ensues in two, three, or four days, without any remarkable symptoms, but languor and hard breathing. Magendie, however, found that it produced in dogs a state like reverie, accompanied with convulsions. They lie apparently asleep, but are really alive to external objects.

When narcotine was injected into the veins, its action was more

* Edinburgh Medical and Surgical Journal, vol. xxxiii. p. 220.

† Christison, p. 633; Edinburgh Medical and Surgical Journal, vol. xxxvi. p. 461.

‡ Edinburgh Medical and Surgical Journal, vol. xxxiii. p. 219. Trousseau and Bonnet found that morphine and its salts acted with much greater rapidity when applied to the denuded skin than when taken internally. (Annales d'Hygiène, vol. ix. p. 229.)

rapid and powerful. In doses of three grains, it produced convulsive movements, stupor, and death.

Dr. Wibmer, of Munich, found by experiment on himself, that two grains dissolved in olive oil produced merely slight transient headache; that eight grains dissolved by means of muriatic acid had no effect at all, while the same quantity of solid narcotine occasioned headache and restlessness of mind, and trembling of the hands. Dr. Tully, from experiments on himself and others, deems it a powerful narcotic, producing contraction of the pupils, vertigo, nausea on motion, staggering in the gait. In two individuals, vomiting was induced. The doses varied from two to four grains.*

Meconine is said to be acrid.

Meconic acid is probably inert. Drs. Fenoglio and Blegnini, of Turin, gave eight grains of the acid, or of the meconiates of soda or potash, to dogs, crows, and frogs, without any deleterious effects; and the same quantity was repeatedly administered to a horse, without any injury. The meconiates, in doses of four grains, were then given to persons labouring under tape worm, without any effect on them or the worms.†

Codeine, from the experiments of Kunkel on animals, produces tetanic convulsions and death. On dissection, he found the cerebellum and spinal marrow gorged with blood. When introduced into the cellular tissue, its action was violent, and exerted principally on the urinary organs—suspending the exertion of urine.‡ Barbier, however, having used it therapeutically, thinks that it exercises no influence on the spinal marrow or its nerves.§

Paverine. This is a new principle announced by Robiquet, which is, according to him, soluble in water, and saturates the acids. It is poisonous, and acts in a very marked manner on the spinal marrow.‖

Appearances on dissection from opium or laudanum. I have already mentioned in the preliminary chapter on Poisons (page 676.) that these are seldom very marked. The most striking will be seen in the narratives of a few examinations.

In a case where two drachms of opium produced fatal effects in six and a half hours, the body was covered with red-brown patches on the arms, shoulders, and back of the neck. The day after death, the face was pale, and the mouth filled with froth. There was a general congestion of black blood in the brain; the dura mater was injected, and even the capillaries gave out, on incision, minute drops of black blood. The heart was filled with the same, as were the lungs, and the bronchiæ were reddish. The stomach was swollen, and had red-brown patches at its fundus. The intestinal mucous membrane was minutely injected—being the effect of congestion, and not of inflam-

* Silliman's Journal, vol. xxi. p. 44; Boston Medical and Surgical Journal, vol. vii. p. 37.

† Brande's Journal, vol. xvii. p. 393.

‡ Philadelphia Journal of Pharmacy, vol. vi. p. 88., from *Revue Médicale.*

§ Lancet, N. S., vol. xiv. p. 118.

‖ London and Edinburgh Philosophical Magazine, vol. ii. p. 153. Magendie corroborates its powerful deleterious qualities. (Lond. Med. Quart. Rev. vol. iv. p. 306.)

mation. The liver and spleen were gorged with blood, and the bladder and kidneys sound.*

In Mr. Stanley's case, related in the Transactions of the London College of Physicians, water was found in the cellular tissue of the pia mater, covering the greater part of the cerebrum; but in other respects, the brain had no unusual appearance. The stomach was contracted, and filled with a fluid, not resembling laudanum either in colour or smell. There was no inflammation present.†

In Mr. Cornish's case, coagulable lymph was effused between the dura mater, the arachnoid coat, and the pia mater; and there was rather more fluid than is usual in the lateral ventricles. The stomach was natural, and the bladder contained about a pint of urine.‡

In commenting on the appearances observed, Dr. Christison remarks, that turgescence of the vessels in the brain, and watery effusion in the ventricles and on the surface of the brain, are generally met with. In a case examined by him, each ventricle contained three drachms of fluid, and the arachnoid membrane on the surface of the brain was much infiltered. "But congestion and effusion are by no means universal."§

Extravasation of blood is a rare occurrence. Our author quotes one from Mr. Jewel of London. In a young female, who died eight hours after taking two ounces of laudanum, several clots were found in the substance of the brain, and one which lay in the anterior right lobe was an inch long.‖ Dr. Granville mentioned another at a meeting of the Westminster Medical Society, in November, 1825, where extravasated blood was found in various parts of the brain.¶

The lungs are generally, but not universally, found gorged with blood.** The stomach is in most cases natural; in a few, the villous coat is red, but it is probably never inflamed. There is only one case in which this is positively stated to have been present.††

* London Medical Repository, vol. xiv. p. 426.

† Transactions, vol. vi. p. 414.

‡ London Medical and Physical Journal, vol. xxxi. p. 193. The same state of the bladder was seen in another case. (Ibid., vol. xxviii. p. 80.)

§ Dr. Bright, in a case examined by him, found great turgescence of the vessels, and the substance of the brain was filled with bleeding points; but there was no water in the ventricles. (Medico-Chirurgical Review, vol. xix. p. 327.)

‖ Christison, p. 637., from the London Med. and Phys. Journal, vol. lv. p. 111.

¶ Lancet, vol. ix. p. 330. Another instance is mentioned by Dr. Clarke, Coxe's Medical Museum, vol. v. p. 88.

** In a letter from Dr. Clarke to Dr. Rush, dated at Verdun in France, in 1807, it is stated, that in a young man found dead in bed from taking laudanum, the trachea and air vessels of the lungs were completely filled with frothy blood, and some blood issued from the mouth: every other part was natural. (Coxe's Medical Museum, vol. v. p. 88.)

†† It is quoted from Lassus by Orfila (Toxicology, vol. ii.). A woman, aged sixty, took thirty-six grains of opium, and in five or six hours after was found asleep, with apoplectic symptoms. She recovered, however, so long as to tell what she had done. Ipecacuanha was given, and afterwards vinegar, but without effect. She soon became insensible, and died in eleven hours after taking it. On dissection, the stomach was found inflamed, and in some parts eroded: the brain was natural. As Lassus saw this female but once, it is supposed that probably some corrosive substance had also been taken. (Merat, Dictionnaire des Sciences Médicales, vol. xxxvii. p. 505.)

Lividity of the skin is quite common, and so also is fluidity of the blood. But this last is not invariable. Four cases are cited by Dr. Christison, in which the blood was found coagulated in the cavities of the heart.*

The bodies of persons poisoned by opium also, generally pass rapidly into putrefaction.†

The poison cannot always be found in the stomach. "This may arise from two causes. It may be all absorbed, as will often happen when it has been taken in the liquid form, or it may be partly absorbed and partly decomposed by the process of digestion. But in one or other of these ways it may certainly disappear, and that in a very few hours only."‡ Cases in which it was detected after death will be hereafter mentioned.

I have already mentioned, at page 686., that Orfila and Lesueur have ascertained that opium and the salts of morphine do not undergo decomposition by being long in contact with decaying animal matter. "Even after many months they may be discovered, at least the putrefaction of the matter with which they are mingled does not add any impediment in the way of their discovery. It is only necessary to observe that the alkaloid may be rendered insoluble by the evolution of ammonia, which separates it from its state of combination.§

Chemical proofs. In noticing these, I shall reverse the order so far as first to mention those of the principles contained in opium.

Tests for meconic acid. This acid may be procured thus: Precipitate a strong watery infusion of opium with acetate of lead. Add ten or twelve parts of water to the impure meconate of lead that has thus been thrown down, and transmit through it a stream of sulphuretted hydrogen. Evaporate and crystallize the acid obtained. The crystals may be subjected a second time to precipitation with acetate of lead, and decomposition by sulphuretted hydrogen. Another method, also proposed by Dr. Christison, is to mix the first precipitation of meconate of lead with vitrified boracic acid, and heat the mixture gently in a tube or retort. At a temperature somewhat short of that of charring,

* Another is given by Dr. Charles A. Lee; New-York Medical and Physical Journal, vol. viii. p. 297.

† I find a very interesting case of poisoning by opium in the Boston Medical and Surgical Journal, vol. xi. p. 285. The details are as follows: — A healthy man, aged 28, purchased an ounce of opium, and probably took all. On his way home he was observed to be merry. He went to bed, and his wife noticed his breathing to be frequent, but in reply to questions he said he was well. His face was ghastly, and his eyes had lost their expression, yet his conversation was rational and his mind clear. A person present, thinking the case a serious one, opened a vein; but after an ounce had been drawn, the bleeding stopped, and the man died, certainly not more than two and a half hours after taking the opium. On dissection, the right ventricle and vena cava were found filled with blood. In the stomach, there was from half an ounce to an ounce of opium; some half dissolved, but the most in masses. There was a slight redness of the mucous coat. The lungs were empty, and the surface of the body pale.

‡ Christison, p. 639. Cases in which it could not be found are mentioned in London Medical Repository, vol. xiv. p. 426.
Edinburgh Medical and Surgical Journal, vol. xix. p. 196., by Dr. Christison.
London Medical and Physical Journal, vol. xxxi. p. 193. by Mr. Cornish.

§ Christison, p. 640.

white crystals of meconic acid are sublimed. The following are some of its properties:—

1. When heated in a tube, it is partly decomposed and partly sublimed, and the sublimate condenses in filamentous radiated crystals.

2. When dissolved even in a very large quantity of water, the solution acquires an intense cherry red colour, with the permuriate of iron.

3. This solution gives a pale green precipitate, with the sulphate of copper; and if the precipitate is not too abundant, it is dissolved by boiling, but reappears on cooling.

4. The following has been proposed by Mr. J. T. Cooper of London: "To the solution supposed to contain opium or meconic acid, add a few drops of solution of muriate of gold. If meconic acid alone exists, a black inky precipitate will be found; but if there be narcotine present, or morphine in combination with the meconic acid, as there is in opium, a fawn-coloured precipitate will fall, which, by the subsequent addition of a few drops of caustic potash, will gradually deepen in colour until it becomes very nearly black. By this means twenty drops of laudanum diffused through a pint of water have been discovered.*

Tests for morphine and its salts. Morphine, when pure, is in small beautiful white crystals. It has a bitter taste, but no smell. A gentle heat melts it, and a stronger one reddens and then chars the fused mass, from which issue white fumes, and at last the mass kindles and burns brightly. Morphine is very little soluble in water, more so in ether; but its proper solvents are alcohol and the diluted acids. All its solutions are intensely bitter.

Nitric acid dissolves morphine with effervescence, and the solution becomes instantly orange red; and if too much acid has been used, it changes quickly to yellow. This property it possesses in common with brucine, and also strychnine when not quite pure.† When suspended in water in the form of a white powder, and then treated with a drop or two of permuriate of iron, it is dissolved, and forms a deep greenish blue solution, the tint of which is more purely blue the stronger the solution and the purer the morphine.‡

Acetate of morphine is usually of a brown colour. The stronger acids disengage acetic acid. The alkalies, and particularly ammonia, throw down morphia from its solution in water, with a white precipitate. Nitric acid and permuriate of iron act on it as on morphine.§

Hydrochlorate (muriate) of morphine. This decrepitates slightly when heated, and then melts, and at the same time chars and exhales a strong odour. Nitric acid and permuriate of iron act on it as on morphia.

* Lancet, N. S., vol. ix. p. 712.

† To distinguish these, Dr. Vassal proposes to use hydrochlorate of tin. If the liquid contains morphine, it will become yellow; if brucine, a violet colour; and if strychnine, it become colourless. (London Medical Repository, vol. xxvi. p. 455.)

‡ Pelletier has ascertained that this blue colour is owing to the morphine attracting a portion of the peroxide of iron, and then uniting with another portion of the protoxide, forming thus a morphite of the metal. (Lancet, N. S., vol. xi. p. 337.)

§ Raspail mentions that the concrete part of the oil of cloves exactly imitates morphine when treated by each of the above tests.

M. Serullas, in 1830, proposed iodic acid as a test for morphine and all its salts. He found that when it was brought in contact with the alkaloid, even in very minute quantities, iodine was disengaged, and a blue colour was communicated to starch. He further states, that this effect is peculiar to morphine; and that the other vegetable alkalies, as strychnine, veratrine, brucine, &c. have no action on iodic acid.*

Tests for narcotine. Its crystals, when pure, fuse with heat, and concrete on cooling into a resinous-like mass. They are soluble in ether and fixed oil, less so in alcohol, insoluble in water or the alkalies, and very soluble in the diluted acids. The tests of morphine and its salts, which I have mentioned above, do not produce any similar effects on narcotine.

Test for opium in solution. Dr. Hare of Philadelphia has published the following. It is founded on the property of meconic acid to precipitate with lead.

Add a few drops of acetate of lead to a weak solution of opium, (even that contained in ten drops of laudanum, diffused in half a gallon of water). The meconate of lead will precipitate, but it may require from six to twelve hours. When it is collected at the bottom of the vessel in a small mass, about thirty drops of sulphuric acid should be poured down on it through a glass tube. Let this be followed by as much of the permuriate of iron. The sulphuric acid liberates the meconic, and thus enables the latter to produce the appropriate colour (cherry red) of meconate of iron.†

Orfila, while commending this test, suggests that as it is only necessary to have meconic acid in a free state for the iron to strike its red colour, we may act directly on the meconate of morphine contained in opium by sulphuric acid. The meconic acid will thus be liberated, and ready for the action of the test.‡

Process for detecting opium in mixed fluids and solids. The following is recommended by Dr. Christison as the most delicate and satisfactory:

"1. If there be any solid matter, it is to be cut into small fragments; water is to be added if necessary, then a little acetic acid to render the mixture acidulous; and when the whole mass has been well stirred and has stood a few minutes, it is to be filtered and evaporated, at a temperature somewhat below ebullition, to the consistence of a moderately thick syrup. To this extract strong alcohol is to be gradually added, care being taken to break down any coagulum that may be formed; and after ebullition and cooling, the alcoholic solution is to be filtered. The solution must then be evaporated to the consistence of

* Philosophical Magazine and Annals, vol. ix. p. 149. Lancet, N. S., vol. viii. p. 4. Mr. Meeson of London has just suggested, January, 1835, the following as a test of morphine and its salts: To the suspected fluid add a strong solution of chlorine. If ammonia be added to this, the solution will take a dark brown colour, which will disappear by adding more chlorine. No other vegetable alkali, he adds, takes this character. With quinine, the same experiment gives a beautiful green colour. (London and Edinburgh Philosophical Magazine, vol. vi. p. 158.)

† Chapman's Journal, N. S., vol. v. p. 77. Dr. Christison suggests as an improvement to throw off the superincumbent fluid, before the acid and iron are added.

‡ North American Medical and Surgical Journal, vol. vi. p. 201.

a thin syrup, and the residue dissolved in distilled water and filtered anew.

"2. Add now the solution of acetate of lead; as long as it causes precipitation, filter and wash. The filtered fluid contains the morphia, and the precipitate on the filter contains meconic acid united with the oxide of lead.

"3. The fluid part is to be treated with sulphuretted hydrogen to throw down any lead which may remain in solution. It is then to be filtered while cold, and evaporated sufficiently in a vapour bath. The solution in this state will sometimes be sufficiently pure for the application of the tests of morphine; but in many cases it is necessary, and in all advisable, to purify it still farther. For this purpose, the fluid is to be precipitated with ammonia; and the precipitate having been collected, washed, and drained on a filter, the precipitate and portion of the filter to which it adheres are to be boiled in a little pure alcohol. The alcoholic solution, filtered if necessary, will give, by evaporation, a crystalline residue, which becomes orange red with nitric acid, and when suspended in water becomes blue with permuriate of iron. The latter property I have sometimes been unable to develope, when the former was presented characteristically.

"4. It is useful, however, to separate the meconic acid also, because, as its properties are more delicate, I have repeatedly been able to detect it satisfactorily, when I did not feel satisfied with the result of the search for morphia. Dr. Ure made the same remark in his evidence on the trial of Stewart and his wife. He detected the meconic acid, but could not separate the morphine. Suspend, therefore, in a little water the precipitate caused by the acetate of lead (paragraph 2.); transmit sulphuretted hydrogen till the whole precipitate is blackened; filter immediately without boiling; then boil; and, if necessary, filter a second time. A great deal of the impurities thrown down by the acetate of lead will be separated with the sulphuret of lead, and the meconic acid is dissolved. But it requires, in general, farther purification, which is best attained by again throwing it down with acetate of lead, and repeating the steps of the present paragraph. The fluid is now to be concentrated by evaporation, and subjected to the tests for meconic acid, more particularly to the action of perchloride of iron when the quantity is small. If there is evidently a considerable quantity of acid, a portion should be evaporated till it yields crystalline scales, which have always a yellowish tint, and these are to be heated in a tube to procure its arborescent crystalline sublimate. About a sixth of a grain of meconic acid, however, is required to try the latter test conveniently."*

Although these tests may appear ample and satisfactory, yet we must remember that in most cases the search will be for substances which exist in small proportions in opium (as for example, Turkey

* Christison, p. 608. This process is founded, as Dr. Christison states, on that proposed by Lassaigne some years previous. The directions contained in the three first paragraphs are principally taken from him. For the details of Lassaigne's process, see Brande's Journal, vol. xvii. p. 168; Edinburgh Medical and Surgical Journal, vol. xxii. p. 231.

opium probably does not contain more, at the highest, than ten per cent. of morphia). The operator must therefore expect to find only minute traces, while in many instances he may be altogether disappointed. This has happened to accurate chemists, as Christison, Buchner, and Reid.*

I have mentioned that the solution of meconic acid, as well as its crystals, acquire an intense red colour with the permuriate of iron. Now it has been found that another acid, the *sulpho-cyanic*, is affected in a precisely similar manner by that test. Were this substance a rare one, as was once supposed, there could be little danger of mistake. But Gmelin and Tiedemann, and subsequently other observers, have found it to exist in *human saliva*.

Dr. Christison observes, "that it is impossible to procure a blood-red coloration from the saliva, except by evaporating a large quantity to dryness, and dissolving the residue in a small quantity of water;" and he questions whether it can be separated at all after the saliva is mixed with the complex contents of the stomach.† Dr. O'Shaughnessy has proposed the following, as a means of discriminating between the two acids: Add a small quantity of a solution of pure potash. This destroys the colour of the sulpho-cyanate, making it a dead pale white, but renders that produced by the meconate more intense. He further adds, that by the use of sulphuretted hydrogen, as directed in paragraph 3., any sulpho-cyanate of lead that may be formed is dissolved away by the water employed in the ablution of the precipitate.‡ The precipitate, with the nitromuriate of gold, will also serve to distinguish it.

Edmund Castaing, of a respectable family in France, studied the medical profession with ardour and success, and in due time became a physician. He was very intimate with Hippolyte and Augustus Ballet, young men of fortune. The former was out of health, and consulted him as a medical adviser.

In this state of things, Hippolyte died on the 22d of October, 1822. Having been deemed an invalid for some time, his death did not become the subject of remark, and Augustus remained on as intimate terms as before with Castaing. It was, however, ascertained subsequently, that while the disease under which Hippolyte was labouring (consumption) was pursuing its usual slow course, he was suddenly seized with severe symptoms, which carried him off in four days. He died in the arms of Castaing, and according to that person would not see his relatives. He made a will in favour of Castaing, and did not mention his brother's name in it. This will, Castaing, according to the testimony of a female witness, sold to Augustus for 100,000 francs. The physicians who examined the body of Hippolyte stated that there was emaciation present, but not sufficient to warrant them in ascribing death to exhaustion (epuisement).

* Edinburgh Medical and Surgical Journal, vol. xxxiii. p. 70. Christison, p. 609. Reid's Chemistry, 2d edition, p. 416. When every other proof has failed, the peculiar odour of opium has in several instances remained, so as to identify the substance.

† Christison, p. 611. ‡ Lancet, N. S., vol. vii. p. 33.

On the 30th of May, after having spent two days in excursions in the country, Augustus Ballet, accompanied by Castaing, arrived at St. Cloud, in a small carriage, and without his usual establishment of servants. They put up at a tavern. In the course of the evening, Augustus complained of being unwell. He took some warm wine, to which sugar and citron were added by Castaing, but without relief. He passed the night in a disturbed state. Castaing left him at 4 A. M. to take, as he said, a walk in the park; but instead of doing this, he went to Paris, called at the shop of a druggist, and demanded and obtained twelve grains of an emetic. He signed an order for this, as the shop boy hesitated to give him so large a quantity. He then went to the shop of Chevallier, a *pharmacien*, and bought a *demi-gros* of acetate of morphine, saying that he wanted it for experiments on animals. He mounted his cabriolet, returned with all speed, and found Augustus still ill. He now prescribed some cold milk, and gave it to his patient. In five minutes he was seized with convulsions, and in half an hour violent vomiting came on, followed by purging. The servant of Augustus received a note from Castaing on this day (31st), saying that his master was ill. He hurried to St. Cloud, and found him labouring under the above.

A physician (Dr. Pigarche) was sent for, who arrived at 11 A.M. Augustus was easy; the vomiting had ceased, but there was some fever; the tongue was yellow, and there was slight pain in the bowels. Deeming the disease cholera morbus, on the representation of Castaing, he prescribed emollient fomentations, light diet, and an enema. At two o'clock he found Ballet free of fever, and expressing a desire to return to Paris. At 4 P. M. and at 7 P. M., though there was some excitement, yet every thing argued favourably. He was sent for at 11 P. M., and found his patient quite insensible, unable to swallow, bathed in a cold sweat, with a small pulse, a burning skin, the jaws locked, the neck rigid, the abdomen tense, and the limbs affected by spasmodic convulsions. Bleeding produced a slight remission of these symptoms. At 6 A. M. Dr. Pelletan arrived from Paris. Stertorous breathing was now present. Sinapisms and even boiling water were applied to the legs, but they excited but little sensibility. The pupil of the eye was noticed at this time to be much contracted. Death followed an hour after mid-day.

The only appearances found on the dead body that bore any relation to the poison suspected, were congestion of blood and serous effusion in the vessels of the cerebral membranes.

Vauquelin and Barruel analysed the liquid found in the stomach, but could find no trace of poison.

Orfila, on his examination, stated that the symptoms present were common to poisoning and ordinary diseases; and further, that poisons might cause death and yet not be detected, owing to their removal by vomiting or absorption.

Magendie concurred in these opinions.

Chaussier was a witness for the accused.

He was one of the commission that examined the body of Augustus and the liquid found in the stomach. He stated that there was only

a slight irritation of the stomach, and not a vestige of poison. He was asked whether the appearances on dissection might not be those of vegetable poisons? He answered, no. Might they not have been absorbed into the blood? Yes, but it requires a long time. But when there is vomiting and purging? Then every thing is evacuated. He was also asked whether the acetate of morphine could be detected? *Yes, to a molecule.* But when it is absorbed is it then possible to find it? It requires a long time to absorb, and when the poison cannot be found the *corpus delicti* is wanting. Does acetate of morphine produce a dilatation of the pupil? Yes. You do not agree with Dr. Orfila? I have experience that Dr. Orfila does not possess.

M. Roussel, the counsel for the accused, urged that the symptoms were those of an inflammatory disease. It might have been excited by the fatigue of his excursions, by his long walks in the sun, the warm wine, &c.

It was proved that Castaing had paid much attention to the subject of poisons, and had bought a considerable quantity of acetate of morphine. He was convicted and executed. Whether from circumstantial or moral evidence, there seems to be little doubt of his guilt in France; but the proofs of it, as developed on the trial, are certainly imperfect. It is highly probable that if Augustus was poisoned, other deleterious substances besides the acetate of morphine were administered.*

A man was poisoned a few years since at Glasgow, by adding laudanum to strong beer. The peculiar smell of opium was manifest in the liquor extracted by the stomach pump. The magistrates requested Dr. Ure to examine the contents of the stomach. "One portion, treated with acetate of lead, afforded an insoluble precipitate, from which an acid, strongly reddening permuriate of iron, was separated by the agency of the sulphuric. Another portion afforded directly, with a few drops of the permuriate of iron, an evident reddish brown tinge. The chemical facts, joined to a body of circumstantial evidence, led to a conviction of the guilty pair, a man and wife, who were accordingly executed."†

Treatment. Probably no poison is more frequently used in this country as the means of suicide, than opium. It hence becomes a matter of special importance that the physician be well acquainted with the modes of preventing its effects, and for much useful information on this we are greatly indebted to the investigations of Orfila.

* Causes Celebres du XIX. Siecle, vol. iv. p. 1—103. Proces de Castaing. Gordon Smith on Medical Evidence, p. 368. Christison, p. 634. London Medical Repository, vol. xxi. p. 87. Considerations Medico-legales sur un accusation d'empoisonnement par l'acetate de morphine, par E. S. Montmahou, M.D., &c. 8vo. Paris, 1823. This last denies that any poison was given.

In Scotland, the felonious administration of laudanum or other narcotic or deleterious drug, with intent to produce stupefaction, whether in malice or to facilitate the commission of any crime, subjects the offender to severe punishment. (Alison's Principles of the Criminal Law of Scotland, p. 629.) I presume the law in this State (see page 658. of this work) would include this under the term *injury*.

† Dr. Ure, in Brande's Journal, N. S., vol. vii. p. 60.

The first indication is to remove the poison from the stomach. This is to be attempted in various ways. *By emetics* of sulphate of zinc, or sulphate of copper. The former is by far the best, and it should be given in doses of half a drachm or two scruples, to be repeated, at short intervals, if the first should fail to operate. The throat should also be irritated with a feather. At the same time, in order to insure its action, it is of great use to keep the patient roused as much as possible. Two persons should be constantly employed in dragging him up and down, and not permit him to sink into a state of insensibility.*

The sulphate of copper, although it is emetic in its operation, is not by any means so safe a prescription as the former. It is, as we have already stated, an active poison, and if retained long in the stomach may prove injurious.† But of all the forms of emetic medicines in use, tartar emetic is most to be discouraged. I have only to refer to its effects in large doses. And the practitioner, before he gives it, should recollect the possibility of its retention in the stomach, without producing vomiting. The torpid condition of that viscus is one of the main difficulties with which we have to contend. In confirmation of this opinion, Dr. Christison quotes a case in which a scruple of tartar emetic was administered to cause vomiting, but to no purpose. When it had remained fifteen minutes, sulphate of zinc was also given, and with immediate effect. But the patient, after recovering from the immediate consequences, was seized with pain in the stomach and bowels, and diarrhœa, which lasted for several days. ‡

A second mode of removing the poison from the stomach, is the use of the *stomach pump*. I have adverted to the history of its introduction in a previous page; and I may now add, that it has proved of more service in cases of poisoning by opium than in any other. Numerous instances of its utility have accumulated in the periodical journals.§

* Successful cases, in which sulphate of zinc was the principal agent, are given by Dr. Kinnis, Edinburgh Medical and Surgical Journal, vol. xiv. p. 603; by Dr. Howison, ibid., vol. xviii. p. 49; by Dr. Kennedy, ibid., vol. xviii. p. 343.

† Dr. Marcet (Medico-Chirurgical Transactions, vol. i. p. 77.) used it successfully in an almost desperate case, where six ounces of laudanum had been swallowed. Fifteen grains were given, and they induced vomiting. The patient complained for some days after of soreness in the throat and at the root of his tongue.

‡ Edinburgh Medical and Surgical Journal, vol. vii. p. 305; case by Mr. McKechnie.

§ Mr. Jukes, in 1822, particularly called the attention of the English medical profession to the utility of this remedy. (London Medical and Physical Journal, vol. xlviii. p. 384.) Mr. Bryce, as a substitute, proposed a long œsophagus tube, to which a bladder is attached. The fluid is introduced by it into the stomach; and when it is proposed to extract it again, the extremity of the tube and bladder are depressed below the level of the stomach; it thus acts as a syphon. (Edinburgh Medical and Surgical Journal, vol. xxiii. p. 220.)

Among the cases in which the stomach pump has been successfully used, I can only refer to those by Dr. Moore of New-York, New-York Medical and Physical Journal, vol. iv. p. 91; vol. vi. p. 357. By Dr. Hamersley, ibid., vol. ix. p. 235. Dr. Charles A. Lee, ibid., vol. vii. p. 518. Dr. Bardsley of Manchester, Edinburgh Medical and Surgical Journal, vol. xxx. p. 306. Lancet, vol. v. p. 218; vol. vi. p. 517; vol. x. p. 245.

Prof. Alison cured a case with Mr. Bryce's tube. (Edinburgh Medical and Surgical Journal, vol. xxiii. p. 416.)

Dr. Roe, of New York, relates a case in which a person took two and a half ounces of laudanum, and was seen within three quarters of an hour. He refused to take any thing. The tube of a stomach pump was introduced into the rectum, and fluid injected; and when the intestine was distended, fifteen grains of tartar emetic dissolved in half a gallon of water were thrown up: nausea and vomiting followed. The injection was repeated, and followed by an enema, which produced purging. The next morning the patient had nearly recovered. *

"The last method of removing opium from the stomach is a desperate one, which can only be recommended when emetics by the mouth have utterly failed, and when a stomach pump, or Mr. Bryce's substitute, cannot be procured. It is an injection of an emetic into the veins. Tartar emetic answers best for this purpose, and its effect is almost certain: a grain is the dose. While injecting it, care must be taken by the operator not to introduce air into the vein."†

The next most important part of the treatment is to keep the patient constantly roused. This is to be accomplished by the means already stated, of dragging him across the room between two persons; and the duration of this exercise should vary, according to circumstances, from three or six to twelve hours; and even if allowed to rest for a short time, he must be roused at short intervals, and any tendency to insensibility counteracted by renewed exercise. It is at this period, also, that dashing cold water over the head and body has been found of especial service in rousing the sensibility of the patient, and it would also seem to ensure the operation of emetics. When, therefore, an emetic has been taken, and its effect is delayed, it is advisable to use the cold water.‡

Internal stimulants sometimes prove useful assistants. Ammonia occasionally but carefully applied to the nose, and injections of assafœtida, have each proved of service. §

* American Journal of Medical Sciences, vol. vii. p. 555.

† Christison, p. 642.

‡ This treatment, according to Dr. Christison, was first proposed in 1767, by Dr. Grater, a German physician. Successful cases, in which it was a leading remedy, are related by Mr. Wray and Dr. Copeland, in Lond. Med. Repos., vol. xviii. pp. 26. 29.
By Dr. Crampton, Dublin Hospital Transactions, vol. iv.
By Dr. Richardson of Kentucky (1821), Chapman's Journal, vol. viii. p. 393.
By Dr. Jackson, ibid., vol. viii. p. 150.
By Dr. John B. Beck, New-York Medical and Physical Journal, vol. iii. p. 474.
By Dr. Staats, ibid., vol. iii. p. 473. In this case, bleeding was also very useful.
Dr. Cross, in an essay on poisoning by opium (Transylvania Journal, vol. i. p. 469.), has collected all the successful cases up to the period when he wrote.

§ Pulling the hair—injecting water in the ears—whipping with cords—slapping between the shoulders, &c., have each been used to produce external irritation, and thus rouse the patient. See Dr. Joseph M. Smith, Transactions of the Physico-Medical Society of New-York, p. 289; Dr. Seaman, New-York Medical Repository, vol. iii. p. 250.
A case in which emetics produced no effect, and oil of turpentine by the mouth, and in the form of enema, proved successful, is related by Dr. Jenkins, New-York Medical and Physical Journal, vol. iii. p. 303.
Dr. Fahnestock, in a case apparently hopeless, where the stomach pump proved

After the poison has been removed, it is often necessary, in consequence of the fulness and strength of the pulse, and the supervention of apoplectic symptoms, to abstract blood. In several cases, the relief thus afforded has been striking and permanent.* "It ought not to be resorted to till the poison is thoroughly removed from the stomach, for it favours absorption."†

Artificial respiration has been employed in some desperate cases, with marked advantage: one indeed proved successful. A middle-aged man swallowed half an ounce of crude opium, and soon became lethargic. Emetics were given with considerable effect, but he was left too soon, and fell into a state of complete lethargy, his pulse and respiration being nearly totally gone. Mr. Whately obtained a common bellows, and distended his lungs; this in a few minutes produced a free expiration, and he gradually recovered.‡ Dr. Ogilvie, of Georgia, has published another successful case in a child ten days old, to whom twenty-five drops of laudanum were given.§

When the patient is in a hopeful way of recovery, purgative enemas are very useful, particularly if we have reason to believe that any of the opium still remains in the intestines. Frequent rubbing of the arms and legs, or sinapisms to the latter, are also often needed, in consequence of the torpor that has been induced.

The experiments of Orfila have demonstrated that the administration of vinegar, lemon juice, or other vegetable acids, previous to the evacuation of the poison by vomiting, *will accelerate and aggravate the action of the opium;* but that when the opium has been previously expelled, water acidulated with vinegar or any other vegetable acid will tend to diminish and correct its effects. Coffee, when prepared in the form of strong decoction or infusion, rapidly lessens the symptoms, but cannot be considered as an antidote. The only substance which he deems entitled to that name is a decoction of nutgalls. This throws down the active principles of an infusion of opium, and may consequently diminish its effects, previous to the necessary attempts for its removal.

ineffectual, gave some sulphuric ether. This produced violent strangulating sensations, and aroused the action of the stomach and diaphragm: vomiting followed, and the patient was saved. (American Journal of Medical Sciences, vol. v. p. 250.)

* Cases in which venesection has been used with great succes, are mentioned by Mr. Richardson, Edinburgh Medical and Surgical Journal, vol. xvii. p. 226.
By Mr. Ross, ibid., vol. xix. p. 247.
By Dr. Rush, in 1801, New-York Medical Repository, vol. v. p. 124.
By Dr. Akerly, ibid., vol. xvi. p. 10. Dr. A. mentions a curious fact that occurred under his notice. A lunatic stole two ounces of laudanum, which were supersaturated with carbonate of potash, and swallowed them without any bad effects.
By Dr. Young, American Journal of Medical Sciences, vol. xiii. p. 61.
By Ollivier of Angers, and Marye, Medico-Chirurgical Review, vol. viii. p. 270.
By Dr. D'Outrepont, in a pregnant female (from a German Journal), American Journal of Medical Sciences, vol. v. p. 480.

† Christison, p. 644.

‡ Medical Observations and Inquiries, vol. vi. p. 331.

§ North American Medical and Surgical Journal, vol. iii. p. 277. Dr. Ware, of Boston, has also given a case where it was repeatedly employed with advantage, but the child sunk under the effects of hooping cough.

Hyoscyamus niger, L. (Black henbane.) Naturalised in the Northern States and in Canada. Several cases are on record of the baneful effects of this plant. Wepfer mentions that several monks made a repast on the roots of wild endive, among which were mixed by mistake two roots of henbane. In a few hours, some experienced vertigo; others a burning of the tongue, lips, and throat. Severe pains were also felt in the iliac region, and in all the joints. The intellectual faculties and organs of vision were perverted, and they gave themselves up to actions that were mad and ridiculous: they, however, recovered. In other cases, a haggard countenance, dilatation of the pupils, difficult breathings, small and intermittent pulse, loss of speech, trismus, and temporary loss of intellect, have been the principal symptoms, while the extremities have been observed cold and nearly paralysed. A glyster prepared of a decoction of henbane caused a numbness and loss of motion of the upper and lower extremities, propensity to sleep, and difficulty of hearing.*

Dr. Patouillat, of Toucy in France, saw nine persons poisoned with this root. Some were speechless and convulsed; others occasionally howled; in all, there was a protrusion of the eyes, contortion of the mouth, and delirium. Emetics relieved them, but their sight was for some days affected, and all objects appeared red like scarlet.†

The vapours of this plant and of belladonna are said to have been lately used by Hufeland in nervous affections. When exposed to these, even although precautions were taken to prevent the fumes from reaching the face, profuse perspiration ensued, with a sense of fulness in the head, and sometimes tremors, difficult respiration, and vertigo.

On animals, the juice and decoction of the root produced lethargic effects, but very seldom any giddiness or convulsions. When applied to the cellular texture, death ensued sooner, and vomiting occurred in one case, but generally the comatose symptoms were all that were observed. No inflammation was noticed in the stomach; the lungs were occasionally livid, and black blood was observed in the heart.

Hyoscyamus albus, L. (White henbane.) The following case is an example of its effects. In April, 1792, a large quantity was carried by mistake on board the French corvette *La Sardine*, which the sailors had gathered in one of the isles of Sapienza in the Morea, where the vessel then was. A part of it was put into the ship's copper, and the remainder into those of some of the subaltern officers. At four o'clock they all dined. In a short time, vertigo, vomiting, convulsions, gripes, and purging, were generally experienced; and when Dr. Picard, the surgeon, came on board, he observed the gunner making a thousand grimaces and contortions. By keeping up the evacuations, most of

* Orfila's Toxicology, vol. ii. p. 135. Foderé, vol. iv. p. 25.

† Philosophical Transactions, vol. xl. p. 446. See also additional cases, by Dr. Stedman, ibid., vol. xlvii. p. 194; by Sir Hans Sloane, ibid., vol. xxxviii. p. 99; Choquet and Wilmer, quoted in Christison, p. 648; by Mr. Donaldson, Medico-Chirurgical Review, vol. x. p. 242. Case by Dr. Burdach, from eating the capsules. (Monthly Journal of Medico-Chirurgical Knowledge, vol. i. p. 58.)

them recovered; but those in whom there were none, remained for some time in a sickly condition.*

The *Hyoscyamus aureus*, L. *physaloides*, L., and *scopolia*, L., are also deemed poisonous.

Meissner and Brande discovered an alkaloid in the Hyoscyamus niger, and which is styled *hyoscyamine*. The vapour of it is very injurious to the eyes, and the most minute fragments placed on the tongue prove deleterious.†

Solanum dulcamara, L. (Woody nightshade. Bittersweet.) A native of the United States. This, and other species of the same genus (*Solanum nigrum*, *villosum*, *fuscatum*, &c.), were deemed narcotic poisons, until the experiments of Orfila and Dunal threw some doubt on their activity. Dunal found that a dog might take 180 of the berries of Solanum dulcamara, or four ounces of the extract, without inconvenience; and quotes an experiment where thirty-two drachms of the extract were taken by a person in two cases, without injury.‡ Mr. Burnett, however, in the first volume of the Medical Botany, gives cases communicated by Mr. Wheeler, of Bayswater, showing the actual poisonous effects of the berries of this plant. Several children, from eating them, were seized with violent pain in the intestines, vomiting, and purging; and in one instance a profuse secretion of saliva. They required active remedies to relieve them. Mr. Wheeler adds, that he has known of two fatal cases from their use.

The extract of the *Solanum nigrum*, L. (Common or Garden Nightshade), possesses, according to Orfila, nearly the power and energy of lettuce opium.

Desfosses obtained an alkaloid from these plants, termed *solanine*, and which produced narcotic effects.

Doubts have lately been thrown on its existence §; but the recent experiments of Otto, who even found it in the potato (*solanum tuberosum*), would seem to decide the question. One grain of this was sufficient to kill a rabbit in six hours.‖

Lactuca virosa, L. (Strong-scented lettuce.) The extract of this plant in large doses produces effects similar to those of opium, but a longer period is required to develope them. It acts with more rapidity when applied to the cellular texture, or injected into the veins.

The lettuce opium, or extract of the *Lactuca sativa*, is much weaker.

Taxus baccata, L. (The yew.) Great diversity of opinion has existed concerning the properties of this plant. Orfila, however, deems it a narcotic.

* Foderé, vol. iv. p. 23. There is also a case by Dr. Hamilton, in Edinburgh Physical and Literary Essays, vol. ii. p. 268.

† Tilloch, vol. lvii. p. 308. Brande's Journal, vol. xi. p. 205. For Geiger's late experiments, see Philadelphia Journal of Pharmacy, vol. vi. p. 318.

‡ Christison, p. 650. In the 2d edition of Dr. Smith's Forensic Medicine, p. 187, is a case of poisoning by the extract, quoted from Hufeland's Journal. The individual took an ounce of it. It produced vertigo, palsy of the tongue, and cold sweats. It did not, however, prove fatal.

§ Magendie, quoted in London Medical Quarterly Review, vol. iv. p. 311.

‖ Lancet, N. S., vol. xiv. p. 117.

Dr. Percival relates, that the fresh leaves were administered to three children of five, four, and three years of age, near Manchester, for worms. Yawning and listlessness soon succeeded, and the oldest vomited a little, and complained of pain in the abdomen; but the others expressed no sign of pain. They all died within a few hours of each other. *

Paris quadrifolia, L. (Herb Paris, One-berry, True-love), occasions vomitings and spasms. The root of *P. polyphylla*, Smith, is also said to be highly poisonous.†

Actæa spicata, L. (Herb Christopher. Bane-berries.) A native of the United States. The berries of this plant are noxious, according to the testimony of Linnæus, Colden, and Le Monnier. It is poisonous to cattle, but sheep and goats eat it.‡

Physalis somnifera, L., *Azalea pontica*, L., *Peganum harmala*, L., are deemed narcotics.

PRUSSIC ACID. (*Hydrocyanic Acid.*)

This substance, in its concentrated state, is one of the most energetic of poisons, and its virulence varies with its strength.

The pure acid is liquid, limpid, and colourless. It has an acrid, pungent taste, and a very peculiar odour, which, when diffused through the air, has a distant resemblance to that of bitter almonds. It is an error, however, says Dr. Christison, to suppose that its *odour is the same with that of the almond.* § At ordinary temperatures, it decomposes spontaneously within a few hours.

It is therefore the acid diluted with water that is the article to be found in the apothecary's shop; and there is unfortunately much variety as to its strength, depending on the various processes by which it is made, and the tendency which it also has to decomposition. The medicinal acids on the Continent, either alcoholic or watery, vary from one to fifty per cent.; and this circumstance will explain the many cases of poisoning that have occurred there. If made according to Vauquelin's method, and which is in common use in England, the per centage will be 3·3. ‖ But even there the medicinal preparations differ "frightfully." ¶

* Medical Commentaries, vol. vi. p. 33. It is also mentioned, that a drove of cattle (twelve in number) were poisoned in December, 1814, in Montgomeryshire (Wales), from eating the branches of this tree. (Edinburgh Annual Register, vol. vii. p. 162.) Two cases of death from its leaves and berries are given by Metzger, p. 397. Mr. Tatem, in Loudon's Magazine of Natural History, vol. viii. p. 91, mentions that two horses were put under a yew tree, which they cropped with eagerness. No unfavourable circumstances appeared for three hours, when having staggered a few paces, they both dropped, and before the harness could be taken off they were dead. Their stomachs were contracted and inflamed.

† Edinburgh Philosophical Journal, vol. i. p. 380.

‡ Actæ spicata of Mich. includes the *Actæa rubra* of Willd. and *A. alba*, Big., which are decidedly distinct. The fruit of both, as well of *A. racemosa*, L., are noxious.

§ Dr. A. T. Thomson confirms this. (Cyclopædia of Pract. Med., vol. iii. p. 723.)

‖ Christison, p. 653.

¶ Everitt, in London and Edinburgh Philosophical Magazine, vol. vi. p. 101.

Effects on man. The following case is related on the authority of Hufeland, as an example of its effects. A man about to be taken up as a thief swallowed an ounce at 2 P. M. He staggered a few steps, and fell. The pulse could not be felt, and there was no trace of breathing. In a few minutes, a single and violent expiration took place. The extremities were cold; the eyes half open and shining, but without any irritability. At night he was stiff. The blood on dissection had the smell of bitter almonds. The pia mater and vessels of the brain were filled with blood. The stomach was highly inflamed, and presented gangrenous spots of the size of a sixpence. The villous coat separated on the slightest pressure of the nails. The intestines were healthy — the liver natural, but filled with black blood. All the blood was collected in the veins, while the arteries were empty; and it was generally of a black-blue colour, fluid, yet thick like oil, and had a most penetrating smell of bitter almonds.*

Orfila also relates the following as communicated to him by M. Fueter: "M. B., professor of chemistry, left, through forgetfulness, a flask, containing alcohol saturated with prussic acid. The servant girl, seduced by the agreeable smell of the liquor, swallowed a small glass of it. At the expiration of two minutes, she fell dead, as if she had been struck with apoplexy. The body was not opened." †

Dr. B., of Rennes, took two teaspoonfuls of the acid (prepared by Vauquelin's process). In a few seconds, he fell; his teeth were closed — the respiration was difficult, noisy, and rattling — the mouth distorted — the extremities cold — the pulse scarcely perceptible — the face and neck red and swelled — the pupils fixed and dilated; and in a word, all the appearances of apoplexy were present. A violent convulsion followed. Antidotes were administered, and after some time, there was a slight vomiting, but he did not recover his senses until nearly three hours had elapsed. Dyspnœa continued, but with enemas and other applications he gradually recovered. After every evacuation by stool, a quantity of gas was discharged from his mouth, which had the odour of prussic acid. It was a fortnight before he perfectly recovered. ‡

Mr. Ferrus was in the habit of using the acid prepared according to Magendie's formula, viz. one part of acid to 128 of syrup. He directed half an ounce to be administered to fourteen epileptics at the Bicetre. Instead of using this, the attendants obtained some which had been prepared according to the French Pharmacopeia (one part of acid to one of syrup). By the time the medicine had been administered to the seventh the first was dead, and the others expired within forty-five minutes. § The symptoms in all were first convulsions, and then coma.

He procured samples from different druggists in London (Apothecaries' Hall included), and found them to vary from $\frac{5}{8}$ per cent. to $\frac{1}{4}$ per cent.; and this, though he asked in each for Scheele's acid.

* London Medical Repository, vol. iv. p. 506.

† Orfila's Toxicology, vol. ii. p. 147. The professor, I believe, was Magendie.

‡ London Medical Repository, vol. xxiii. p. 233.

§ Modico-Chirurgical Review, vol. xiii. p. 461. Other cases are mentioned by

The inspiration of this substance, when diffused in the state of vapour through his laboratory, caused in Dr. Ittner, oppression and painful respiration, giddiness, vertigo, and burning heat.

Dr. Heller gives the case of a chemist in Paris, who applied a bottle of Scheele's acid to his nose. He was soon seized with extreme tightness of the chest, and tetanic stiffness of the whole body. His legs in particular were immovable. The vapours of ether and ammonia were applied to his nose with some success; but the circulation remained extremely low, not rising for some time above forty. The distress continued during the day, but he gradually recovered.†

It is not necessary after this to caution the physician in his administration of this highly powerful agent.‡

There are two questions which may be asked in medico-legal trials, which the physician should be prepared to answer. They are judiciously considered by Dr. Christison. *Within what time may hydrocyanic acid prove fatal? and how long is it before it begins to operate?*

Now very large doses, as we have seen, cause death in a few seconds; but, generally speaking, the cases that require examination have not been produced thus. It is the ordinary medicinal acid, at various degrees of strength, that is the agent.

As to the first, it is supposed by Christison, on the researches of Schubarth, that if an individual survive forty minutes, he will generally recover.

The last question came up for consideration on a late trial in England. An apothecary's maid servant at Leicester, who was pregnant by her master's apprentice, was found one morning dead in bed, and obviously poisoned by hydrocyanic acid. The body was in a composed posture, with the arms crossed over the trunk, and the bed clothes pulled closely up to the chin; and at her right side lay a small narrow-necked phial, from which about five drachms of the acid had been taken, and which was corked and wrapped in paper.

The question arose, whether all these acts could be performed by the deceased before becoming insensible. To settle this point, Mr. Mac-

Hufeland, Quarterly Journal of Foreign Medicine and Surgery, vol. v. p. 467. Mertzdorff, Edinburgh Medical and Surgical Journal, vol. xxii. p. 232. Dr. Whiting, Lancet, N. S., vol. vi. p. 250. Leuret, Annales d'Hygiène, vol. iv. p. 422. Case of Mrs. Latten, dead in twelve minutes from taking, by mistake, a drachm and a half of the acid, Lancet, N. S., vol. xii. p. 257. A case said to have occurred near Leeds in England, Annales d'Hygiène, vol. x. p. 180. Christison, p. 664., &c.

* American Medical Recorder, vol. ii. p. 530. See also the effects produced on Professor Silliman, from breaking a bottle in his laboratory. Silliman's Journal, vol. ii. p. 98.

† London Medical and Physical Journal, vol. lii. p. 63.

‡ The following articles deserve perusal on this point—*On the Deleterious Effects of the Hydrocyanic Acid*, by Dr. Randolph of Philadelphia, American Medical Recorder, vol. iv. p. 456; Review of Granville's treatise on prussic acid, ibid. vol. iv. p. 562.

There is, however, one point to which I may briefly advert. It is, whether prussic acid given medicinally causes ptyalism. This is asserted by Drs. Elliotson, Granville, and Macleod, to have occurred in *some* cases. (Christison, p. 663; London Medical and Physical Journal, vol. xlix. p. 128.) They are not, however, numerous. By others this occurrence is attributed to the cynanide of mercury from which it is prepared; but not with much probability.

aulay, Mr. Paget, and other medical men of Leicester, experimented on animals, and the result was unfavourable to the supposition, since one dog was killed with four drachms in eight seconds, and others in even less time. Dr. Christison, although inclining generally in favour of the opinion deducible from these, supposes it possible that occasionally the acid may not act with such extreme rapidity.

The principal circumstantial testimony in favour of the prisoner was, that he must have passed through three doors without noise, and one occupied room, in order to arrive at the apartment of the deceased. *

In a case quoted by Dr. Christison, the bed clothes had been drawn up as high as the breast, and the right arm extended down beneath the clothes. In another, a person swallowing some acid by mistake called out for hartshorn, and was found reclining on the steps of the cellar where he had been sent. With the cry for aid, however, he expired.

The smallest dose that has proved fatal is that given to the Parisian epileptics. Each of them took twenty grains of the medicinal acid, which quantity ought to have contained only two thirds of a grain of pure acid.†

Appearances on dissection. In addition to Hufeland's case already given, I may mention the following: —

In the persons poisoned at the Parisian Hospital, the back part of the body was livid; the head, face, and lips bloated, and of a violet colour; frothy blood issued from the mouth and nose; the eyes were closed, and the body rigid. The cellular tissue of the stomach and small intestines was highly injected, and in one place dark; but there was no odour of hydrocyanic acid from the stomach. Its inner membrane had red patches. So also in the small intestines, and at the point corresponding with the external blackness, there was blood effused between the mucous and muscular coats. The liver, spleen, and kidneys were healthy, but highly gorged with black blood. The heart was healthy, but contained no blood. The great arteries were empty, but the great veins gorged with black fluid blood. The lungs were slightly gorged, and the windpipe was of a deep red, and its ramifications filled with a bloody froth. The sinuses and veins of the brain were filled with fluid blood; but there was no effusion. The brain was soft.‡

In other instances the odour of bitter almonds has been very perceptible. It is mentioned by Leuret and Hufeland.

Rigidity of the limbs is also of slow occurrence. In Mertzdorff's case, there was an erection, and marks of an emission of semen, and the blood was violet coloured; but there was no odour. In

* Christison, p. 666. London Medical Gazette, vol. viii. p. 580. Trial of Freeman for the murder of Judith Burwell, April, 1829.

† Orfila, quoted by Christison, p. 669.

‡ Orfila, Annales d'Hygiène, vol. i. p. 507. Edinburgh Medical and Surgical Journal, vol. xxxiii. p. 221. The dissections were made by Adelon, Marc, and Marjolin.

other respects, the examination corresponded with those already given.*

Effects on animals. Two drops of acid prepared according to the process of Scheele, and which consequently contained considerable water, caused a bitch to stagger, fall, and vomit. Eight drops induced weakness, plaintive cries, purging, falling down, tetanic stiffness, dilatation of the pupils, paralysis, insensibility, and at length sleep. "In fifteen minutes the animal rose up, passed some urine, experienced an opisthotonos, and in half an hour was recovered." Thirty or forty drops destroy dogs and cats in six, twelve, or fifteen minutes after taking them; and the blood is all found in the veins, the arteries being empty, while the muscles are pale. Convulsions generally attend the administration of this poison.

Animals of various classes equally sink under its effects — a carp who was made to swallow twenty-four drops — snails, helices, leeches, crabs, lobsters, bees, ants, and grasshoppers. A cow, according to Emmert, died with all the phenomena of opisthotonos, a few seconds after injecting half a drachm into the trachea.†

M. Robert exposed animals to the aperture of a mattress in which prussic acid had been distilled, and the air of which consequently was a mixture of the atmospheric fluid with the vapour of this acid. Birds, rabbits, cats, and dogs, all died in a short space of time — from an instant to six minutes. The liquid acid in its pure state, and also dissolved in alcohol, was equally but not so promptly destructive. He examined a dog destroyed by it. The brain was healthy, but exhaled the odour of prussic acid. The tongue was soft, bluish, and hung out of the mouth. The mucous membrane of the trachea was injected. The lungs were of a bright red hue, and the heart was filled with very dirty deep red blood. The veins contained thick and dark-coloured blood. The lungs and heart, and their contents, exhaled the odour of prussic acid.‡

It is hardly necessary to add, that the concentrated acid acts with the rapidity of lightning. I subjoin some references to additional experiments. §

* Leuret, Annales d'Hygiène, vol. iv. p. 422. Mertzdorff, Edinburgh Medical and Surgical Journal, vol. xxii. p. 232. Schubarth explains the presence or absence of the odour (on which he has made numerous researches) by stating that if the dose be sufficient to cause death in ten minutes, the peculiar odour will always be remarked in the heart, lungs, and great vessels, provided the body has not been exposed to rain or a current of air, and is early examined; but if life be prolonged from ten to thirty minutes, or under circumstances opposite to those just named, the odour may not be noticed, since the acid is rapidly discharged by the lungs, or it may be decomposed. (Christison, p. 671.)

† Orfila's Toxicology, vol. ii. p. 142—146.

‡ See his experiments in the London Medical Repository, vol. iii. pp. 243—249.

§ Essay on prussic acid, by Duvignau and Parent. (American Medical Recorder, vol. ii. p. 573.) Experiments by Dr. Davie, Eclectic Repertory, vol. x. p. 246. A few drops thrown on the eye of a cat caused death. Annals of Philosophy, vol. xii. p. 23. It is here stated, that Magendie dipped a rod into the acid prepared according to Gay-Lussac's method, and brought it in contact with the tongue of an animal. Death ensued before the rod could be withdrawn. Gay-Lussac's essay on prussic acid, in the Annals, vols. vii. and viii., and Magendie's, in Brande's Journal, vol. iv. p. 347. Krimer's experiments, in Bulletin des Sciences Médicales, vol. xiii. p. 124.

Tests. These have been particularly and recently examined by Lassaigne of Paris, Professor Turner of London, and Professor Orfila.* Instead, therefore, of the tests mentioned in a former edition, I will state such as they appear to have determined.

(*a.*) *The peculiar odour.* On this I have already remarked. It is asserted by Orfila, but doubted by Christison, that the smell is perceptible when no chemical agent is delicate enough to detect the acid. Its occasional absence is also an objection to a too great dependance on it.

(*b.*) *Sulphate of copper* forms with hydrocyanic acid when rendered alkaline with a little potash a greenish precipitate, which becomes nearly white on the addition of a little hydrochloric (muriatic) acid. This last acid redissolves some *oxide* of copper thrown down by the potash, and the precipitate is then the cyanuret of copper. Lassaigne observes that this test will act on the poison when dissolved in 20,000 parts of water.

(*c.*) *The salts of the protoxide of iron,* if the acid be rendered alkaline by potash, produce a greyish green precipitate, which on the addition of a little sulphuric acid becomes of a deep *Prussian blue* colour. The common green vitriol† will answer for this purpose; and even the salts of peroxide of iron may be used, since they are, unless very carefully prepared, never altogether free of the *protoxide.* But it is shown by Turner, in opposition to Lassaigne and others, that the salts of the pure peroxide have no such effect. They cause, with the potash, a brownish precipitate, which is redissolved on the addition of sulphuric acid, leaving the solution limpid. Dr. Turner also deems this test more delicate than the former one.‡

(*d.*) *Nitrate of silver* gives a *white* precipitate, with a diluted solution of acid, and this precipitate (cyanuret of silver) is distinguished from the other white salts of silver by being insoluble in nitric acid at ordinary temperatures, but easily soluble in it at its boiling temperature. The precipitate also, when dried and heated, emits cyanogen, which is known by its beautiful flame.§

Orfila, Annales d'Hygiène, vol. i. p. 504. Magendie on its external application, Lancet, N. S., vol. xv. p. 146. Christison's experiments, Treatise on Poisons, p. 657. He noticed tetanus as a frequent occurrence. Garret and Hasting's experiments in Midland Medical and Surgical Reporter, vol. ii. p. 317. 319.

* Lassaigne, Brande's Journal, vol. xviii. p. 397. He proposed the tests of sulphate of copper and nitrate of silver, and I rather imagine that Dr. Granville first proposed the sulphate of iron. London Medical Gazette, vol. ii. p. 651. Turner, Edinburgh Medical and Surgical Journal, vol. xxx. p. 344. Orfila, Lancet, N. S., vol. iv. p. 737. Annales d'Hygiène, vol. i. p. 489.

† Proto-sulphate of iron, copperas.

‡ It is very important to understand the distinction taken by Dr. Turner. "The formation of Prussian blue (he remarks) from prussic acid, by admixture with a salt of iron and potash, does not occur when the iron is strictly at its maximum of oxidation. A very minute quantity of the protoxide, however, gives rise to the production of Prussian blue, which is rendered obvious by dissolving the precipitated oxide by a slight excess of sulphuric acid." (Edinburgh Journal of Science, N. S., vol. ii. p. 217.)

§ Mr. Barry also adds, that the cyanuret of silver may be further verified by its redissolving when a drop of caustic ammonia is applied. (London and Edinburgh Philosophical Magazine, vol. iv. p. 152.)

Orfila recommends, as the best method for ascertaining the *strength* of a solution of hydrocyanic acid, to throw down the nitrate of silver, and dry the precipitate: a hundred parts of this will correspond to 20·33 of the pure acid.

As to the detection of this poison, *when mixed with animal matters*, Leuret and Lassaigne have made some researches. They found that if the body of an animal poisoned with this acid is unburied for three days, the poison can no longer be detected; but that if it is buried within twenty-four hours, the poison may be found after a longer interval, but never after eight days. The reason of this has been already intimated. *

For the detection of the acid, in these instances, Orfila advises that a piece of writing paper, moistened with caustic potash, be dipped in the mixed fluids. This paper should then be touched with a solution of the sulphate of iron; and if hydrocyanic acid is present, the usual blue colour, with a tinge of green, will appear, and this will become more blue by exposure. Purified animal charcoal alone without heat will sometimes destroy the colour of the fluid, and permit it to be tested by the reagents already enumerated.†

If neither of these modes is found to answer, the fluid should then be distilled. Dr. Christison recommends that the filtered contents be previously neutralised with sulphuric acid, if they are alkaline, so as to fix the ammonia which may have been disengaged by putrefaction; and then distil the product slowly from a vapour bath, till an eighth part has passed over it into the receiver. The distilled fluid should then be tested with the protosulphate of iron.

It has been objected to this last process, that hydrocyanic acid may be formed during the distillation, by the decomposition of animal matter. Undoubtedly in some instances it appears to have been thus generated; but in the present state of our knowledge, all that can be done to avoid this occurrence is not to press the heat of the vapour bath too much.

The application of the tests has already been made in medico-legal cases. In the instance of Ramus, the particulars of whose murder is mentioned at page 546, the facts ascertained led to the suspicion that he had not been able to offer any resistance; and it was hence suggested that prussic acid might have been previously given.

At the end of seven days, when the examination was made, the matters found in the stomach had a sharp odour, "ayant quelque chose de vineux." They were also distinctly acid; and on distillation the smell resembled *that of bitter almonds*. The tests above recommended were now applied. Nitrate of silver gave a curdled white precipitate, which, when treated with nitric acid and the application of heat, dissolved nearly altogether. Sulphate of copper produced a

* Christison, Brande's Journal, N. S., vol. i. p. 480. It is possible, however, that the poison may be detected somewhat later, as the iron test, in the form proposed by Turner, was not used by them. A case in which Lassaigne could not succeed in detecting the poison after thirty-eight hours, is given by Leuret, in Annales d'Hygiène, vol. 4. p. 422.

† Annales d'Hygiène, vol. i. p. 493. Lancet, N. S., vol. vii. p. 806.

minute milky precipitate. It was evident, from these circumstances, that hydrocyanic acid was present in the stomach in minute quantities, and the probability was great that the murdered person had taken it. The only doubt was, whether it might not have been generated from the matters contained in the stomach.*

Antidotes. The substances which have the highest character for this purpose, are powerful and diffusible stimuli. *Ammonia* was first recommended by Mr. John Murray of London.† He administered fatal doses of the acid to animals, and immediately thereafter applied ammonia to their nostrils; they invariably recovered. Dupuy confirmed these results by experiments on horses‡; and the general course of observation, with some fluctuations, goes strongly to show its efficacy. In the latest publication of Orfila, he speaks highly of the application of the vapour, and states that he has thus recovered several dogs; but he, as also Dr. Herbst, attach little value to swallowing the liquid ammonia.§ It should be remembered that ammonia is often extremely acrid, and may cause inflammation of the mouth and throat.

Chlorine. This was first proposed in 1822, by Riauz, a chemist of Ulm, and many experiments on animals have verified its value. "According to Orfila, animals which have taken a dose of poison sufficient to kill them in fifteen or eighteen minutes will be saved by inspiring water impregnated with a fourth part of its volume of chlorine, even although the application of the remedy be delayed till the poison has operated for four or five minutes." ‖

The *cold effusion* was first advised by Dr. Herbst of Gottingen, and it is certainly a most valuable remedy. Even in the stage of insensibility and paralysis, it has been successfully used. It often requires to be repeated several times; and in extreme cases, the first sign of amendment is a renewal of the spasms of the muscles.¶ It should be used in connection with the inhalation of chlorine or ammonia.

Oil of turpentine, coffee, &c., have deservedly lost their reputation as remedies in these cases.

The *hydrocyanates of ammonia and potash* are as poisonous as the original acid. This has been proved by the experiments of Coullon, Robiquet, Magendie, and Schubarth**; but the *triple prussiates* (ferrocyanates) do not possess deleterious properties. The *sulphocyanic acid,* although once supposed to be a very active poison, is not found

* Annales d'Hygiène, vol. ix. pp. 363—379. The case is reported by Chevallier and Boys de Loury. Some acid was found in a phial in the room of the murderer.

† Edinburgh Journal of Science, vol. ii. p. 214.

‡ London Medical Repository, vol. xxvi. p. 441.

§ Annales d'Hygiène, vol. i. p. 512.

‖ Christison, p. 675. Other experimenters have tested its efficacy. Persoz and Nonat, Annales d'Hygiène, vol. iv. p. 435. Simeon, Brande's Journal, N. S., vol. v. p. 421. Dr. T. D. Mitchell says that the *American* Fire King (a rival of Chabert) took chlorine water, to prevent the effects from swallowing prussic acid. (Chemistry, p. 184.)

¶ Herbst, Edinburgh Medical and Surgical Journal, vol. xxxii. p. 229. Orfila confirms its value. (Annales d'Hygiène, vol. i. p. 520.)

** Christison, p. 661.

to act with much energy on animals. Dr. Westrumb of Hammeln, however, observed very active effects from the *sulphocyanate of potash*. Two scruples dissolved in water killed a dog in seven minutes.*

We come next to the consideration of those vegetables which contain hydrocyanic acid, and of which it constitutes the poisonous ingredient. They may be arranged as follows: —

Prunus lauro-cerasus, L. *Cerasus lauro-cerasus*, D. C. Cherry laurel.
Prunus avium, L. *Cerasus avium*, D. C. Black cherry; its kernels.
Prunus padus, L. *Cerasus padus*, D. C. Bird cherry tree; Cluster cherry; its bark.
Prunus virginiana, L. *Cerasus virginiana*, Mx. Wild cherry tree.
Prunus nigra, Ait. *Cerasus nigra*, D. C. Black cherry tree.
Prunus caroliniana, Ait. *Cerasus caroliniana*, Mx. Wild orange.
The three last are natives of the United States.
Amygdalus communis, L. Bitter almonds.
Amygdalus persica, L. *Persica vulgaris*, D. C. The peach; its kernels, leaves, and flowers.
Sorbus aucuparia, L. *Pyrus aucuparia*, D. C. Mountain ash; Rowan tree.

The poison obtained from these various substances exists in two forms — as a distilled water, and as an essential oil; and it is in these products that the peculiar odour, already spoken of, is observed. It is present even after the acid is thrown down by the iron test; and, of course, it is a probable conjecture that it is owing to some substance other than the acid itself.

Prunus lauro-cerasus† (Cherry laurel). The distilled water of this plant (doubtless containing variable quantities of the essential oil, and which oil has been shown by Robiquet to possess all the chemical properties of the oil of bitter almonds) has been proved a poison by numerous experimenters.‡

When applied to wounds in animals, it induced vomiting, convulsions, great prostration of strength, diminished sensibility, and death. Injected into the stomach and rectum, it excited a similar train of symptoms, except that in the latter the convulsions were more violent, and tetanus of the extremities was present. Its action was most rapid and intense when injected into the jugular vein.§

Several cases are recorded of its effects on the human subject. One

* Christison, p. 663. Tiedemann and Gmelin, in their experiments on digestion, ascertained that the *sulphocyanate of potash* is contained in the human saliva. (Edinburgh Medical and Surgical Journal, vol. xxvii. p. 420.)

† Schrader, an apothecary at Berlin, was the individual who discovered that the prussic acid is contained in the aqua lauro-cerasi and the distilled water of the flowers of the peach tree, as likewise in the infusion of bitter almonds. (London Medical and Physical Journal, vol. x. p. 95.) Bergmann, also an apothecary at Berlin, discovered, in 1811, that the bark of the Prunus padus contained a notable quantity of it. (Annals of Philosophy, vol. v. p. 28.) See also a paper by Vauquelin, on the presence of prussic acid in vegetables, from the *Annales de Chimie*. (Repertory of Arts, 2d series, vol. ii. p. 461.) He detected this substance in the kernels of apricots.

‡ Orfila enumerates the following: Madden, Mortimer, Brown, Langrish, Nicholls, Stenzelius, Heberden, Watson, Vater, Rattray, the Abbe Rozier, Duhamel, and Fontana; and we may add, Robiquet and Taddei. The last made his experiments at Florence, in the laboratory of the Marquis Ridolfi. (London Medical Repository, vol. xvii. p. 431.)

§ Orfila's Toxicology, vol. ii. pp. 148—153. Also an analysis of the experiments of Fontana, in the Medical Commentaries, vol. xii. p. 106.

of the earliest happened in Dublin in 1728. Martha Boyse, servant to a person who sold large quantities of this water, gave to her mother a bottle of it, and by the latter it was given to Frances Eaton, her sister. Mrs. Eaton was a shopkeeper; and thinking it a compliment to her customers, offered them some. Among others, one Mary Whaley drank of it; went to another shop, and in about a quarter of an hour complained of a violent disorder in her stomach. She was carried home, and from that time lost her speech, and died in about an hour, without vomiting or purging, or any convulsions. Mrs. Ann Boyse was informed of this, and came immediately to her sister. She affirmed that it could not have been the cordial that caused the death; and to convince her of it she filled out three spoonfuls and drank it, and shortly after two more. In a few minutes she died, without a groan or convulsions.*

Foderé says, that when he was attending his studies at Turin, in 1784, the chamber maid and man servant of a noble family of that town stole, for the purpose of regaling themselves, from their master, a bottle of distilled laurel-water, which they took for an excellent cordial. Fearful of being surprised, they hastily swallowed, one after the other, several mouthfuls of it; but they soon paid the price of their dishonesty, for they expired almost instantly in convulsions. The dead bodies were carried to the university for examination. The stomach was found highly inflamed, but the rest of the organs were in a sound state.†

It has also formed the subject of investigation in a very interesting criminal trial, whether this substance was the cause of death. The case was that of Capt. Donellan for the murder of Sir T. Boughton. Its importance requires that a full abstract should be given.

Sir Theodosius Boughton was a young gentleman of fortune, in the county of Warwick in England, and nearly arrived at the age of twenty-one. His mother, and his brother-in-law, Capt. Donellan, and his sister, Mrs. Donellan, resided with him. In the event of his dying before the period of his majority, the greatest part of his fortune descended to his sister, and Capt. Donellan would thus become entitled to a life estate in it.

Sir Theodosius was labouring under a slight venereal affection, for which he was attended by Mr. Powell, an apothecary at Rugby. His

* Philosophical Transactions, vol. xxxvii. p. 84. Communicated by Dr. Madden. His experiments on animals are also contained in the same article; Dr. Mortimer's, in vol. xxxvii. p. 163; Fontana's, in vol. lxx. p. 163. In 1782, Dr. Price, of Guilford, having professed to convert mercury into gold, offered to repeat his experiments before a competent tribunal; but the unfortunate philosopher put a period to his existence before the day appointed for his exhibition by a draught of laurel water. (Paris's Medical Jurisprudence, vol. ii. p. 401.)

† Foderé, vol. iv. p. 27. Even the *leaves* are noxious, as the following extract will show: "1819. Several children at a boarding-school near Richmond, having partaken of some custard flavoured with the leaves of the cherry-laurel, four of them were taken severely ill. Two of them, a girl of six and a boy of five years of age, fell into a profound sleep, out of which they could not be roused in ten hours; the other two complained of pain in the epigastric region. By proper medical treatment, they all recovered, after an illness of three days." (Paris's Medical Jurisprudence, vol. ii. p. 402.)

general health is, however, stated to have been good. On the 29th of August, 1780, Mr. Powell sent him a draught to be taken on the next morning, consisting of rhubarb and jalap, each fifteen grains; spirits of lavender, twenty drops; nutmeg water, two drachms; simple syrup, two drachms, and an ounce and a half of simple water. The bottle containing this draught was placed on a shelf in his bed-room.

Sir Theodosius returned in the afternoon of this day from fishing, in good health and spirits. In the morning, a servant awoke him at an early hour, for the purpose of obtaining some straps for a net. He arose, and went into the next room for them. Even now he appeared in perfect health. About 7 A. M. Lady Boughton got up and went into his room, as he had before desired her to give him the medicine. She inquired whether he had taken it, or whether he chose that she should give it to him. He desired her to reach down the draught, which was labelled — "Purging draught for Sir T. B.;" and she poured it into a cup, for the purpose of his taking it. He had not, however, swallowed more than half of it, when he complained that it was so nauseous to the taste, and disagreeable to the smell, that he did not apprehend he should be able to keep it on his stomach. This remark induced Lady Boughton to smell the draught. She found it very peculiar in this respect, and observed to him that it smelt very strongly of bitter almonds. He ate some cheese, in order to take the taste out of his mouth, and afterwards washed his mouth with some water. In about two minutes after swallowing the draught, he appeared to struggle very much, as if to keep it down, and had a rattling and guggling at his stomach. These symptoms continued about ten minutes, when he seemed to Lady Boughton to be inclined to go to sleep, and she left the room. She returned again in about five minutes, and was surprised to find him with his eyes fixed upwards, his teeth clenched, and froth running out of his mouth. He died in about half an hour afterwards, having never spoken since he took the draught.

Mr. Donellan came into the room when Sir Theodosius was dying, and inquired of Lady Boughton where the physic bottle was. She showed it to him. He immediately took it and poured water into it, shook it, and then emptied its contents into the wash-hand basin. And he persisted in doing this with another bottle, although Lady Boughton remonstrated, and objected to his conduct. Mr. Powell was sent for, but arrived after the death of Sir Theodosius.

It appeared also in evidence, that Capt. Donellan had a still in his own room, and that he had used it for distilling roses. Some days after the death of Sir T. he brought this still to one of the servants to be cleaned. It was full of lime, and the lime was wet. On the other hand, it appeared on the cross-examination of Lady Boughton, that Sir T., a short time before his death, had bought a quantity of arsenic, in order to poison fish, and some of this was afterwards found locked up in his closet.

Suspicions soon began to be excited as to the cause of this sudden decease; and when these reached the ears of Sir William Wheeler, the guardian of the young baronet, he wrote to Capt. Donellan, informing him of the rumours that were abroad, and requesting him

to have the body opened, in order to satisfy the family and the public. Donellan, in his answer, immediately consented to this, and sent for some medical gentlemen. He, however, did not explain to them the cause of his request; and as they were thus led to suppose it merely an ordinary case, they declined the performance, from the circumstance that the body was already far advanced in a state of putrefaction. It is not necessary, nor indeed does it belong to this statement, to enumerate the various devices by which Capt. Donellan evidently attempted to elude the wishes of Sir William Wheeler respecting a dissection. On the 8th day after death, the body was buried; but it was taken up immediately after by the coroner, and opened. It was found swoln and distended; the face was black, the lips swoln and retracted and showing the gums, the teeth black, the tongue protruding, and the skin spotted in many parts of the body. "The orifices and small arch of the stomach, and the intestines, bore the appearance of inflammation; the heart was natural; the lungs were suffused with blood, looking red, and spotted in many places with black specks; and on the back part the blood had settled in a deep red colour, almost approaching to purple: the diaphragm was in the same state, and in general, upon the depending surfaces of the body, the blood was settled in the like manner; the kidneys appeared black as tinder, and the liver much in the same state." There was also some blood extravasated in the thorax.

Several physicians and surgeons (Dr. Rattray, Dr. Ashe, Dr. Parsons, Professor of Anatomy at Oxford, and Mr. Wilmer) deposed, that they had performed experiments on animals with laurel water, and found the effects very similar to the symptoms in the case of Sir Theodosius. Death succeeded in a few minutes, after having been preceded by convulsions. The appearances on dissection also agreed.

It may be mentioned in this place, that Mr. Powel prepared a draught precisely alike to that which he had sent to the baronet, with the addition of some laurel water; and Lady Boughton, on being requested to smell this, stated that it resembled the one she had given to her son.

The counsel for the prisoner, in their cross-examination, inquired of the medical witnesses, whether the presence of epilepsy or apoplexy would not account for the symptoms observed. To this a negative answer was given. Dr. Parsons thought they resembled the latter most, but he was decided in attributing them to the effects of the medicine. Sir Theodosius was young, and of a thin habit, and it was hence very improbable that apoplexy should have caused his death.

They also inquired, whether the appearances observed on dissection might not be the effects of putrefaction. It was allowed that the external might, but not the internal.

On the part of the prisoner, the celebrated JOHN HUNTER was summoned as a witness. As this is probably the only time when that distinguished surgeon appeared before a court to testify on a case of poisoning, and as his examination is peculiarly interesting, I conceive that I shall do a service by quoting it entire.

Mr. JOHN HUNTER *sworn; examined by Mr. Newnham.*

Question. Have you heard the evidence that has been given by these gentlemen?

Answer. I have been present the whole time.

Q. Did you hear Lady Boughton's evidence?

A. I heard the whole.

Q. Did you attend to the symptoms her Ladyship described, as appearing upon Sir Theodosius Boughton, after the medicine was given him?

A. I did.

Q. Can any certain inference upon physical or chirurgical principles be drawn from those symptoms, or from the appearances externally or internally of the body, to enable you, in your judgment, to decide that the death was occasioned by poison?

A. I was in London then; a gentleman, who is in court, waited on me with a copy of the examination of Mr. Powell and Lady Boughton, and an account of the dissection, and the physical gentlemen's opinion upon that dissection.

Q. I don't wish to go into that: I put my question in a general way.

A. The whole appearances upon the dissection, explain nothing but putrefaction.

Q. You have been long in the habit of dissecting human subjects? I presume you have dissected more than any man in Europe?

A. I have dissected some thousands during these thirty-three years.

Q. Are those appearances you have heard described such, in your judgment, as are the result of putrefaction in dead subjects?

A. Entirely.

Q. Are the symptoms that appeared after the medicine was given such as necessarily conclude that the person had taken poison?

A. Certainly not.

Q. If an apoplexy had come on, would not the symptoms have been nearly or somewhat similar?

A. Very much the same.

Q. Have you ever known or heard of a young subject dying of an apoplectic or epileptic fit?

A. Certainly; but with regard to the apoplexy, not so frequent. Young subjects will perhaps die more frequently of epilepsies than old ones. Children are dying every day from teething, which is a species of epilepsy arising from an irritation.

Q. Did you ever, in your practice, know an instance of laurel water being given to a human subject?

A. No, never.

Q. Is any certain analogy to be drawn from the effects of any given species of poison upon an animal of the brute creation to that it may have upon a human subject?

A. As far as my experience goes, which is not a very confined one, because I have poisoned some thousands of animals, they are very nearly the same. Opium, for instance, will poison a dog similarly to a man. Arsenic will have very near the same effect upon a dog as it would have, I take for granted, upon a man. I know something of the effects of them, and I believe their operations will be nearly similar.

Q. Are there not many things which will kill animals almost instantaneously that will have no detrimental or noxious effect upon the human subject; spirits, for instance, occur to me?

A. I apprehend a great deal depends upon the mode of experiment. No man is fit to make one, but those who have made many and paid considerable attention to all the circumstances that relate to experiments. It is a common experiment, which I believe seldom fails, and is in the mouth of every body, that a little brandy will kill a cat. I have made the experiment, and have killed several cats; but it is a false experiment. In all those cases where it kills the cat, it kills the cat by getting into her lungs, not into her stomach; because, if you convey the same

quantity of brandy, or three times as much, into the stomach, in such a way as the lungs shall not be affected, the cat will not die. Now in those experiments that are made by forcing an animal to drink, there are two operations going on: one is a refusing the liquor by the animal, its kicking and working with its throat to refuse it; the other is a forcing the liquor upon the animal; and there are few operations of that kind, but some of the liquor goes into the lungs. I have known it from experience.

Q. If you had been called upon to dissect a body suspected to have died of poison, should you or not have thought it necessary to have pursued your search through the guts?

A. Certainly.

Q. Do you not apprehend that you would have been more likely to receive information from thence than any other part of the frame?

A. That is the track of the poison, and I certainly should have followed that track through.

Q. You have heard of the froth issuing from Sir Theodosius's mouth, a minute or two before he died: is that peculiar to a man dying of poison, or is it not very common in many other complaints?

A. I fancy it is a general effect of people dying in what you may call health, in an apoplexy or epilepsy — in all sudden deaths, where a person was a moment before that in perfect health.

Q. Have you ever had an opportunity of seeing such appearances upon such subjects?

A. Hundreds of times.

Q. Should you consider yourself bound, by such an appearance, to impute the death of the subject to poison?

A. No, certainly not: I should rather suspect an apoplexy; and I wish, in this case, the head had been opened, to remove all doubts.

Q. If the head had been opened, do you apprehend all doubts would have been removed?

A. It would have been still farther removed, because, although the body was putrid so that one could not tell whether it was a recent inflammation, yet an apoplexy arises from an extravasation of blood in the brain, which would have laid in a coagulum. I apprehend, although the body was putrid, that would have been much more visible than the effect any poison could have had upon the stomach or intestines.

Q. Then, in your judgment, upon the appearances the gentlemen have described, no inference can be drawn from thence that Sir Theodosius Boughton died of poison?

A. Certainly not; it does not give the least suspicion.

Cross-examined by Mr. Howorth.

Q. Having heard the account to-day that Sir Theodosius Boughton, apparently in perfect health, had swallowed a draught which produced the symptoms described, I ask you whether any reasonable man can entertain a doubt that that draught, whatever it was, produced these appearances?

A. I don't know well what answer to make to that question.

Q. Having heard the account given of the health of this young gentleman, on the morning previous to taking the draught, and the symptoms that were produced immediately upon taking the draught, I ask your opinion, as a man of judgment, whether you don't think that draught was the occasion of his death?

A. With regard to his being in health, that explains nothing. We frequently, and indeed generally, see the healthiest people dying suddenly; therefore I shall lay little stress upon that. As to the circumstances of the draught, I own they are suspicious: every man is as good a judge as I am.

Court. You are to give your opinion upon the symptoms only — not upon any other evidence given.

Mr. Howorth. Upon the symptoms immediately produced after the swallowing of that draught, I ask whether, in your judgment and opinion, that draught did not occasion his death?

A. I can only say, that it is a circumstance in favour of such an opinion.

Court. That the draught was the occasion of his death?

A. No; because the symptoms afterwards were those of a man dying who waa before in perfect health: a man dying of an epilepsy or apoplexy, the symptoms would give one those general ideas.

Court. It is the general idea you are asked about now, from the symptoms that appeared upon Sir Theodosius Boughton, immediately after he took the draught, followed by his death so very soon after; whether, upon that part of the case, you are of opinion that the draught was the occasion of his death?

A. If I knew the draught was poison, I should say, most probably, that the symptoms arose from that; but when I don't know that that draught was poison, when I consider that a number of other things might occasion his death, I cannot answer positively to it.

Court. You recollect the circumstance that was mentioned, of a violent heaving in the stomach?

A. All that is the effect of the voluntary action being lost, and nothing going on but the involuntary.

Mr. Howorth. Then you decline giving any opinion upon the subject?

A. I don't form any opinion to myself. I cannot form an opinion, because I can conceive if he had taken a draught of poison, it arose from that: I can conceive it might arise from other causes.

Q. If you are at all acquainted with the effects and operations of distilled laurel water, whether the having swallowed a draught of that would not have produced the symptoms described?

A. I should suppose it would. I can only say this of the experiments I have made of laurel water upon animals, it has not been near so quick. I have injected laurel water directly into the blood of dogs, and they have not died. I have thrown laurel water, with a precaution, into the stomach, and it never produced so quick an effect with me as described by those gentlemen.

Q. But you admit that laurel water would have produced symptoms such as have been described?

A. I can conceive it might.

Mr. Newnham. Would not an apoplexy or epilepsy, if it had seized Sir Theodosius Boughton at this time, though he had taken no physic at all, have produced similar symptoms too?

A. Certainly.

Q. Where a father has died of apoplexy is that not understood, in some measure, to be constitutional?

A. There is no disease whatever that becomes constitutional but what can be given to a child. There is no disease which is acquired that can be given to a child; but whatever is constitutional in the father the father has a power of giving that to the children, by which means it becomes what is called hereditary. There is no such thing as an hereditary disease, but there is an hereditary disposition for a disease.

Mr. Howorth. Do you call apoplexy constitutional?

A. We see most diseases are constitutional. The smallpox is constitutional, though it requires an immediate cause to produce the effects. The venereal disease is hereditary. I conceive apoplexy as much constitutional as any disease whatever.

Q. Is apoplexy likely to attack a thin young man, who had been in a course of taking cooling medicines before?

A. Not so likely, surely, as another man; but I have, in my account of dissections, two young women dying of apoplexies.

Q. But in such an habit of body, particularly attended with the circumstance of having taken cooling medicines, it was very unlikely to happen?

A. I do not know the nature of medicines so well as to know that it would hinder an apoplexy from taking effect.

Court. Give me your opinion in the best manner you can, one way or the other, whether, upon the whole of the symptoms described, the death proceeded from that medicine, or any other cause?

A. I do not mean to equivocate, but when I tell the sentiments of my own mind, what I feel at the time, I can give nothing decisive.

The judge (the Hon. Francis Buller) in summing up the evidence, after stating that four medical witnesses were decided in attributing the death to the effects of laurel water, made the following comments on the testimony of Mr. Hunter: "For the prisoner, you have had one gentleman called, who is likewise of the faculty, and a very able man. I can hardly say what his opinion is, for he does not seem to have formed any opinion at all of the matter. He, at first, said he could not form an opinion whether the death was or was not occasioned by the poison, because he could conceive that it might be ascribed to other causes. I wished very much to have got a direct answer from Mr. Hunter, if I could, what upon the whole was the result of his attention and application to the subject, and what was his present opinion, but he says he can say nothing decisive. So that, upon this point, if you are to determine upon the evidence of the gentlemen who are skilled in the faculty only, you have the *very positive* opinion of four or five gentlemen of the faculty that the deceased died of poison. On the other side, you have what I really cannot myself call more than the *doubt* of another; for it is agreed by Mr. Hunter, that the laurel water would produce the symptoms which are described. He says an epilepsy or apoplexy would produce the same symptoms; but as to an apoplexy, it is not likely to attack so young and so thin a man as Sir Theodosius was; and as to an epilepsy, the other witnesses tell you, they don't think the symptoms which have been spoken of do show that Sir Theodosius had any epilepsy at the time."

The jury retired for about an hour, and then brought in a verdict of guilty, and Capt. Donellan was executed in a few days thereafter.*

It was, and still is, a prevailing opinion with several, that Sir Theodosius Boughton was not poisoned, and that Capt. Donellan was innocent. Mr. Dease notices this case, as "a melancholy and striking instance of the unhappy effects of popular prejudice, and the fatal consequences of medical ignorance."† Mr. Phillips, in his "Theory of Presumptive Proof," adduces it as an instance where a man was unwarrantably condemned on circumstantial evidence.‡

I cannot agree with either of these gentlemen, although I will readily allow that too much dependance was placed on the appearances found on dissection. Putrefaction was evidently too far advanced to render them a certain ground of testimony.

As a medical man, it might be inquired of Mr. Dease, whether the symptoms preceding this death have not been most strikingly and

* This abstract is taken from a folio pamphlet entitled "The trial of John Donellan for the wilful murder of Sir Theodosius Edward Allesley Boughton, bart., at the assize at Warwick, on Friday, March 30. 1781, before the Hon. Francis Buller, Esq., one of the justices of his majesty's court of King's Bench. The second edition. Taken in short-hand by Joseph Gurney." London, 1781.

† Dease, in Cooper's Tracts, p. 88.

I owe every apology to Dr. Male for incorrectly using his name in a previous edition. Dr. Gordon Smith kindly and truly explained the reason of my mistake in the London Medical Repository, vol. xxii. p. 521., and again in his work on Medical Evidence, p. 183.

‡ Appendix to his treatise on the law of evidence, p. 30.

astonishingl y verified, as *probably* originating from laurel water, by the subsequent investigations of chemists and physicians. Mr. Hunter, in his testimony, says, that he had never known laurel water to act so rapidly as the other medical witnesses described. He had injected it into the veins and into the stomach of animals, *but it never produced so quick an effect.* Who, I would ask, have subsequent experiments proved to be right on this point; Mr. Hunter or the other witnesses? Let the facts I have adduced in previous pages answer this question.

Again, Mr. Phillips and others object greatly, that the whole proof as to its being laurel water rested upon the comparison of the smell. Now I conceive this to be a very satisfactory circumstance. The medicine administered by Mr. Powell did not contain laurel water; while few, very few indeed, of the fluids in common use, possess a smell at all resembling that of bitter almonds. This property is peculiar — confined to a certain number of vegetable products, several of which, even at that day, were known to be deleterious.

Capt. D. had a still in his own room; there were laurels and bays in the garden (see Amos's testimony). This is a sufficient answer to Mr. Phillips' question, *where did the prisoner procure it?* Certainly, if there was an intention on the part of Capt. Donellan to use the laurel water for the purpose of poisoning, we have shown *how he could obtain it.**

Another circumstance has been stated of late years, which adds to the irresistible weight of testimony in this case. It was first pointed out to me by my friend, the Hon. Benj. F. Butler (now Attorney-General of the United States), in Colton's Lacon; and if this should be objected to as an anonymous or doubtful authority, it is confirmed by Burnett. The remarks in Lacon are as follows: —

" In the case of Donellan, who was executed for poisoning Sir T. Boughton with distilled laurel-water, some circumstances were elicited that would have weighed more strongly in the judgment of reflecting minds than any positive but single affidavit which might have been brought to contradict them. A still that had been recently used was discovered on the premises. Donellan was so bad a chemist, that on being asked for what purpose he had procured this machine, he replied, " that he used it to make lime water to kill the fleas;" not knowing that lime water could only be made by saturating water with lime, and that a still never was and never can be applied to such a purpose. *But in his library there happened to be a single number of the Philosophical Transactions, and of this single number the leaves had been cut only in one place, and this place happened to contain an account of the mode of making laurel water by distillation.*" †

* The fact of Capt. Donellan's having a still is cautiously omitted in Mr. Phillips' statement of the case. Nor is this a solitary instance of omission; and in proof of this, I request any gentleman to compare the abstract I have given (and which is taken almost verbatim from the trial), with that presented by Mr. Phillips. His comments on the medical testimony are evidently founded on imperfect information concerning the subject in dispute.

† Burnett's Medical Botany, vol. ii. Prunus lauro-cerasus. It is of no use to quote the volume and page of Lacon, as the editions are so numerous. It is No. 576. in the edition I have used.

As to the opinion of medical jurists, I will only adduce that of Christison. "For my part (says he) taking into account the general as well as medical circumstances of the case, I do not entertain a doubt of his guilt."* Sir Henry Halford, in 1833, uses this language: "Sir T. Boughton, who was poisoned by Capt. Donellan in 1780, with laurel water."† I shall have occasion hereafter to notice the regrets of John Hunter concerning his testimony.

The *oil of laurel* also acts as a violent poison.‡

Prunus padus. The essential oil of this contains, according to Schrader, 9·25 per cent. of hydrocyanic acid. Both its distilled water and essential oil are poisonous to animals, and even its fruit is injurious to them.

Prunus virginiana. (Wild cherry tree.) Its leaves are poisonous to certain animals, as calves; while its berries intoxicate birds. Dr. Morris, in his inaugural dissertation at Philadelphia in 1802, mentions that he destroyed kittens, &c. with its distilled water. Mr. Proctor detected the hydrocyanic acid in its bark.§

Prunus nigra. (Black cherry tree.) Its bark, infused in cyder, proved poisonous to several persons in this State some years since.

Prunus caroliniana. (Wild orange.) Elliot remarks that its leaves are very poisonous, and frequently in the spring of the year destroy cattle that are tempted to browse freely on them.‖

Amygdalus communis. (Bitter almonds.) These, when pounded and taken in sufficient quantity, prove highly deleterious, as has been proved by numerous experimenters.

The essential oil of bitter almonds acts violently. One drop applied to the tongue of a cat instantly excited convulsions, to which loss of motion and insensibility succeeded; the respiration became hurried, and death followed at the end of five minutes. So also when two drops were injected into the rectum. While performing these experiments, Mr. Brodie touched his tongue with a probe that had been dipped into the oil. He instantly experienced an uneasy sensation in the epigastric region, and a weakness of the limbs. The application of the oil to the cellular texture was equally, but not instantaneously, destructive.¶

* Christison on Poisons, p. 685.

† Halford's Essays, p. 158. I cannot but express my surprise that Dr. Williams (Manual, p. 13.) should say that "Donellan innocently suffered for the death of Boughton." His *innocence* is out of the question.

‡ It is now generally conceded, I believe, that the *Laurus* genus contains no prussic acid. Hancock, London Medical Gazette. Burnett's Medical Botany. If there are any poets among my readers, I congratulate them on this.

§ Barton's Materia Medica, part 1. p. 11; part 2. p. 22. Philadelphia Journal of Pharmacy, vol. vi. p. 11.

‖ Elliot's Botany, vol. i. p. 540. North American Archives, vol. ii. p. 31.

¶ Brodie's experiments on vegetable poisons, in Philosophical Transactions. According to Robiquet, the essential oil of almonds does not, like common essential oils, exist ready formed in the almond, but is only produced when the almond pulp comes in contact with water. It contains hydrocyanic acid in the proportion of from 8 to 14 per cent.

This substance has peculiarly occupied the attention of chemists. Vogel and Ro-

Two cases are said to have occurred at Montpelier, of children poisoned by the use of bitter almonds. In one, the person had eaten them after they had been heated in a copper vessel; and in the other, the child had been made to drink the milk, as a remedy against worms.*

Mertzdorff relates of an hypochondriac, aged forty-eight years, who swallowed two drachms of the oil of bitter almonds:—In a few minutes his servant, whom he called to his bedside, observed that his features became spasmodically contracted, and his eyes fixed. Insensibility soon followed, with stertorous breathing, and the breath smelling strongly of bitter almonds. Death followed in thirty minutes from taking the oil. The body was examined in 29 hours afterwards; and although the temperature had never exceeded 40° F., putrefaction was far advanced. The body was inflated with gas, and the skin covered with bluish green stains. Pure blood flowed from the mouth and nose, and the whole body had the odour of almonds. The jaws were firmly fixed. The stomach and intestines were red, and checkered with bloody streaks, and in the former were six ounces of a brownish and highly odorous fluid. The liver, spleen, and kidneys were gorged with violet-coloured fluid blood. The gall bladder contained a violet-coloured bile, and all the muscles had a similar tint. The lungs and heart were natural, but the latter was empty. The brain was every where tinged with the same sort of blood.†

Amygdalus persica. The kernels of the peach are very often distilled for the purpose of impregnating *eau de noyau;* and if too strongly charged with the oil, it must prove noxious. The late Duke Charles of Lorraine nearly lost his life by swallowing a small quantity of this liquor ‡, and fatal cases are said to have lately occurred in England from the same cause.

Two fatal cases of poisoning with the peach blossom are quoted from Coullon. The symptoms were violent purging, convulsions, and stupor. These are rather the symptoms of a narcotico-acrid.§

An oil is obtained by distilling its leaves or shoots.

Sorbus aucuparia. Mr. Grassmann, of St. Petersburgh, has ascertained that the flowers and bark contain more or less of the peculiar essential oil which is procured from all the above vegetables.‖

Carbazotic acid. This substance, procured by the action of nitric acid on indigo, is deemed a narcotic poison from the result of experiments

biquet. Brande's Journal, vol. xiii. p. 404; vol. xv. p. 155. Annals of Philosophy, vol. xi. p. 426.

Wohler and Liebig, London and Edinburgh Philosophical Magazine, vol. iii. p. 389; vol. iv. p. 70. Silliman's Journal, vol. xxvi. p. 262. Robiquet, North American Medical and Surgical Journal, vol. x. p. 430. Goppert, Edinburgh Medical and Surgical Journal, vol. xxxv. p. 455.

* London Medical and Physical Journal, vol. xi. p. 92. A probable case of death from eating bitter almonds is given by Mr. Kennedy, ibid. vol. lvii. p. 150.

† Edinburgh Medical and Surgical Journal, vol. xxii. p. 232. A case of suicide with the oil occurred in England in December, 1831.

‡ London Medical Repository, vol. iv. p. 15.

§ Christison, p. 687. ‖ Ibid. p. 688.

on animals, by Professor Rapp of Tulingen. Its solution in doses of from ten to thirty grains destroyed them rapidly, with convulsions and insensibility. No inflammation was seen after death, but many of the textures, as the lungs, conjunctiva, cellular tissue, &c. were dyed of a yellow colour.*

Nitrogen is classified by Orfila among the narcotic poisons. Animals when plunged into it experience a difficulty of respiration, which gradually becomes more rapid and weaker, but without any lesion of the nervous functions. Life is however readily restored by exposure to the atmosphere.

In Mr. Broughton's experiments on animals, death followed almost instantaneously from immersion into it. The right ventricle was distended with black blood, and the vessels of the brain, pleura, and lungs were collapsed.

Carbonic oxide. This forms a part, as we have already stated, of the deleterious gases arising from burning charcoal. There are, however, one or two facts on record of its influence when prepared in the laboratory.

Sir Humphry Davy inspired it, in a state of mixture with about one fourth of common air. The effect was a temporary loss of sensation, which was succeeded by giddiness, sickness, acute pains in different parts of the body, and extreme debility. Some days elapsed before he entirely recovered.†

Mr. Witter of Dublin, desirous of fully ascertaining the effects of carbonic oxide, when freely inhaled, took three or four full inspirations of it. The consequence was an inconceivably sudden deprivation of sense and volition. He fell supine and motionless on the floor, and continued in a state of total insensibility for almost half an hour, and apparently lifeless, as pulsation was nearly extinct. Various restorative means were used without success, but on the introduction of oxygen gas into the lungs, he recovered with convulsive agitation, excessive headache, and quick irregular pulsation; and for some time after mental recovery total blindness, extreme sickness, and vertigo were experienced. An unconquerable propensity to sleep succeeded, after which he gradually recovered.‡

The following curious fact has also been considered as illustrative of the effects of the carbonic oxide. I quote it for its singularity, although I am not satisfied but that other causes may have aided in producing the disease.

"The workmen of a cotton manufactory at Argues, near Dieppe, were attacked with nausea, vertigo, and convulsions, which so much affected their imaginations that they thought they saw spectres and other fantastic objects flying at them, and seizing them by the throat. Mr. Nicolle, an apothecary at Dieppe, published a memoir on this disease, and he attributes it to the gaseous oxide of carbon, resulting

* Christison, p. 690. Professor Hunefeld would seem to deny its poisonous qualities. It did not, with him, prove noxious. (Edinburgh Medical and Surgical Journal, vol. xxxvi. p. 460.)

† Davy's Elements of Chemical Philosophy, p. 172., American edition.

‡ Eclectic Repertory, vol. v. p. 540.

from the decomposition of the oil, by the heat of a cast-iron stove, on which they were in the habit of placing their vessels of that fluid. This gaseous product being lighter than the atmosphere, would ascend; and in this way he accounts for the fact that the persons in the upper stories of the manufactory were first affected, while those on the ground floor were generally preserved from it."*

Carburetted hydrogen. Sir Humphry, in attempting to breathe a mixture of air and carburetted hydrogen, was attacked with giddiness, headache, and weakness of the limbs. When he inspired it pure, the first attempt caused numbness in the muscles of the chest; the second induced an overpowering sense of oppression in the breast, and insensibility to external objects; while the third seemed to remove all sensation, and the mouth piece dropped out of his hand. On again becoming sensible, which happened in less than a minute, he continued to suffer for some time from a feeling of impending suffocation, extreme exhaustion, and great feebleness of the pulse.† In Mr. Broughton's experiments with this gas on animals, the effects were extremely rapid, causing one or two gasps, stupor, and death. On dissection, black blood was found in the right ventricle, while the vessels of the brain were nearly empty and the lungs collapsed.‡

Not long since, at Paris, in consequence of a leak in a pipe that carried the *gas lights*, several individuals were attacked during the night with stupor; and if one had not been awakened by the smell and roused the rest, probably all would have perished. One person was comatose and occasionally convulsed, with froth issuing from his mouth, vomiting, stertorous breathing, and dilated pupils. Bleeding relieved him somewhat, but he died in six hours from the time of the alarm. On dissection, the vessels of the brain were found much gorged, the blood in the heart coagulated, one of the lungs congested, and its bronchial tube blocked up by a kidney bean.§ The cause of his death is therefore doubtful, but there can be no doubt that an atmosphere of it in a close room and at night must be deleterious.

Nitrous oxide gas. Occasionally this gas has proved injurious to persons breathing it, and there is every probability of its being hurtful to such as have weak lungs. Chemists are hence unwilling to make it the subject of exhibition at the present day.

Cyanogen gas. Coullon found this to be very poisonous to the smaller animals, and the symptoms were coma, and more rarely convulsions. Hunefeld confirms these results. In the rabbit, slight convulsions, dilated pupils, and coma followed, with death in five or six minutes. Drs. Turner and Christison also found it very noxious to vegetables.‖

Oxygen gas. When breathed in a state of purity, Mr. Broughton

* Silliman's Journal, vol. vi. p. 199.
† Christison, p. 703., from Davy's Researches.
‡ Brande's Journal, N.S., vol. vii. p. 14.
§ Annales D'Hygiène, vol. iii. p. 457.; Christison, p. 504.
‖ Christison, p. 715.

found that animals lived longer in it than in an equal quantity of atmospheric air; but if the experiment was continued for any length of time, hurried respiration and panting came on, then debility, slow inspirations, and insensibility. Examined in this state, the diaphragm was still, but the heart in action, and the peristaltic motion of the viscera maintained. The blood both in the veins and arteries was of a bright scarlet colour. From these experiments Mr. Broughton is induced to rank oxygen among the sedative poisons. *

Hydrogen gas. It is doubted by many whether this should be deemed a poison. Sparrows and kittens immersed in an atmosphere of it, however, died in half a minute; and Mr. Broughton found the right ventricle distended with black blood, and the brain and lungs collapsed. Cardone's experiments on himself would also seem to render its dangerous nature probable.†

* Brande's Journal, *ut antea*.

† Brande's Journal, vol. xx. p. 394.

CHAPTER XXI.

NARCOTICO-ACRID POISONS.

Atropa belladonna — effects; atropine. Datura stramonium, and other species — effects. Nicotiana tabacum — effects; juice; oil. Conium maculatum. Cicuta virosa, maculata. Œnanthe crocata. Œthusa cynapium. Chærophyllum sylvestre. Sium latifolium. Aconitum napellus, and other species. Helleborus niger. Veratrum album, and other species. Colchicum autumnale. Digitalis purpurea. Scilla maritima. Ipecacuanha. Ruta graveolens. Anagallis arvensis. Aristolochia clematitis. Nerium oleander. Cerbera tanghin, and other species. Apocynum. Asclepias. Cynanchum. Cissus. Mercurialis perennis — treatment. Brucea antidysenterica. Strychnos nux vomica — effects — appearances on dissection; strychnine — tests. Strychnos Ignatii — Tieuté. Upas antiar. Ticunas. Woorara. Curare. Camphor. Cocculus indicus; picrotoxine. Coriaria myrtifolia — treatment. Poisonous mushrooms — symptoms — appearances on dissection — treatment. Ergot. Spurred maize. Diseased wheat. Darnel. Lathyrus cicera. Ervum ervilia. Cytisus laburnum. Alcohol — symptoms — appearances on dissection — treatment. Sulphuric ether. Nitric ether. Empyreumatic oils; Dippel's oil; oil of tar. Creosote. Cyanuret of iodine — of bromine — of potassium. Unarranged vegetable poisons. Compound poisoning.

"NARCOTICO-ACRID poisons include those which possess a double action, the one local and irritating, like that of the irritants; the other remote, and consisting of an impression on the nervous system. Sometimes they cause narcotism, which is generally of a comatose nature, often attended with delirium; but in one very singular group, there is neither insensibility nor delirium, but merely violent spasms. At other times, they excite inflammation where they are applied. This effect, however, is by no means constant. Those which inflame the tissues where they are applied rarely occasion death in this manner. Some of them may produce very violent local symptoms, but they generally prove fatal through their operation on the nervous system."*

Orfila divides this class of poisons into six groups, which may be stated here, although it must be added that they pass insensibly into each other, and therefore cannot sometimes be well distinguished.

1. Those whose principal symptom is delirium, as atropa, datura, stramonium, &c.

2. Those whose principal symptom is tetanus, as nux vomica, strychnine, &c.

3. Those which also excite convulsions, but at the same time

* Christison, p. 717.

cause impaired sensibility and sleep, as cocculus indicus, camphor, upas antiar.

4. Poisonous mushrooms.
5. Poisonous grain.
6. Alcohol, ether, and empyreumatic oils.

The individual substances to be noticed are the following: —

VEGETABLES.
Solaneæ,
Atropa,
Datura,
Nicotiana.
Umbelliferæ,
Conium,
Cicuta,
Œnanthe,
Æthusa,
Chærophyllum,
Sium.
Ranunculaceæ,
Aconitum,
Helleborus.
Melanthaceæ,
Veratrum,
Colchicum.
Scrophularineæ,
Digitalis.
Asphodeleæ,
Scilla.
Rubiaceæ,
Cephaelis,
Psycothria.
Rutaceæ,
Ruta.
Primulaceæ,
Anagallis.
Aristolochiæ,
Aristolochia.
Apocyneæ,
Nerium,
Cerbera,
Apocynum,
Strychnos.
Asclepiadeæ,
Asclepias,
Cynanchum.
Ampelideæ,
Cissus.
Euphorbiaceæ,
Mercurialis.
Terebinthaceæ,
Brucea.
Artocarpeæ,
Antiaris.
Laurineæ,
Laurus.
Menispermaceæ,
Cocculus.
Coriariæ,
Coriaria.
Fungi,
Agaricus,
Sclerotium.
Gramineæ,
Lolium.
Leguminosæ,
Lathyrus,
Ervum,
Cytisus.

Alcohol.
Sulphuric ether,
Nitric ether,
Empyreumatic oils,
Creosote,
Cyanuret of iodine, &c.

Atropa belladonna, L. (Deadly night shade.) The berries of this plant are highly noxious. A detachment of several hundred French soldiers, having halted at a short distance from Pirna, near Dresden, were allured by the inviting appearance of the berries of the atropa, which grew in abundance in the neighbourhood. They accordingly ate freely of them, and 180 men were thus poisoned, many of whom died before professional assistance could be rendered, and the rest were long in recovering. The following were the symptoms as related by M. Gaultier de Claubry, the medical officer in attendance: Dilatation and immobility of the pupils; total insensibility of the eye to the presence of external objects, or very confused and indistinct vision; the conjunctiva turgid with purple-coloured blood; prominence of the eye, which in some appeared dull and heavy, in others bright and furious; great dryness of the lips, tongue, palate, and throat; deglutition difficult, in some cases nearly impossible; nausea, not followed by vomiting; sense of weakness, lypothymia, syncope; inability to stand upright; bending forward of the trunk of the body; continual movement of the hands and fingers; lively delirium, accompanied with a silly laugh; aphonia or inarticulate sounds uttered with difficulty; ineffectual inclination to intestinal evacuation; very gra-

dual return to health and reason, without any recollection of the preceding state.*

In many other cases related by authors, most of the prominent symptoms mentioned above have been noticed.† Delirium of the agreeable kind, and dilated and insensible pupil, are the most invariable symptoms. After these, the most frequent are a dryness of the throat, constant motion of the extremities, and locked jaw.‡ Blindness often remains for some time. In one case, where forty-four grains of the powdered plant were taken by mistake, it was succeeded, among other symptoms, with extreme redness of the whole external surface, exactly resembling that observed in scarlatina. Even the throat was of a deep red, and very painful and heated, and this sensation extended throughout the alimentary canal. Ineffectual attempts were made to evacuate the urine, which was red and bloody. It came away by drops. By soothing and antiphlogistic treatment, this dangerous condition was removed.§

It appears from a case related by Ray, that even the external application of the fresh leaf to the broken skin is not unattended with danger.‖ The dilatation of the pupil of the eye from the application of this substance is well known, and has been extensively applied in modern surgery.

The watery extract of belladonna, when administered to animals, produced vomiting, dilatation of the pupils, delirium, and in general, the same course of symptoms as in man. The stomach was sometimes ulcerated or red, and at other times sound. The lungs and heart are occasionally livid.

The root of this plant is also poisonous. Indeed Dr. Christison states, on the authority of Buchner, that it is the most active part of the plant. In one fatal case, where the individual died comatose twelve hours after eating the berries, an examination was made twelve hours after death. Putrefaction had commenced, the abdomen was swollen, the scrotum and penis distended with fœtid serum, the skin

* Orfila's Toxicology, vol. ii. p. 201. New England Journal, vol. iv. p. 92.

† Christison, p. 721. Sage saw fourteen children who had eaten of the berries. They could not swallow, and the pupils were immoveable. They became drunk and furious, leaping and running. The one who had taken most suffered under spasmodic twitchings, and discharged blood by the nose and anus, and vomited bloody and purulent matter. On recovering the power of deglutition, it was found that the whole roof of his mouth, his tonsils, and part of his tongue, were covered with apthæ. They all survived; but on going to school four days thereafter, some saw red, others not at all, and none were able to articulate a sound. Of this they gradually recovered. (Edinburgh Medical and Surgical Journal, vol. ix. p. 380.)

‡ Mr. Brumwell, in Medical Observations and Inquiries, vol. vi. p. 222. Mr. Smith of Forres (Scotland), London Medical and Physical Journal for April, 1827. Edinburgh Medical and Surgical Journal, vol. xxix. p. 452. from *Journale de Chimie Médicale*. Medico-Chirurgical Review, vol. xxvi. p. 528. Koestler in Burnett's Medical Botany, vol. i.

§ Jolly, from *Nouvelle Bibliotheque Medicale*, 1828, in Edinburgh Medical and Surgical Journal, vol. xxxi. p. 225.

‖ London Medical and Physical Journal, vol. xii. p. 134. A case in which all the usual effects of this substance were produced from a plaster composed of the extract and cerate, and applied to the wrist for psoriasis, is given in ibid. for April, 1827.

covered with dark vesicles, and the brain soft. The blood vessels of the head were gorged, and the blood every where fluid, and flowing from the mouth, nose, and eyes.*

Brandes discovered an alkaloid in this plant, which is styled *atropine*, and in which all the active properties reside. The vapour of it was so injurious, producing violent headache, pain in the back, giddiness, and nausea, that he was obliged to discontinue his experiments. On tasting a small quantity of the sulphate of atropine, shaking of the limbs and oppression of breathing were induced, and even the vapour of this and the other salts was noxious. Six drops of the hydrate of atropine killed a bird, producing previously dilatation of the pupil and spasms, succeeded by stupor. On dissection, the head and lungs were seen gorged with black blood.†

Runge has ascertained that alkaline solutions and lime water so destroy or change the properties of atropine, as to remove its power of dilating the pupil.‡

In a fatal case, parts of the plant will undoubtedly be found in the stomach or intestinal canal. These should be examined for atropine, and it has been suggested to boil down the stomach or intestines, and evaporate the aqueous solution. The extract may be applied to the eye to ascertain whether it produces its characteristic symptoms.§

Datura stramonium, L. (Thorn apple. Jamestown weed.) Its native country doubtful, but naturalized in every part of the United States. (Bigelow.) This plant has extended itself rapidly over various parts of our country, and is certainly one of the most offensive.‖ There are numerous cases on record of the poisonous effects of the leaves and seeds of it.

Dr. Barton states, that in 1765, when some of the British troops under Sir John Sinclair were stationed in the vicinity of Elizabethtown

* Case by Gmelin, Christison, p. 724.

† Annals of Philosophy, N.S., vol. i. p. 270. Burnett's Medical Botany. Geiger's experiments on it. London Medical Quarterly Review, vol. i. p. 215. For an analysis of the atropa-belladonna by Vauquelin, see Philosophical Magazine, vol. xxxvi. p. 144.

‡ Brande's Journal, vol. xviii. p. 400.

§ Burnett's Medical Botany.

‖ Dr. Barton remarks, that it grows in great abundance about Vincennes, and was introduced there about the year 1785. "The plant," he adds, "is cut down by legal order, for the inhabitants assert that they were never affected with remitting fevers until the datura was introduced among them. The effluvia arising from the leaves, stem, and flowers are supposed to have given origin to the disease." Barton's Medical and Physical Journal, vol. i. p. 145. This is evidently laying too much on the plant, but its effluvia are certainly noxious.

Mr. Heckewelder, however, the Moravian missionary, in a letter to Dr. Samuel Cooper, says that he once lay in camp below the falls of Ohio, with General Putnam and others for several days. The ground was covered with stramonium in full blossom; its strong odour caused headache, and in some days he and General Putnam had each a fever. The fogs of the river might have caused this; yet as he was accustomed to them and had never been affected, he ascribes it to the scent of the plant. Dr. Cooper's Dissertation on Stramonium, in Caldwell's Medical Theses, vol. i. p. 182.

(New Jersey), three of the soldiers collected a quantity of the plant (which they mistook for lamb's quarters, *Chenopodium album*), and dressed and ate it. One of them became furious, and ran about like a madman. The second was seized with genuine tetanus, and died. *

Dr. Rush saw a child between three and four years old, who had swallowed some of the seeds. A violent fever, delirium, tremors in the limbs, and a general eruption on the skin, were present, accompanied with considerable swelling, itching, and inflammation. Repeated emetics and purgatives, however, alleviated the disease, and brought away some of the seeds. Dilatation of the pupils and blindness still remained, but were obviated by a continuance of the previous remedies, and she recovered her health. †

In the Transactions of the College of Physicians of Philadelphia, Dr. Moses Bartram relates, that he was called to a child suddenly seized with idiocy, without fever. The pulse was natural, tongue clear, and no internal function disturbed except those of the brain. The child appeared very happy, talking, laughing, and in constant motion, yet so weak that it could not stand or walk without tottering. He exhibited an emetic, and the seeds of the thorn apple were rejected, after which the child recovered. ‡

* Barton's Medical and Physical Journal, vol. i. p. 146.

† Transactions of the American Philosophical Society, vol. i. p. 384.

‡ Other cases are related by *Dr. Fowler* (Medical Commentaries, vol. v. p. 161.) Here the face, eyes, and abdomen were swelled. The other symptoms were, however, similar to those mentioned in the text. By *Dr. Thomas Young* (Edinburgh Medical and Surgical Journal, vol. xv. p. 154.) By *M. Sarlandiere* (Journal of Foreign Science, vol. i. p. 463.) A fatal case by B. Granger, in a child two and a half years old. Convulsions and locked jaw, with insensibility, were among the latest symptoms. (Edinburgh Medical and Surgical Journal, vol. xvi. p. 155.) Another by Mr. Duffin. (London Medical Gazette, vol. xv. p. 194.) Several cases are quoted by Orfila from various authors. A remarkable case, by Orfila himself, is given in the London Medical Repository, vol. xiii. p. 259., where it produced most of the symptoms of poisoning, but finally was the means of curing an intense and long-continued headache. A very interesting historical account of this plant by Mr. Royston, is contained in the London Medical and Physical Journal, vol. xxv. and xxvi.

American Cases.

By Dr. Brown (New York Medical Repository, vol. v. p. 36.) A scarlet efflorescence was here present, and the pupils were dilated.

Two cases by Dr. De Witt (ib. vol. ii. p. 27.) In one instance the poison produced pain, and during recovery there were numerous vesications on the skin.

Dr. Beardsley of Ohio, five persons with the usual symptoms. Dr. Drake's Tables, note, p. 69.

By Dr. C. D. Meibs. Here also, in a child, there was a very general efflorescence, (small petechiæ). (North American Medical and Surgical Journal, vol. iii. p. 33.)

By Dr. R. E. Griffith, symptoms similar; but three days after eating the seeds, and when the patient was relieved from the immediate symptoms, a general eruption resembling measles broke out and continued twelve hours. (American Journal of Medical Sciences, vol. v. p. 251.)

By Dr. Slavens of Kentucky, a case of attempted poisoning by a parent, first with

Orfila enumerates the following list of symptoms as produced by this plant: "Intoxication, delirium, loss of sense, drowsiness, a sort of madness and fury — loss of memory, sometimes transitory, and sometimes permanent — convulsions, paralysis of the limbs, cold sweats, and excessive thirst and tremblings."

Dr. Drake, of Cincinnati, mentions that it is not uncommon in the Western States to observe hemiplegia, with spasmodic affections of the opposite side, in children who have eaten the seeds or flowers.*

The stramonium was some years since used to a considerable extent in asthma, and there is reason to believe that in some cases it proved deleterious.†

The tincture and decoction of this substance produce effects resembling those already described. Half a wine-glassfull of the former, after the common symptoms, caused violent convulsions, lock-jaw, and stertorous breathing.‡ The extract used as a suppository, and introduced into the rectum, induced many of the symptoms of delirium tremens.§ Even bruising the leaves in a mortar has caused dilated pupil and irritation of the skin.‖

In two fatal cases of children less than three years old, an examination was made. In one, a large quantity of the seeds was found in the intestines; but no mention is made of any marks of irritation in them, or in the stomach. The bladder was distended, and the vessels of the pia mater loaded. In the other, where death followed in twenty-four hours, the brain was natural — the blood semifluid throughout the body — the stomach and intestines healthy — the bladder distended — the larynx and œsophagus slight red, and the rima glottidis thickened and very turgid.¶

The stomach of animals poisoned with the watery extract, by introduction into that organ was found inflamed, and blood was extravasated between the mucous coat and the one subjacent to it. The lungs were of a deep red, and distended with black and fluid blood.**

Brandes has discovered an alkaline principle in this plant, called

the seeds and then with the decoction. Great torpor of the bowels ensued from the repeated doses. (Transylvania Journal, vol. iv. p. 172.)

By Dr. Williams of Ohio, a child delirious and deaf from merely chewing, not swallowing, the seeds. (Western Journal of Medical and Physical Sciences, vol. viii. p. 165.)

Anonymous cases in Boston Medical and Surgical Journal, vol. ix. p. 10.

* Drake's Tables, note, p. 69.

† See on this point Dr. Bree's Letter on Stramonium, in New-England Journal, vol. i. p. 411.

‡ Dr. Williams, in New-England Journal, vol. xii. p. 253. Dr. Swaine, in Edinburgh Physical and Literary Essays, vol. ii. p. 272. Mr. Mash, in London Medical Gazette, vol. viii. p. 605.

§ Medico-Chirurgical Review, vol. vi. p. 493.

‖ Dr. Abel, in Medical Recorder, vol. xiv. p. 203. Very dangerous results have also been caused by applying stramonium ointment to an abraded surface. (North American Medical and Surgical Journal, vol. xi. p. 483, from *Journal de Chimie Med.*)

¶ Mr. Granger, in Edinburgh Medical and Surgical Journal, vol. xvi. p. 155. Mr. Duffin, in London Medical Gazette, vol. xv. p. 194.

** Orfila's Toxicology.

daturine. It is highly poisonous. One eighth of a grain was enough to poison a sparrow in three hours. It produces, when placed on the eye, long-continued dilatation of the pupil.* Dr. Simes gave four grains of muriate of daturine to a cat, at 10 P. M. It produced nausea and contractions of the muscles of the leg and neck, and the animal was found dead the next morning.†

The *Datura metel* L., *ferox* L., and *tatula* L., are equally poisonous. The seeds of the datura metel are used in Asia for their soporific and intoxicating qualities, and are made the instrument of unbounded libertinism.‡

The *Datura aborea*, L., is another species, that produces similar effects on the human system. Dr. Renton, of Madeira, relates several cases occurring in that island, from eating the seeds.§

Nicotiana tabacum, L. (Tobacco.) It is not necessary to multiply cases proving the poisonous nature of this subtance when taken *internally*. The death of Santeuil, a French poet, was caused by an inconsiderate person emptying the contents of a snuff-box into his wine, which, as soon as he had swallowed, excited violent vomiting and excessive pain, and he died in fourteen hours.‖ So also when the infusion or the smoke is administered in large quantities, as by a glyster, convulsions, sickness, and vomiting supervene, and death often is the result.¶

A female in London was persuaded by an empiric to use the infusion as a cure for worms. Soon after its exhibition as an enema, she was seized with violent convulsions, and died in fifteen minutes.** Another in Hamburgh took an enema, consisting of an ounce of tobacco, boiled in water, for fifteen minutes. In two minutes thereafter, she was seized with vomiting, violent convulsions, and stertorous breathing. Death ensued in three hours after taking it.††

Externally, the effects are no less striking. A man and his wife fomented their bodies with a watery infusion of tobacco, in order to remove the itch. Giddiness, headache, retching and vomiting, with diarrhœa, soon supervened. Thirst accompanied these, as also spasms,

* Brande's Journal, vol. xi. p. 205; Lancet, N. S., vol. xiv. p. 117.

† Philadelphia Journal of Pharmacy, vol. v. p. 118; Dr. Morries found the empyreumatic oil of stramonium poisonous to animals. (Edinburgh Medical and Surgical Journal, vol. xxxix. p. 382.)

‡ Edinburgh Medical and Surgical Journal, vol. vii. p. 97., and Mr. Royston's paper already quoted.

§ Edinburgh Medico-Chirurgical Transactions, vol. iii. p. 475.

‖ Orfila's Directions, p. 107. An individual swallowed two ounces of manufactured tobacco with an intention to destroy himself. It produced dilated and insensible pupils; cold extremities; scarcely perceptible pulse; cold, clammy sweats; stertorous breathing; spasms; jaws set. He was relieved by the stomach syringe and sinapisms. Dr. Guy Wright, in Ohio Medical Repository, vol. i. p. 28.

¶ See some remarks on this point in the Edinburgh Medical and Surgical Journal, vol. ix. p. 159. A case where the smoking of tobacco produced most of the symptoms of apoplexy, as stertor, insensibility of the pupil, deep livid countenance, and spasmodic contraction, is given in the same work, vol. xii. p. 11.

** North American Medical and Surgical Journal, vol. vi. p. 187.

†† Case by Dr. Grahl (from Hufeland's Journal), Edinburgh Medical and Surgical Journal, vol. xxxvi. p. 227; see also Burnett's Medical Botany, vol. i.

and the debility and oppression were great. They were, however, gradually relieved by judicious treatment. A liniment, prepared with the powder of tobacco and butter applied to the heads of children, labouring under tinea, caused vertigoes, violent vomitings and faintings, extreme perspiration, and a staggering walk.†

In a case where the expressed juice of tobacco, applied to the head of a boy for tinea capitis, proved fatal in three hours, the brain and viscera were found healthy, but the blood in the heart was fluid, with the exception of a coagulum in the right ventricle.‡ In the case related by Dr. Grahl, there was, two days after death, great lividity of the back, paleness of the lips, and flexibility of the joints. The omentum very red, without gorging of its vessels; the small and great intestines, both outside and inside, gorged and red, and in some parts of the mucous membrane extravasated bloody patches. The other abdominal viscera natural, but their vessels very empty of blood. The stomach natural, the lungs pale red, the heart empty of blood, and the brain very natural.§

Several experimenters have examined the effects of tobacco on animals. Fontana found that the insertion of the oil into wounds induced temporary paralysis, but not death.‖ Brodie used both the infusion and the oil. The former, when injected into the rectum of an animal, produced faintness, and early insensibility and death. It stopped the circulation of the heart, and caused syncope. The latter excited violent convulsions, frequent respiration, and death, occasioning this termination by destroying the functions of the brain.¶

The experiments of Orfila with snuff produced results generally similar to those we have now related, and they also show that the extract of the *nicotiana rustica* acts in the same manner as tobacco, but is less active.

Vauquelin, some years since, analysed tobacco, and found in it an acrid principle, which was styled *Nicotine*. Subsequent investigations by Posselt and Reimarus have shown that this substance is the essential oil of tobacco, which is solid at ordinary temperatures; and they succeeded in obtaining another principle, which they deem the true nicotine. This is volatile, extremely acrid, and capable of forming salts.** Half a grain of the hydrochlorate produced violent nervous symptoms, succeeded by insensibility for three hours, in an animal.††

Conium maculatum, L. (Hemlock.) Raving madness and epileptic

* Medical Commentaries, vol. xi. p. 327.

† Orfila's Toxicology vol. ii. p. 214.

‡ Case by Mr. Weston, from London Medical and Physical Journal, quoted in Coxe's Medical Museum, vol. iii., appendix, p. 177.

§ Edinburgh Medical and Surgical Journal, vol. xxxvi. p. 227.

‖ Medical Commentaries, vol. xii. p. 110; Philosophical Transactions, vol. lxx. p. 163; see also Dr. Morries's Experiments in Edinburgh Medical and Surgical Journal, vol. xxxix. p. 383.

¶ Eclectic Repertory, vol. ii. p. 274.

** Edinburgh Medical and Surgical Journal, vol. vi. p. 379; Christison, p. 728; see also a Memoir on Tobacco, by Dr. Conwell, in Philadelphia Journal of Pharmacy, vol. i. p. 104.

†† Philadelphia Journal of Pharmacy, vol. v. p. 201.

fits occurred to Mr. Ray, in the case of a woman who had eaten the roots of this plant.* Vertigo, convulsions, coma, and death, were the result to two soldiers at Waltham Abbey, in Essex, who had boiled it with their bacon for dinner.†

Some soldiers partook of broth into which hemlock had been put. All of them were shortly after seized with pains in the head and throat, and felt as if drunk; but the one who had eaten the most had lain down and gone to sleep. When first noticed he was insensible, respiring with great difficulty; his pulse small and slow, even to thirty pulsations in the minute; the extremities were cold, and the face bluish and distended with blood. An emetic was given without effect. He complained of being cold, but shortly after lost again the use of speech and sense, and died in three hours after taking the poison. On dissection, there were some red spots seen round the pylorus; the intestines were healthy, but all the vessels of the brain were gorged with blood; and, on opening the cranium, there flowed out blood sufficient to fill twice an ordinary chamber-pot.‡

Convulsions, furious delirium, and swellings of the face, appear thus to be among the leading symptoms from the use of this poison.

The juice and the extract, when properly prepared, produce similar effects on animals. Orfila has, however, shown, that the extract usually sold in the shops is inefficient and weak.§

In a case examined by Drs. Christison and Coindet, where a hypochondriacal old woman took two ounces of a strong infusion of hemlock in whiskey, early in the morning fasting, and where death followed in an hour after, being comatose and slightly convulsed, the vessels of the head were not turgid, but the blood was every where fluid.‖

Brandes has obtained a peculiar alkaloid from the juice of the leaves of this plant, which is variously called *conine*, *conia*, or *coniin*. Half a grain will kill a rabbit, with tetanic symptoms resembling those produced by strychnine.¶ Geiger, in further experiments, ascertained that the seeds, flowers, or fresh stems, yielded a volatile alkali, analogous to that in tobacco. *The dry plant is almost destitute of it.* Coniin, as obtained by Geiger, is irritating to the eyes, causes giddiness, and, indeed, is so highly poisonous, that one or two grains are sufficient to kill the largest animal.**

* Philosophical Transactions, vol. xix. p. 634.

† Ibid. vol. xliii. p. 18; case by Dr. Watson.

‡ Case by M. Haaf, quoted by Orfila; Toxicology, vol. ii. p. 242.

§ A drachm of the extract prepared by himself was sufficient to poison a dog, whereas an ounce, and even ten drachms, from several of the shops in Paris, produced no effect whatever. (Quarterly Journal of Foreign Medicine and Surgery, vol. i. p. 104.)

‖ Christison, p. 735.

¶ Brande's Journal, N. S., vol. iii. p. 227. Tests of this substance have been proposed by Giseke. (North American Medical and Surgical Journal, vol. vi. p. 421.) For Battley's and Bird's Experiments on Conium Maculatum, see American Journal of Medical Sciences, vol. ix. p. 506., and vol. xii. p. 260.

** British Association Report for 1831–2, p. 509; London Medical Quarterly Review, vol. i. p. 215; Researches on Conium, by Foderé (Medico-Chirurgical Review, vol. xxiii. p. 218); Philadelphia Journal of Pharmacy, vol. vii. p. 241.

Cicuta virosa, L. or *aquatica*. (Water hemlock.) This is a more violent poison than the preceding.

The following train of symptoms has been noticed:—Dazzling, obscurity of the sight, vertigo, headache, often acute and excruciating, a vacillating walk, anxiety of the præcordia, cardialgia, dryness of the throat, ardent thirst, eructatio, vomiting of greenish matter, frequent and interrupted respiration; tetanic contractions of the jaws, sometimes followed by lethargy, with coldness of the extremities; at other times with a furious delirium, or attacks resembling epilepsy. In one or two cases, a swelling of the face has been noticed. In a case where death followed, hiccup and fruitless efforts to vomit were present, with tetanic convulsions. The abdomen and face swelled after death, and there flowed a quantity of green froth from the mouth.*

The experiments of Wepfer prove how deadly this plant is to animals; and Linnæus, in his Tour to Lapland, has illustrated it in an impressive manner. At Tornea, hundreds of cattle were annually destroyed in the spring, without any assignable cause. The poison was said to be of so pestilential a nature, that though the animals were flayed before they were cold, yet, wherever their blood came in contact with the human body, it caused gangrenous spots and sores. Some, indeed, had lost their lives in this way. On examining the meadow into which they were first turned out to grass, he found in it a bog or marsh, in which the *Cicuta aquatica* grew in great abundance, and had evidently been plentifully cropped by the cattle in feeding.†

In three fatal cases the appearances on dissection were as follows:—Bluish red spots on the skin, pupils dilated, vessels of the conjunctiva gorged, lungs sound, but of a bluish red colour, and gorged with blood, as were also the vessels of the pleura. Blood in the right side of the heart. Brown spots on the mucous membrane of the stomach and small intestines, and these organs distended with gas. Epiglottis red, and much mucus in the trachea; and the vessels of the brain highly injected, as if they had died of apoplexy.‡

Cicuta maculata, L. (Snake weed. American hemlock, called wild carrot. Wild parsnip root. Mock eel root, in Virginia.) A native of this country. We have, unfortunately, several cases on record of death produced by the root of this plant§, and from an examination of these

* Orfila's Toxicology, vol. ii. p. 248., collected from Wepfer, Guersent, &c.

† Linnæus's Tour in Lapland, London edition, vol. i. p. 245; see also vol. ii. p. 136. 212. Cows eat it early in the spring, when its growth has just commenced; but as the summer advances its scent becomes stronger, and warns them to avoid it. It is remarkable, however, that goats devour it with impunity. (London Medical and Physical Journal, vol. xii. p. 368.)

‡ Medico-Chirurgical Review, vol. v. p. 505., from Journal Complementaire, February 1824.

§ New York Medical Repository, vol. xvii. p. 303; two cases by Dr. Ely, of Duchess county, in this State. New England Journal, vol. vii. p. 219; case by Dr. Hazeltine, of Massachusetts. Ibid. vol. iii. p. 334., by Dr. Stockbridge. Dr. Muhlenberg states in a letter, that it had killed several at Harmony (Pennsylvania), who had eaten it instead of angelica; Medical Repository, *ut antea*. Three cases by Dr. Greenway, of Virginia, under the name of *Cicuta venenosa*, in the Transactions of the American Philosophical Society, vol. iii. p. 234. A case by Dr. G. W. Wright;

the following appear as the effects:—Vomiting, pain in the bowels, tenesmus, and occasionally purging, convulsions, dilatation of the pupils, feeble pulse, and frothing at the mouth and nose, mixed with blood. When not convulsed, the patients lay in a deep sleep; the countenance is pale, and the extremities are cold. Several observers have noticed an astonishing mobility of the eyeballs and eyelashes, although the pupils are firmly and widely dilated. Death followr rapidly, and particularly in children; in two cases, within an hous after eating it.

In some instances it kills without producing pain or convulsions. The Indians, when tired of life, are said to poison themselves with its roots.*

One dissection has been made by Dr. Hazletine. The limbs were more flexible than is usual. The stomach was inflated, and contained about three gills of a mucous, greenish fluid, on the surface of which was seen a part of the masticated root. There were no appearances of inflammation.

Œnanthe crocata, L. (Hemlock dropwort. Dead tongue.) Several cases are on record of the poisonous effects of this plant. A citizen of the Hague ate, with one of his friends, some of its roots. In a short time they both felt a great heat in the stomach, which was followed by alienation of mind, vertigo, cardialgia, nausea, and diarrhœa. One of them had violent convulsions, the other bled at the nose; and the one who had eaten the most died at the end of two hours, and the other at the end of three.†

Eleven French prisoners, walking about the town of Pembroke, gathered and ate by mistake a small quantity of this plant with bread and butter. One of them was shortly after seized with convulsions, and died in spite of every effort to save him. The others were attacked in a similar manner, of whom one died, and the others were relieved by forcing down an emetic. None experienced any heat at the stomach.‡

M. Charles visited a family who had eaten the roots of the œnanthe A sensation of burning was present in the stomach, and small rose-coloured spots appeared successively in different parts of the body. The abdomen, in one case, was greatly swollen. Several soldiers are also said to have died from eating them. The previous symptoms were nausea, vertigo, vomiting, and violent convulsions. Death ensued in less than an hour after using the poison. On dissection, the lungs were found distended, and their vessels full of black and dissolved

Ohio Medical Repository, vol. i. p. 51. Cases in Boston Medical and Surgical Journal, vol. ix. p. 12., and vol. x. p. 107; see also Bigelow's Medical Botany, vol. i. p. 129. There is scarcely a spring that fatal cases from eating it through mistake are not mentioned in our newspapers.

* Barton's Essays towards a Materia Medica, part 1. p. 17.

† Stalpart, vol. i. p. 182. Our author quotes cases from Smetius, Roeslerus, and Timæus, in which the root produced vertigo and violent delirium, and in some instances difficult respiration and hiccup.

‡ *Howell*, in Philosophical Transactions, vol. xliv. p. 227., with the remarks of Mr. Watson.

blood; the bronchiæ, trachea, and mouth contained a frothy and whitish fluid; the stomach was contracted and inflamed in its extremity and lesser curvature—its coats were thickened; the intestines were puffed up, and their vessels injected. The derangements were precisely similar in all the cases; and the body of one, though preserved four days, exhibited no sign of putrefaction.*

"This seems (says Dr. Christison) to be the most energetic of the umbelliferous vegetables. In none of the fatal cases was life prolonged beyond three hours and a half; and, in several, death took place within an hour. One man was killed by a single spoonful of the juice of the root."

Œnanthe fistulosa, L., has also frequently proved poisonous.

Æthusa cynapium, L. (Common fool's parsley.) This plant has been the cause of injury from its being mistaken for parsley. Orfila gives the following as distinctive characters:—1. The leaves of the fool's parsley are of a blackish green on the upper side, and shining. 2. They have no smell without being bruised, but they give out a nauseous smell when rubbed between the fingers; parsley, on the contrary, presents an agreeable odour. 3. Its root is smaller than that of parsley, and dies every year in autumn. Its effects are, heat in the throat, pain, cramps in the stomach, swelling of the body, and difficult respiration; drowsiness and starting: delirium is occasionally present. The symptoms are more violent if vomiting does not occur.†

Riviere examined a body poisoned by it. The tongue was black; a brownish serosity was found in the stomach, and the liver was hard and of a yellow colour.

Dr. Ficinus, of Dresden, has discovered an alkaloid in this plant, which is called *cynapia*, and by others *cynapin*.‡

Chærophyllum sylvestre, L. (Wild chervil.) The root of this plant has produced delirium, profound sleep, numbness, and suffocation.

Sium latifolium, L. (Procumbent water parsnip), a native of the United States. This has also caused violent delirium, on eating the root in August; before that, it is not deemed noxious. Dangerous mistakes have been made from mistaking it for water-cresses, among which it grows. When not in flower, they are much alike. The leaves of the parsnip are toothed at their edges; those of the other, undulated.§

* Duval, quoted by Orfila; Toxicology, vol. ii. p. 67. Additional cases are related by Dr. Vaughan, in Philosophical Transactions, vol. xx. p. 84; by Dr. Watson, ibid., vol. l. p. 856; and by Dr. Pulteney, ibid, vol. lxii. p. 469; by Dr. Graves, Medical Facts and Observations, vol. vii. p. 308; by Drs. Bry and Reveille-Parise (Journal Général), London Medical Repository, vol. xix. p. 434: in several of these death followed in three or four hours. By Mr. Froysell, Lancet, N. S., vol. xiii. p. 860; by Mr. Houlston, in his Observations on Poisons, p. 40.

† Orfila's Toxicology, vol. ii. p. 250; cases by Mr. Stevenson, in London Medical and Physical Journal, vol. xiv. p. 425; Dr. Buckhave, in Medical Commentaries, vol. xiv. p. 37; Mr. Lowe, in Burnett's Medical Botany, vol. i.

‡ Philosophical Magazine and Annals, vol. ii. p. 392; British Associati n Report for 1831–2, p. 510.

§ Brande's Journal, N. S., vol. vi. p. 427.

The two following plants belong to the natural order of the *Ranunculaceæ*, which are usually acrid in their properties; but Dr. Christison observes that they possess distinctly the characters of the Narcotico-acrids, and I therefore place them in this class.

Aconitum napellus, L. (Monkshood, wolfsbane, aconite.) Mr. Bacon, a surgeon, was called to visit a man named John Crumpler, who, at 8 P. M., had eaten some salad in which, by mistake, a certain quantity of aconite had been put. The patient immediately felt a burning heat in the tongue and gums, and an irritation in the cheek. This tingling sensation extended over the whole body, accompanied with twitchings. When Mr. Bacon saw him, his eyes and teeth were fixed; his hands, feet, and forehead cold, and covered with a cold sweat. No pulse could be perceived, and his breath was so short as scarcely to be distinguishable. Oil and carduus tea were immediately administered, which induced vomiting, but the symptoms still remained aggravated. Ammonia was now given, when vomiting again supervened, accompanied with purging. His symptoms now improved, although the pulse was still interrupted and irregular; and he gradually recovered. *

Mathiolus states, that the root of this plant was administered to four highwaymen. Two of them, after having experienced the most violent pains, were saved by appropriate means; the other two died, one of whom, a few hours after the administration, became an idiot; the face was covered with cold sweat; asphyxia, spasms, and syncope took place; he passed involuntary stools, vomited bilious and livid matter; his body swelled, and he died apoplectic.

Willis relates that a man died mad, within a very short time after eating some salad in which there were some of the fresh leaves of the Aconitum napellus. Even its juice introduced into a small wound made into the thumb, has been known to give rise to pains in the fingers and arms, cardialgia, lipothymia, agitation, and finally copious suppuration, and gangrene. †

A family near Lille were poisoned by this plant, in consequence of a tincture of its roots being mistaken for that of a species of lovage. The usual symptoms soon followed, with swelling of the face, vomiting, and purging. Two individuals died, and the only appearance of note was great redness of the inner membrane of the stomach and small intestines. ‡ In some other cases observed by Pallas, the throat and rectum were also red; the lungs dense, dark, and gorged; and the cerebral vessels turgid. §

Effect on animals. Mr. Brodie injected an ounce of the juice of the leaves of aconite into the rectum of a cat. He soon voided it, and

* Philosophical Transactions, vol. xxxviii. p. 287. A fatal case, where convulsions followed the early symptoms, and where the aconite was mistaken for horse-radish, is given by Dr. G. Smith, Forensic Medicine, p. 169., 2d edition

† Orfila's Toxicology, vol. ii. p. 56. Mr. Brodie states, that if a small quantity of the leaf of aconite be chewed, it occasions a remarkable sense of numbness of the lips and gums, which does not subside for two or three hours.

‡ Edinburgh Medical and Surgical Journal, vol. xxviii. p. 452., from *Journal de Chimie Médicale.*

§ Christison, p. 741.

then stood motionless for some minutes. At the end of nine minutes, he retched and vomited, and then attempted to walk, but faltered and fell at every step, as if from giddiness. At the end of thirteen minutes, he lay motionless, except some slight convulsive actions of the limbs; and in forty-seven minutes from the time of the injection, he was dead.* Orfila gave the freshly prepared watery extract to dogs, with similar effects. The posterior extremities were entirely paralyzed, and great pain seemed to be present. When, however, he used the extract purchased in the apothecaries' shops, it was slow in its operation, and required large doses to produce its usual effects.† The root of the plant also acts as a similar, and indeed more violent, poison to animals. Wepfer destroyed a wolf with two drachms of it; and Bonetus, a young dog with half a drachm.

When applied to the cellular texture of animals, by Brodie and Orfila, the symptoms were very similar to those previously described. On dissection, the stomach and brain were generally seen healthy, although in a few cases the mucous membrane of the former was slightly inflamed. In another instance, the rectum exhibited a few reddish spots.

The *Aconitum cammarum*, Jacq., is said to be no less deleterious than the napellus, and cases of death from its use are related by Mathiolus and Bonetus. In an instance mentioned by the former, vertigo and violent commotion of the brain preceded a general swelling of the body; the countenance became livid, and the patient died in horrible convulsions.

The *Aconitum anthora*, L. and *Aconitum lycoctonum*, L. (Wolfsbane), are also deemed poisonous.‡

The *Aconitum ferox*, Wall., however, a native of the mountain ranges of Northern India, would seem to excel all the other species in virulence. Dr. Wallich says it is the *Vishavish* or *Bish* of the natives; and he observes, that this dreadful root is equally poisonous when taken into the stomach or applied to wounds. It is in universal use for poisoning arrows. The Gorkhalese pretend that it is one of

* Brodie's Observations and experiments on the different modes in which death is produced by certain vegetable poisons, from Philosophical Transactions of 1811, in Eclectic Repertory, vol. ii. p. 273.

† Orfila's Toxicology, vol. ii. p. 52. This corresponds with the following fact, mentioned in a late journal: — Ten patients, threatened with phthisis, were received into the hospital at Pavia, and the extract of aconite was prescribed for them. They took this to the amount of *half a drachm at a dose*, without any inconvenience, and, indeed, with improvement. All the extract, however, prepared in the hospital, being consumed, a fresh quantity was procured from the shop of an apothecary, and administered in similar doses. Mental affections of the most alarming nature rapidly supervened, accompanied with other distressing symptoms. Borda prescribed laudanum as a *contra-stimulant*, and the patients were gradually restored. (London Medical Repository, vol. xv. p. 540.)

‡ Linnæus, however, mentions, that he was informed by the wife of the principal clergyman of Lulea, that, at a certain post-house in Lapland, she had seen large quantities of the *aconitum lycoctonum* collected and boiled for the use of the table, like cabbage! She was evidently acquainted with the plant. (Linnæus's Tour in Lapland, vol. ii. p. 123.)

their principal securities against invasion from the low countries. In one tank of water destined for the use of a part of the British army, on a halt in pursuit of the retreating Burmese, the water had been poisoned by the aconitum ferox, bruised and thrown in by the enemy, before they evacuated the place. Undoubtedly fatal consequences would have ensued, had not Dr. Wallich discovered it.*

The Bish is also used in Northern India for destroying tigers. Arrows poisoned with it are shot at them, and they are soon found dead.

At the request of Dr. Wallich, who deems this substance equal in power to strychnine, Mr. Pereira performed some experiments with the root of the aconitum ferox. The same numbness of the lips and tongue was experienced as from the napellus, on merely tasting the tincture. The poison was then exhibited to animals, either by the stomach, the cellular tissue, or the blood vessels. The symptoms produced were difficulty of breathing, convulsions, and paralysis of the extremities. Death occurred rapidly; and on dissection the right side of the heart was seen distended, and the left empty; the lungs of a florid red.†

According to Peschier, the aconitum napellus contains a peculiar alkaloid, the *aconitine*, which possesses the poisonous qualities of the plant. His analysis, which at first was doubted, has been confirmed by Brandes and Geiger. It would appear to be highly poisonous. The one fiftieth of a grain dissolved in alcohol killed a sparrow in a few minutes, and one tenth of a grain destroyed a small bird with the rapidity of lightning.‡

Helleborus Niger, L. (Melampodium, black hellebore, Christmas rose.) Morgagni mentions a case, where an individual under cure in the hospital took about half a drachm of an extract made with water from the roots of this substance. He was seized with pain and vomiting, and died in eight hours. On dissection, the whole digestive canal was found inflamed, and the larger intestines more so than the smaller. There was, however, no gangrene, and the limbs continued flexible for some time after death.§

Two cases of poisoning with this substance have lately been communicated to the *Societe Medicale d' Emulation*, at Paris, by M. Ferrary. A domestic took a decoction of the root in some cider, at the recommendation of an empiric; and his master, from curiosity, swallowed a like dose. In about three quarters of an hour, alarming symptoms were developed, without, however, exciting suspicion of their real cause. Another glass full was taken by the servant, when vomiting,

* History of British India (in Harper's Family Library), vol. iii. p. 127; Dr. A. T. Thomson's Lectures in London Medical and Surgical Journal, vol. vii. p. 292; Wallich, quoted in Journal Royal Institution, vol. i. p. 366.

† Edinburgh Journal of Natural and Geographical Science, vol. ii. p. 435. For further information on the Indian Bish, I refer to Ainslie's Materia Indica, vol. ii. p. 40; Transactions of the Medical Society of Calcutta, vol. ii. p. 289. 410.

‡ Duncan's Supplement, p. 2; Lancet, N. S., vol. xiv. p. 118; Turnbull on Aconitine, in Medico-Chirurgical Review, vol. xxvi. p. 435.

§ Morgagni, vol. i. epist. 59. p. 392.

delirium, horrible contortions, accompanied with immediate coldness, supervened, and death at last ensued. The violence of the symptoms was proportioned to the quantity taken. The master died in two hours and a half, and the servant in one hour and three quarters after its ingestion. On dissection sixteen hours afterwards, the appearances in each were found precisely similar, except that in the domestic they were more strongly marked. The lungs were gorged with blood. The mucous membrane of the stomach was considerably inflamed, of a blackish brown colour, and reduced to an almost gangrenous state. The œsophagus and intestines were natural.*

In animals this produces vomiting or attempts to vomit, great debility, vertigo, insensibility and great torpor, and finally death. And this, if the dose be large enough, whether taken internally or applied to a wound. The stomach and intestines, and particularly the rectum, are found inflamed, and in one instance the mucous membrane was ulcerated. Slight congestions have also been noticed in the lungs, and the bladder has been observed red and thickened.†

Helleborus fœtidus, L., is also said to have caused the death of a child, who ate its root in the pulp of an apple.‡

Helleborus orientalis, Lam. The hellebore of the ancients is also poisonous.§

Chemists have not been able to detect an alkaloid in this plant. According to Fenuelle and Capron, the active principle appears to be an oily matter containing an acid.‖

Veratrum album, L. (White hellebore. Indian poke.) The root of this plant has long been distinguished for its poisonous qualities. Etmuller states, that when applied to the abdomen it produces violent vomiting; and the same phenomenon has been observed by Schroeder, when it was used as a suppository. Internally, it produces spasms, suffocation, loss of voice, and coldness over the body. Vicat relates the case of a family, who took some soup in which the root of white hellebore had been put instead of pepper. Shortly after they were seized with a general coldness, and their bodies became covered with an icy sweat. Debility and an almost imperceptible pulse succeeded, and they were not relieved until vomiting came on. The root when powdered is a powerful errhine.

In several instances collected by Dr. Christison, burning in the throat, gullet, and stomach, followed by nausea, vomiting, and dysuria, occurred very early; and these were succeeded by weakness of the limbs, giddiness, blindness and dilated pupils, great faintness, convulsive breathing, and small pulse. In a fatal case quoted by Bernt vomiting ensued, violent and incessant, and followed by death in

* London Medical Repository, vol. x. p. 424. As this was a quack remedy, *it is possible* that some mineral poison may have been mixed with the hellebore.

† Orfila's Toxicology, vol. ii. p. 7; London Medical Repository, vol. x. p. 426.

‡ Orfila's Toxicology, vol. ii. p. 11. Additional cases are related in Burnett's Medical Botany, vol. i.

§ A beautiful plate of this, from the Flora Græca, is given in Burnett's Medical Botany, vol. ii. plate 87.

‖ Philosophical Magazine, vol. lx. p. 70; Brande's Journal, vol. xiii. p. 150.

twelve hours. On dissection, the gullet, stomach, and colon were here and there inflamed. *

When administered to dogs, it produced violent vomitings and debility; and when the œsophagus was tied, there was violent straining, dejection, vertigo, and finally death. On dissection, the mucous membrane of the stomach was seen red, but not ulcerated. The other parts were natural. On inserting the root in powder into a wound on the thigh of a dog, similar symptoms were produced, accompanied with dilatation of the pupils, and the stomach after death presented the same appearance as in the previous instance. †

Veratrum viride of Aiton and Willdenow is a native of New-England, and is said to have produced dangerous and even mortal effects. The root is bitter, nauseous, and acrid, and burns the mouth and fauces.‡

In the *Veratrum album*, in the seeds of the *Veratrum sabadilla*, Retz., and in the root of the *Colchium autumnale*, L., Pelletier and Caventou have detected an alkaloid which they denominated *veratrine* or *veratria*. It is extremely bitter, and excites even in minute doses violent vomiting and purging. A few grains destroy the life of animals; and these effects, according to Andral junior, occur also when it is applied to the cellular tissue or thrown into the veins. § Within a short time, Courbe is said to have ascertained veratrine to be a compound substance; and a new alkaloid extremely poisonous, and termed *colchicine*, is announced by Geiger.‖

Colchicum autumnale, L. (Meadow saffron.) This plant acquired considerable celebrity some years since, from its being supposed to be the active ingredient in the *Eau medicinale* of Husson.

Its seeds have proved fatal to several children, in consequence of eating them, and cattle also suffer greatly by them; but only in the *spring*, when the seed vessel is fully matured. The seed, if swallowed, adheres to the coat of the stomach, and produces at the several points of adhesion spots of inflammation, which occasion the death of the beast.¶

The following is an instance of its poisonous effects on man: An

* Christison, p. 746.

† Orfila's Toxicology, vol. ii. p. 3.

‡ New-England Journal, vol. iii. p. 335. Bigelow's Medical Botany, vol. ii. p. 125. In a late essay on the veratrum viride by Dr. Osgood, the idea is advanced that it does not contain veratrine. (American Journal of Medical Sciences, vol. xvi. p. 297.) Dr. Osgood corroborates its noxious effects.

§ Brande's Journal, vol. x. p. 171. Edinburgh Medical and Surgical Journal, vol. xlii. p. 156 and 235. There is a good paper on the vegetable alkalies by Dr. Peter, in the Transylvania Journal, vol. vii. p. 157.

‖ Lancet, N. S., vol. xiv. p. 118. Philadelphia Journal of Pharmacy, vol. vi. p. 320.

¶ Mr. Want, in the Annals of Philosophy, vol. iv. p. 281.; from information communicated to him by Sir Joseph Banks and Mr. Andrew Knight. In the Edinburgh Annual Register, vol. vii. p. 114., it is mentioned that a farmer near Tetbury lost seven yearling beasts out of eighteen, by putting them in a pasture where this plant grew in abundance. On opening their bodies *the food was found clogged together, in a crude and undigested mass, incapable of passing through the proper ducts.* The French call it, among other names, *tue chien*, from its killing dogs.

ounce and a half of the vinous tincture of colchicum was by mistake given to a feeble man aged fifty-six, and labouring under chronic rheumatism. No complaint was made until about an hour after, when retching and acute pains at the stomach came on, and vomiting and purging supervened. This state continued for nearly twenty-four hours, when the purging ceased; but the most distressing nausea continued, with frequent retching. The stools were, during the succeeding night, often involuntary, but not bloody. Excessive thirst came on and continued till death, with severe pains of the stomach and bowels. In the evening, the patient seemed nearly exhausted; delirium appeared; the pulse could scarcely be perceived. He lived, however, through the second night, but died the morning following. On dissection, there was a redness of the stomach observed, but no appearance of inflammation in the bowels.*

In a case that occurred to Mr. Fereday, where two ounces of the wine of colchicum were taken through mistake, vomiting and purging, with violent pain, came on in an hour and a half. These continued, and resisted all means for their suppression, for more than twenty-four hours, and the patient sunk in forty-seven hours after taking the substance. On dissection, the body, particularly in front, was seen covered with patches of a purple efflorescence. The stomach and bowels were coated with a thick mucus, and a portion of the mucous membrane of the former was red, owing to a slight effusion of blood under it. There was a similar apearance in the peritoneum covering the jejunum. Lungs gorged with black blood, and which was effused under the pleura in spots. The heart was flabby, with black blood on the right side.†

A female took an infusion of colchicum to produce abortion. The symptoms were similar to the cases already related. The miscarriage took place the next day, and she died in a few hours after. On dissection, every part was found healthy, except the mucous membrane of the stomach and intestines, and this was highly inflamed. ‡ In a fatal case Dr. A. T. Thomson found that every mucous surface of the body, even including the bladder, poured out quantities of blood. There was a general hæmorrhagic condition. §

Digitalis purpurea, L. (Purple foxglove.) Dr. William Henry was called in October, 1809, to visit a female, an out patient of the Manchester Infirmary, and labouring under dropsy, who had taken an over-dose of the decoction of foxglove. It was prepared by boiling two handfuls of the leaves in a quart of water, and then pressing the mass, so as to expel the whole of the liquor. Of this at 7 A. M. she drank two teacupfuls, amounting in the whole to not less than ten ounce measures. Before eight she began to be sick, and vomited parts of the contents of her stomach. Enough, however, was retained to ex-

* Edinburgh Medical and Surgical Journal, vol. xiv. p. 262.

† London Medical Gazette, vol. x. p. 161.

‡ Case by Mr. Dillon in Burnett's Medical Botany, vol. ii.

§ Lancet, N. S., vol. vii. p. 281. Some curious facts on the effects of climate on the properties of drugs, and colchicum in particular, are stated in Dr. A. T. Thomson's Elements of Materia Medica, vol. i. p. 72.

cite violent vomiting and retching throughout the whole of that and the following day, during which every thing that was taken was instantly rejected. In the intervals of sickness, she was excessively faint, and her skin was covered with a cold sweat. The tongue and lips swelled, and there was a constant flow of viscid saliva from the mouth. Very little urine was voided on the day she took the digitalis, and on the two following days the action of the kidneys was entirely suspended. When Dr. Henry saw her, which was forty-eight hours after she had taken the poison, the tongue was white; the ptyalism continued, though in a less degree; and the breath was fœtid. The pulse was low, irregular (not exceeding forty), and after every third or fourth pulsation an intermission occurred for some seconds. She complained also of general pains in the limbs, and cramps in the legs. By the use of effervescing draughts, and ether with ammonia, she gradually recovered her imperfect health. Dr. Henry remarks, that she had not taken any mercury, and that the ptyalism was entirely the effect of the digitalis.*

A man labouring under asthma imprudently took an ounce of the tincture of digitalis. He immediately fell asleep, and slept for three hours and a half. After this, on awakening, he vomited, and likewise had a motion. He then again slept quietly. A strong emetic was now given, which operated well, and he continued tranquil and his pulse regular. After two or three hours, however, his pulse began to intermit. Strong punch was given in divided doses, and also carbonate of ammonia. This supported the system, though the pulse was at one period as low as thirty-six in a minute. The intermission lasted for about twelve hours, and *the asthma was cured.*†

A quack was tried in London in 1826 for administering an over dose of digitalis. By his advice, a young lad took, early in the morning, about six ounces of a strong decoction. Very soon afterwards vomiting, severe pains in the bowels, and purging ensued. In the afternoon he became lethargic, and slept profoundly for several hours; but when he awoke, vomiting and pain returned. Convulsions ensued, with dilated and insensible pupil, and a slow, small, and irregular pulse, and in twenty-two hours from swallowing the drug the boy died. On dissection, the internal membranes of the brain were found much injected with blood, and the inner coat of the stomach was red in some places. The other parts were healthy.‡

* Edinburgh Medical and Surgical Journal, vol. vii. p. 148. This symptom has been noticed by other practitioners. Dr. Barton mentions having seen it produced in a child from ordinary doses. (Barton's Medical and Physical Journal, vol. i. part i. p. 80.) Another case is related ibid. vol. i. part ii. p. 48. Dr. Barton quotes the following remark from Dr. Withering:—"I am doubtful whether it does not sometimes excite a copious flow of saliva." (Withering's Tracts, vol. ii. p. 285.)

† Case by Dr. Fogo, in Edinburgh Medical and Surgical Journal, vol. xviii. p. 345; see also a case quoted from Dr. Beddoes in Orfila, vol. ii. p. 228. Some useful cautions, as to the use of digitalis, are given in the Medico-Chirurgical Review, vol. i. p. 510., American edition.

‡ Edinburgh Medical and Surgical Journal, vol. xxvii. p. 223. The prisoner was acquitted, on the ground that his advice had been asked.

In France, this substance is prescribed medicinally in very large doses, and instances of sudden death are hence not uncommon.*

Dr. A. T. Thomson asserts that foxglove acts powerfully in exciting the generative organs; and that one of the effects of an over-dose is inflammation of the genitals in both sexes.†

As an instance of its inertness, I may add, that Dr. Robbins relates of an intemperate man, who in a fit of passion took half an ounce of the tincture: It remained on his stomach for one hour, without causing vertigo, affection of the pulse, or dilated pupil. At the end of that time, an emetic was given with effect.‡

When administered to animals in the form of powder, or extract, or infusion of the leaves, it excites vomiting, anxiety, melancholy, smallness and slowness of pulse, involuntary stools, and convulsions —death closes the train of symptoms.

Mr. Le Royer, some years since, obtained an active principle from the leaves of this plant, which he calls *digitaline*. A grain in solution injected into the stomach of a rabbit caused death in a few minutes, without agitation or pain. Similar effects were induced in larger animals by increased doses.§ It is, however, still doubtful whether there is a distinct active principle in this plant.‖

Scilla maritima, L. (Squill.) The root of this plant in over-doses causes sickness, vomiting, diarrhœa, and bloody urine. It likewise, according to Christison, produces narcotic symptoms. Lange mentions the case of a woman who died from taking a spoonful of the root in powder to cure tympanites. She was seized with violent pain, and died soon in convulsions. The stomach was found every where inflamed, and in some parts eroded. Twenty-four grains of the powder have proved fatal.¶

When administered to animals, either internally or injected into the veins, violent efforts to vomit, dilated pupils, and lethargy were caused, and in a few hours violent convulsions and death.**

Vogel has discovered an acrid principle in the squill, denominated *scillitin*.

Ipecacuanha. This substance is obtained from several plants of the genera cephaelis and psycothria.†† In itself, it can hardly be deemed poisonous, except in very large doses.‡‡ But a very powerful

* London Medical Quarterly Review, vol. ii. p. 454. Edinburgh Medical and Surgical Journal, vol. ii. p. 480.

† Elements of Materia Medica and Therapeutics, vol. ii. p. 465.

‡ Boston Medical and Surgical Journal, vol. iii. p. 723.

§ Brande's Journal, vol. xviii. p. 178. On the oil of digitalis, see Edinburgh Medical and Surgical Journal, vol. xxxix. p. 381.

‖ Philadelphia Journal of Pharmacy, vol. vii. p. 220.

¶ Christison, p. 744.

** Orfila's Toxicology, 3d edit. vol. ii. p. 202.

†† See Abel's Journey in China, Appendix, p. 335; Edinburgh Journal of Natural and Geographical Science, vol. ii. p. 17., on the roots that yield the ipecacuanha of commerce. Dictionnaire des Sciences Médicales, vol. xxvi.; Dr. Griffith, in Philadelphia Journal of Pharmacy, vol. iii. p. 181.

‡‡ In some constitutions, however, its effluvia induces difficult breathing, anxiety, and even spasms. A case is quoted from Rust's Magazine, where these were induced

alkaloid has been obtained from it by Pelletier, and which is termed *emetin.** Two grains of this will kill a dog; and the symptoms are frequent vomiting, followed by lethargy and coma. Death ensues in fifteen or twenty hours, and the stomach and lungs are found inflamed.

The same effects occur when it is injected into a vein, or applied to a wound.†

Of secondary consequence, but arranged in this group by Orfila, are —

Ruta graveolens, L. (Rue.) The distilled water and watery extract in large quantity caused death in animals after a long interval, but its effects are not powerful.

Anagallis arvensis, L. (Meadow pimpernel.) Naturalized in the United States. Its extract produces in animals dejection, insensibility, and death. The mucous membrane of the stomach and rectum were found inflamed, and the lungs livid.

Aristolochia clematitis, L. (Common birthwort.) Vomiting, convulsive motions, weakness of the posterior extremities, dejection, and death, were induced by its root. The stomach and rectum somewhat inflamed.

Nerium oleander, L. (Common oleander. Rose-bay.) The extract of this plant produced in animals vomiting, vertigo, weakness of the extremities, convulsions, and death. The distilled water and powder are less active. The digestive canal was not affected.

Morgagni (who also called this plant *Rhododaphne*) relates the case of a female who drank some of the juice. Vomiting soon succeeded. Her lips were brown; the pulse small and weak; the power of speech was lost, and she lay insensible. Death ensued nine hours after taking the juice. On dissection, the back of the body was universally of a violet colour, but the anterior natural. There was some heat of the body, though seventeen hours had elapsed since death; the blood vessels of the stomach, intestines, and omentum were much distended; the stomach contained a greenish fluid, but its membranes were sound; the right lung was red and adhering, while the left was completely collapsed. All the other viscera were natural.‡

Tanghinia veneniflua (Boyer), Cerbera Tanghin, a native of Madagascar, and where the seeds are said to be employed as an ordeal for the detection of persons accused of crimes.§ According

in a person from pounding the root during three hours. Vomiting and dangerous dyspnœa ensued, and these were relieved only by the use of active remedies. (Lancet, N. S., vol. viii. p. 38.)

* The same substance has been found in the *Viola odorata*, L., by Boullay. Brande's Journal, vol. xvii. p. 385; see also Brande's Journal, N. S., vol. vi. p. 194. Duncan's Supplement, p. 58.

† Magendie.

‡ Morgagni, vol. iii. p. 387; Orfila's Toxicology, vol. ii. p. 259. The *Nerium odorum*, Aiton, has its root poisonous, and "is but too often resorted to for the purpose of self-destruction by the Hindoo women, when tormented with jealousy." (Ainslie's Materia Indica, vol. ii. p. 23.)

§ Loudon's Magazine of Natural History, vol. vi. p. 264. Under the name of

to the experiments of Dr. Ollivier, of Angers, it produced in animals vomiting, great weakness, dilated pupils, convulsions, succeeded by lethargy. Mr. Henry has obtained from it a white and crystallizable substance, to which the acrid properties are attributed; and another, styled *tanguin*, to which the narcotic symptoms are to be ascribed.*

Cerbera ahovai, L. Its nut is highly deleterious, and the wood, when thrown into the water, intoxicates fishes. The *Cerbera manghas*, L., is equally so. A Javanese woman (says Dr. Horsfield) swallowed, out of curiosity, about a scruple of the external part of the fruit; it produced partial delirium, and temporary blindness, but she retained the power of speech.†

Cerbera thevetia, L., is a native of Guadaloupe, and according to Dr. Ricord Madianna its seeds operate similarly on animals. In large doses, it caused death; and on dissection, the head and stomach were found much injected with blood.‡

Several species of *Apocynum*, as the *androsæmifolium*, *cannabinum*, and *venetum*, furnish an acrid milky juice, which inflames and ulcerates the skin. The first and second of these are American plants.

Asclepias gigantea, L. Bauhin asserts that the juice of this, given in the dose of a drachm and a half, has produced violent symptoms, and a fatal hæmorrhage. When Orfila administered to dogs the *Asclepias vincetoxicum*, L., the animals died at the end of one or two days, and their stomachs were found inflamed.

Cynanchum erectum, L. (*Pergularia erecta*, Spreng.) Plenck relates that thirty-six grains of the leaves of this plant administered to a dog produced violent vomiting, a trembling, convulsions, and death. The *Cynanchum viminale*, L. (*Sarcostemma viminale*, R. Br.), furnishes a milky juice, extremely caustic.

Cissus glandulosa, Gmel., and *quadrangularis*, L. (Saelanthus glandulosus and quadragonus of Forskal), are acrid, and according to Orfila poisonous.

Mercurialis perennis, L. (Mountain mercury. Dog's mercury.) This plant is hurtful both to man and animals. It causes vomiting, diarrhœa, profound sleep, and convulsions. Ray relates the case of a

Cerbera Tanghin, Mr. Telfair, in a letter from the Mauritius, dated March 8, 1829, gives an interesting account of this substance. It is not much larger than an almond, yet it is sufficient to destroy twenty persons. He was present on an occasion when it was given to the servants of the king of Madagascar, on a suspicion of his having been poisoned. The kernel was pounded fine with a stone, and every one was made to swallow a portion of it. On some it began to act in half an hour, or less. Those whose stomachs reject it early, generally recover. On this occasion there were only two individuals in whom this was the case. The others were thrown, in a state of insensibility, into a hole, and every person present was obliged to throw ground over them, so that the burial was quickly completed. Radama abolished the use of this as an ordeal. (Transylvania Journal, vol. iii. p. 420., from Curtis's Botanical Magazine, February, 1830.)

* Orfila's Toxicology, 3d edit. vol. ii. p. 338; Bulletin des Sciences Med. vol. iii. p. 80.

† Ainslie's Materia Indica, vol. ii. p. 262.

‡ Annals of the New York Lyceum of Natural History, vol. i. p. 86.

man, his wife and three children, who experienced deleterious effects from eating it, fried with bacon.*

An Irish female at Boston, mistaking this for a common green in her native country, cooked it as such. In half an hour, it caused delirium, stertorous breathing, and coma. An emetic of sulphate of zinc, however, relieved her.†

The treatment of the poisons enumerated until now in this chapter, resolves itself into an endeavour to remove the noxious substance, by emetics or the stomach pump. Enemas are also advisable, if the poison has been retained any time, to procure its discharge by the bowels. If symptoms of cerebral congestion supervene, venesection is advisable, and afterwards diluted acidulated drinks, frequently repeated. Inflammation is to be met by its proper remedies.‡

We come now to a class of narcotico-acrids which induce violent tetanic spasms, without impairing the sensibility; but on the other hand, heightening it. They have also local irritant properties, although these are seldom observed, on account of the rapidity of their deleterious action. And in consequence of this last, but few morbid appearances are found.§

Brucea antidysenterica, Mill. (False angustura bark.) This substance resembles the real angustura, and this fact indeed was noticed, shortly after the discovery of the plant by Mr. Bruce‖; but it was not until a few years since that its deleterious nature was discovered. A patient under the care of Dr. Rambach, at Hamburgh, experienced poisonous effects from the use of a decoction; and death also resulted from it in Hungary and Berne. This led to an examination, and it was ascertained that two species are known in commerce — the genuine, called West Indian, and the spurious, East Indian angustura (brucea). Several experiments on animals confirmed its poisonous nature. The Austrian government was so impressed with the danger to be apprehended, that it ordered all the angustura bark in the empire, genuine and spurious, to be burnt, and interdicted its further importation. Its sale was also prohibited in Denmark; and in Russia and Wirtemberg, the characters distinguishing each were published by authority.¶ Some of these may be briefly enumerated.

The taste of the genuine is aromatic bitter, that of the spurious, highly and disgustingly bitter. The concentrated infusion of the first is clear and reddish-brown, and when diluted becomes yellow. If an alkali be added, it is changed to a dark-red, and a solution of persulphate or permuriate of iron, imparts to it a high red colour, and after some time throws down a rose-coloured precipitate. The infusion of the last is not so clear, of a dirty brown colour, and when

* London Medical and Physical Journal, vol. xv. p. 71. The case of a family poisoned by it (of whom some died) is mentioned in the Philosophical Transactions, vol. xvii. p. 875.

† Boston Medical and Surgical Journal, vol. iii. p. 358.

‡ Orfila's Toxicology, 3d edit. vol. ii. p. 200.

§ Christison, p. 750.

‖ See Medical Commentaries, vol. xv. p. 134.

¶ Edinburgh Medical and Surgical Journal, vol. xiii. p. 211.

diluted, does not become yellow. On the addition of an alkali, it becomes greenish, and a solution of sulphate of iron, gives it a dark green colour, and throws down a copious satin black precipitate.*

Animals are readily destroyed by this substance, and the symptoms are violent convulsions, resembling tetanus, and which occur in paroxysms. The animal expires in one of these. On dissection, no inflammation is found. Professor Emmert, of Tubingen, communicated the following case to Orfila: "A child died after having taken by mistake, a decoction of this bark; he preserved the use of his intellectual faculties, and earnestly begged that he might not be touched, for he experienced terrible cramps after each time that he was handled. He had a copious perspiration, but did not vomit."†

Pelletier and Caventou discovered an alkaloid in this substance, on which its poisonous properties depend, and which is called *brucine* or *brucea*. It produces tetanus and death; but though poisonous, it acts only with one twelfth of the energy of strychnine. Four grains were necessary to kill a rabbit.‡

Strychnos nux vomica, L. A native of Ceylon, and the coasts of Coromandel and Malabar. The seeds are what is commonly called *nux vomica*, and this is the poisonous ingredient. It has of late years been frequently used in cases of suicide, and a narrative of its effects is therefore necessary.§

Mr. Ollier saw a young woman who, in a fit of melancholy, took nearly half an ounce. Half an hour after, she was found by him calm and well. He went away in search of an emetic, and on his return found that slight convulsions had occurred. These increased rapidly in frequency and violence, darting out the extremities, and stiffening the body. In the short intervals, she was sensible, but had a feeble pulse, and complained of sickness and great thirst. She died in an hour after swallowing the poison.‖

A young lady took by mistake a table spoonful of the powder of nux vomica. She was instantly deprived of the power of walking, and fell down, but without losing her recollection. Dr. Basedow (of Merseburg) saw her immediately. The pupils were contracted, pulse small, and skin cool. The fore-arm was half bent, and the hands and fingers had convulsive twitches. The legs were rigid, and all the muscles tetanically contracted. She had not the slightest pain or sickness, but her breathing became every moment more difficult, and she complained of impending suffocation. She was gradually relieved by an emetic, and small doses of oil of turpentine and sulphuric ether. The

* For a further list of its distinguishing characters, see Orfila's Toxicology, vol. ii. p. 280.; Edinburgh Medical and Surgical Journal, vol. xiii. p. 210.; Philadelphia Journal of Pharmacy, vol. ii. p. 158.

† Emmert, in London Medical Repository, vol. vi. p. 89.

‡ Annals of Philosophy, vol. xvi. p. 30.; Edinburgh Philosophical Journal, vol. iii. p. 303. It is denied by some, that the bark of the brucea will yield this, and the article mistaken for it is said to be the bark of the Strychnos nux vomica.

§ This poison seems to have been known in the time of Valentini. See his Pandects, vol. i. p. 622. *De nuce vomica penes furem deprehensa.*

‖ London Medical Repository, vol. xix. p. 448.

dyspnœa gradually subsided, and towards evening the tetanic spasms had ceased. *

These instances, one of death and the other of recovery, might be multiplied; but they are sufficient to give an idea of the usual symptoms. † It would appear, that in smaller doses the effects are more distinctly those of the narcotico-acrid poisons. Heat and burning in the stomach, stiffness of the joints, convulsive tremors, and at last violent fits of tetanus, were noticed in a case where about a drachm had been taken. To this followed redness and inflammation of the tongue, burning thirst, pain in the stomach, and hot skin. Next day, though the fits had ceased, the muscles were very sore, especially on motion. Colic and diarrhœa, with vomiting, occurred; but on the fourth day they disappeared, and she became convalescent. ‡

Its action on the paralytic is striking. A patient at the Hospital St. Louis, in Paris, labouring under hemiplegia of the right side, took twenty-four pills of it. He would have suffered severely, if proper remedies had not been instantly administered; but the convulsions which always accompany this poison, continued, and afterwards affected only the diseased part, so that the arm which before was lifeless, was now strangely and constantly agitated. §

Appearances on dissection. In Mr. Ollier's case, the parts were almost natural; the brain somewhat congested, and the heart empty. In a dissection by Orfila and Barruel, where death was also speedy, the spinal plexus of veins was slightly gorged, the pia mater red and injected, and the cerebral substance soft, and presented a number of bloody spots on cutting into it. The spinal marrow was natural; the mucous membrane of the stomach and intestines blanched; but here and there, on the former, a red patch. Lungs gorged with black fluid blood. ‖

According to the time that elapses before death, will be the marks of inflammation in the stomach and intestines. This is shown by comparing the dissections mentioned by Christison. ¶

No substance has been more repeatedly made the subject of experiment than the nux vomica and the alkaloid found in it. This was discovered by Pelletier and Caventou, and is denominated *strychnia* or *strychnine*. Its effects are most rapid and violent. Magendie

* Edinburgh Medical and Surgical Journal, vol. xxxi. p. 445.

† Other cases are given in Christison, p. 754, &c.; London Medical Gazette, vol. iii. p. 445., by Mr. Baynham; Edinburgh Medical and Surgical Journal, vol. xxxv. p. 451., by Mr. Watt (from Glasgow Medical Journal); Lancet, vol. x. p. 732.

‡ Tacheron, Medico-Chirurgical Review, vol. iv. p. 500. It is singular that the natives of Hindostan use this substance for many months continuously, beginning with a small quantity, and increasing, sometimes to twenty grains, without any bad effect, provided it be not taken on an empty stomach; if this be neglected, spasms are apt to ensue. The nut is taken in its natural state, or half roasted. The seeds are employed in the distillation of country spirits, to render them more intoxicating. (Baker, in Transactions of Medical and Physical Society of Calcutta, vol. i. p. 138.)

§ London Medical Repository, vol. vii. p. 163.

‖ Lancet, vol. viii. p. 56., from Archives Générales.

¶ Christison, p. 757.

killed a dog with one eighth of a grain; and the Editor of the Edinburgh Medical and Surgical Journal says, that he has himself seen one die in two minutes after the injection of one sixth of a grain.* "There is little doubt," says Christison, "that half a grain thrust into a wound might kill a man in less than a quarter of an hour." †

Tests. Nux vomica in powder has a dirty greenish grey colour, an intensely bitter taste, and an odour like powder of liquorice. It inflames on burning charcoal, and if nitric acid be added to it, takes an orange red colour, which is destroyed by the addition of protochloride of tin. Its infusion becomes orange red by nitric acid, and is precipitated greyish white with tincture of galls.

Orfila and Barruel ascertained its presence in the dead body. They advise that the contents of the stomach be boiled in water acidulated with sulphuric acid. (This, if it be nux vomica, will become yellowish.) The filtered liquid is then to be neutralized with carbonate of lime, and evaporated to dryness. The dry mass is then acted on with successive portions of alcohol, and evaporated to the consistence of a thin syrup. Ammonia precipitates this, it becomes deep orange red, with nitric acid, and will deposit, if left standing, in a day or two, crystals of strchynine.‡

Strychnos Ignatii, L, or *Ignatia amara* (Bean of St. Ignatius). Its operation is similar to the nux vomica. Dr. Hopf relates of a man who was attacked with tetanus of several hours' duration, after taking the powder of half a bean in brandy.§ The native Indian practitioners are said to use it in cholera, and too large doses frequently cause vertigo and convulsions.‖

Strychnos tieute, Leschen. From this plant is obtained the *upas tieute* of Java.¶ Numerous experiments have been performed with it on animals. It induces tetanus, asphyxia, and death with great rapidity, and on dissection, Dr. Horsfield found the brain highly inflamed. Criminals in Java are said to be wounded by arrows poisoned with it, and death follows in a few minutes. Pelletier and Caventou

* Among the experimenters on nux vomica and strychnine, I may enumerate, Magendie and Delille, Eclectic Repertory, vol. iii. p. 274.
Segalas, in London Medical Repository, vol. xxv. p. 552.; vol. xxvi. p. 61.
Somerville, Harlan, Coates, Lawrence, and Hubbard, in Chapman's Journal, vol. ii. p. 192.; vol. iii. p. 296.; vol. iv. p. 242.
Dr. A. T. Thomson, in London Medical Gazette, vol. viii. p. 50.
Review of Bardsley on Strychnia and Brucia, Edinburgh Medical and Surgical Journal, vol. xxxiii. p. 406.
See also Annals of Philosophy, vol. xvi. p. 28. Brande's Journal, vol. vii. p. 375. Edinburgh Medical and Surgical Journal, vol. xviii. p. 159.; vol. xix. p. 495.

† Instances are multiplying of the dangerous and fatal effects of applying strychnine and its salts to the skin, in too large quantities (*endermically*, as it is styled). See Magendie and Guthrie, in Lancet, N. S. vol. xv. pp. 117. 321. Richter, in North American Archives, vol. ii. p. 137.

‡ Christison, p. 752. Lancet, vol. viii. p. 56. The red, with nitric acid, will only occur when some brucia is present, combined with the strychnia. (Caventou.)

§ Christison, p. 759.

‖ Transactions of Medical and Physical Society of Calcutta, vol. iii. p. 432.

¶ Upas is probably a common adjunct in the Javanese language to all poisonous plants.

obtained strychnine from this species also, combined with various colouring matters.

Upas Antiar is the juice of a large tree in Java, denominated by Leschenault *Antiaris toxicaria*. The ancient opinion concerning the deadly influence of the vapour of the bohon upas, is now generally abandoned; but it is evident from the nature of these two indigenous substances, that there was much foundation for the accounts given of the virulence of the native poisons. In small doses it acts as an irritant, but in large ones, causes convulsions and coma.

It operates, however, more slowly than the tieute, and, according to Mr. Brodie, death is caused by rendering the heart insensible to the stimulus of the blood, and stopping the circulation. The heart, after death, is found to have lost its irritability.

The French chemists could detect no strychnine in it, but found a bitter substance, soluble in water and alcohol, and concentrating all the noxious qualities of the poison. In very small quantities it proved rapidly fatal.*

To these it is common to subjoin the following poisons, whose exact nature is unknown.

Ticunas, according to De la Condamine, is an extract obtained from various plants by the Indians of South America. The experiments of Fontana with it, indicate that it produces death in animals, either externally applied or internally given. The ordinary symptoms are convulsions, faintings, great debility, and loss of feeling.†

Woorara is a poison with which the Indians of Guiana arm the points of their arrows. It does not appear to differ essentially from the ticunas. Mr. Brodie has performed several experiments with it, and he imagines it to produce death by destroying the functions of the brain.‡

Curare. The war poison of the Indians on the banks of the Oronooko, in South America. Some interesting details concerning its preparation are contained in the note extracted from one of the latest volumes of Humboldt's Personal Narrative. §

* The following are authorities deserving of consultation on the *tieute* and *antiar*. Quarterly Review, vol. vi. p. 514. American edition. Annals of Philosophy, vol. ix. pp. 202. and 265.; containing Dr. Horsfield's essays on oopas, or the poison tree of Java, extracted from the Batavian Transactions. Horsfield writes those poisons thus, *antshar and tshittik*. Orfila, vol. ii. pp. 260. 287. Eclectic Repertory, vol. ii. p. 281. Brodie's Experiments from Philosophical Transactions. Hosack's Medical and Philosophical Register, vol. i. p. 171. containing Delille's dissertation on the upas tieute. Annals of Philosophy, vol. iv. p. 259. See also Medical Commentaries, vol. xv. p. 36. Pelletier and Caventou's paper in full in Repertory of Patent Inventions, 2d series, vol. xlv. p. 185. Edinburgh Medical and Surgical Journal, vol. xxiii. p. 224. Albers, Nees, and Emmert's Experiments on Tieute, American Journal of Medical Sciences, vol. vii. p. 223. Penny Magazine, vol. ii. p. 322. Burnett's Outlines of Botany, p. 552.

† See the experiments of Fontana in Philosophical Transactions, vol. lxx. p. 163.; also Dr. Brocklesby's, ibid. vol. xliv. p. 408., and Herissant's, ibid. vol. xlvii. p. 75.

‡ Eclectic Repertory, vol. ii. p. 289. Dr. Hancock on the Worari. (Brande's Journal, N. S. vol. vi. p. 50.)

§ Esmeralda is the most celebrated spot on the Oronooko for the fabrication of this poison. The Indians collect the liana (bejuco) for the preparation of this (the

Laurus camphora, L. Camphor when introduced into the stomach of dogs produced general convulsions, loss of hearing, foaming at the mouth, and difficult breathing. Vomiting ensued, and they recovered. But when the œsophagus was tied, the consequence was death, and the stomach presented an inflammatory appearance, and in one case ulceration.

Several cases of its effects on man are stated by Dr. Christison. One was of Mr. Alexander on himself. He swallowed in one dose two scruples. In the course of twenty minutes he became languid, and this soon ended in giddiness. At length he lost all consciousness,

curare , and it bears the same name as in the forest of Javita. It is the *Bejuco de mavacure*, which is gathered in abundance on the east of the Mission, on the left bank of the Oronooko and in other places. "The juice of the liana when it has been recently gathered is not regarded as poisonous; perhaps it acts in a sensible manner only when it is strongly concentrated. It is the bark and a part of the alburnum which contains the terrible poison. Branches of the *mavacure*, four or five lines in diameter, are scraped with a knife, and the bark that comes off is bruised and reduced into very thin filaments, on the stone employed for grinding cassava. The venomous juice being yellow, the whole fibrous mass takes this colour. It is thrown into a funnel made of the leaf of a plaintain tree, nine inches high, with an opening four inches wide. A cold infusion is first prepared by pouring water on the fibrous matter, which is the ground bark of the mavacure—a yellowish water filters during several hours, drop by drop, through the leafy funnel. This filtered water is the venomous liquor, but it acquires strength only when it is concentrated by evaporation, like molasses in a large earthen pot. The Indians from time to time invited us to taste the liquid. Its taste, more or less bitter, decides when the concentration by fire has been carried sufficiently far. There is no danger in this, the curare being deleterious only when it comes into immediate contact with the blood. The vapours, therefore, that are disengaged from the pans, are not hurtful, notwithstanding what has been asserted on this point by the missionaries of the Oronooko. Fontana, in his fine experiments with the poison of the *ticunas* of the river of Amazon, long ago proved that the vapours arising from this poison, when thrown on burning charcoal, may be inhaled without apprehension, and that it is false, as M. de la Condamine has announced, that Indian women, when condemned to death, have been killed by the vapours of the poison of the ticunas.

"The juice is thickened with a glutinous substance to cause it to stick to the darts, which it renders mortal, but taken internally, the Indians consider the curare to be an excellent stomachic. Scarcely a fowl is eaten (adds our author) on the banks of the Oronooko which has not been killed by a poisoned arrow. The missionaries pretend that the flesh of animals is never so good as when these means are employed. Father Zea, who accompanied us, though ill of a tertian fever, caused every morning the live fowl' allotted for our repast to be brought to his hammock, together with an arrow. Notwithstanding his habitual state of weakness, he would not confide this operation, to which he attached great importance, to any other person. Large birds, when wounded in the thigh, perish in two or three minutes; but it is often ten or twelve before a pig or a pecari expires." M. Humboldt does not seem to be acquainted with any certain antidote, if such exists, to this fatal poison. Sugar, garlic, the muriate of soda, &c. are mentioned doubtingly. (Tilloch's Philosophical Magazine, vol. lviii. p. 233. See also Orfila, vol. ii. p. 479.)

There is a curious paper on the plants employed by the ancient inhabitants of Europe for poisoning their arrows, by Coquebert, in Philosophical Magazine, vol. xviii. p. 163. He supposes that the juice of the various species of hellebore was used.

Dr. Christison remarks that the best account of the above poison is that by Emmert, published in 1818. They do not produce convulsions or spasms of the muscles, but sudden paralysis. In this way, death is probably caused by suspending the respiration. According to Emmert, the spine only is acted upon, and not the brain, p. 761.

and strong convulsions, with maniacal frenzy, ensued. He was relieved by an emetic. In Dr. Edwards' patient, as detailed by Orfila, the symptoms were excited by an injection containing a drachm of camphor. It induced staggering and great weakness, with mobility of mind.

Another instance is given by Professor Wendt of Breslau. An intemperate man took four ounces of camphorated spirits prescribed for him as an embrocation. Soon after he was seized with fever, burning heat of the skin, anxiety, pain in the stomach, giddiness, dimness of sight, and some delirium. Almond oil and vinegar restored him to health, without any vomiting. A difficulty in passing urine continued for some days. *

Dr. Eickhorn of New Orleans relates the effects produced on him from taking about 120 grains, as resembling the intoxication of champaigne. Copious perspiration and weakness ensued. †

Cocculus indicus. The fruit of the *Menispermum cocculus*, a native of Malabar and Ceylon. It is used in India for the purpose of intoxicating, and thus killing fish, and this is done by throwing the berries on the surface of the water. Goupil, a physician of Nemours, ascertained that it destroyed not only fish, but also carnivorous quadrupeds; and Orfila has proved the same on dogs. It acts, he observes, on the brain, and produces convulsions. ‡

Dr. T. D. Mitchell reports a case where a female took a drink from a bottle containing alcohol, in which the cocculus had been infused for the purpose of destroying vermin. She was comatose, foaming at the mouth, and now and then convulsed. A tobacco cataplasm excited vomiting and purging, and she was relieved. §

Boullay discovered in this substance a peculiar alkaloid, termed *picrotoxine.* It is highly poisonous. Ten grains of it killed a dog in the second paroxysm of tetanus. ‖

Coriaria myrtifolia, L. (Myrtle leaved sumach.) Sauvages states, that a labouring man and a child died in horrible convulsions, within half an hour after eating some of the berries of this plant. ¶

In July, 1828, four little girls in France ate some of the berries by mistake. They were all soon attacked with the signs of intoxication, the countenance was livid, and convulsions and loss of speech succeeded. The pupils became dilated, and comatose symptoms supervened. All, however, recovered after vomiting was induced, except the youngest, who sunk under the effects in sixteen hours. On dissection, the membranes of the brain were found much injected, the

* Christison, p. 763.

† American Journal of Medical Sciences, vol. xi. p. 248.

‡ Orfila's Toxicology, vol. ii. p. 305.

§ Western Medical Gazette, vol. i. p. 20.

‖ Annals of Philosophy, vol. ii. p. 468.; vol. xiii. p. 70. Brewster's Edinburgh Journal of Science, vol. v. p. 184.

¶ The seeds of the *Coriaria sarmentosa* of Forster (wine berry shrub of New-Zealand) are poisonous and produce convulsions and delirium. G. Bennet in London Medical Gazette, vol. viii. p. 752.

heart healthy, the lungs gorged, the œsophagus inflamed at its cardiac portion; and there were some red patches in the stomach and intestines. The membranes of the spinal cord were injected. *

In his experiments on animals with this substance, Professor Meyer of Bonn found that it excited violent fits of tetanus, succeeded by apoplectic coma. A drachm of the extract of the juice was sufficient to kill cats and dogs. On dissection, the brain is seen gorged with blood; the blood fluid, and the inner membrane of the stomach yellowish and shrivelled. †

As to the treatment proper in poisons of this class, although the operation of the more powerful is extremely rapid, yet emetics or the stomach pump are no less necessary. In the case of nux vomica this is particularly required, as its powder adheres with great obstinacy, to the inside of the stomach. Artificial respiration and tracheotomy are advised by Magendie and Orfila, in imminent cases. The latter also has found some benefit, in his experiments on animals, from giving diluted ether or spirits of turpentine. In case the poison has been applied to wounds, the cautery is proper.

Dr. Donne of Paris has announced that iodine, bromine, and chlorine are antidotes to strychnine, if they be given instantly. In numerous experiments on animals, he found the compounds previously prepared to be innocuous. It is, however, unfortunate that a delay of ten minutes destroys their power; and again, the salts of strychnine are more common than the pure alkaloid, and on these the antidotes have no effect. ‡

Poisonous mushrooms. The number and variety of these are so great that it will unnecessarily enlarge our pages to copy the botanical description of each. I will therefore only state a few characters which should lead us to doubt concerning their qualities, and for further particulars, refer to systematic writers on this subject.

The following indications should excite a suspicion of mushrooms: A marshy situation in the shade; the substance soft, porous, and moist; an ugly appearance, and the surface more or less dirty; a glairy coat covering the surface; a virulent smell; a bright colour, or a combination of different colours. We should also regard as dangerous all which have bulbous or soft stems, or have fragments of skin glued to their surface. §

The symptoms which generally arise from eating poisonous mushrooms are thus given in a report to the Society of Medicine of Bor-

* Dr. Roux of Montaubon. London Medical and Physical Journal, vol. lxi. p. 292. Burnett's Outlines of Botany, vol. iv. p. 887.

† Christison, p. 767. Rabbits are not affected by this poison

‡ Brande's Journal, N. S. vol. vi. p. 431. Annales D'Hygiène, vol. ii. p. 202. The fruit of the plant *Feuillea cordifolia* has been announced by Drapiez as an antidote against vegetable poisons. He poisoned dogs with the Rhus toxicodendron, hemlock, and nux vomica, and recovered them with this fruit. (Annals, vol. xv. p. 389.) This, however, is not original with M. Drapiez, as Moseley mentions the same plant as an antidote. (Moseley on Tropical Diseases, p. 37.)

§ Orfila's Toxicology, vol. ii. p. 335.

deaux, and which is quoted by Orfila with high approbation. "Pains of the stomach, gripes, nausea, evacuations upwards and downwards, are the first symptoms with which the patients are attacked. Shortly after, heat of the bowels and faintings; the pains become more continued and violent; cramps, convulsions, sometimes general, sometimes partial, and unquenchable thirst succeed; the pulse is small, hard, tight, and very frequent. When the symptoms, after having lasted a certain time, do not diminish in consequence of the relief afforded, vertigo, a stupid delirium, and drowsiness, affect some subjects, and are only interrupted by the pains and convulsions. In others there is no drowsiness; the pains and convulsions exhaust the strength; faintings and cold sweats come on, and death puts a period to this series of sufferings, after having been foreseen and announced by the patient himself, who has not lost his senses for a single moment."*

Poisonous mushrooms do not manifest their action generally until six or eight hours after they are eaten, and even twelve or sixteen sometimes elapse.

The appearances on dissection are as follows:—"Violet-coloured spots over the integuments, very extensive and numerous; the abdomen extremely bulky; the conjunctiva, as it were, injected; the pupil contracted; the stomach and intestines inflamed, and scattered over with gangrenous spots—sphacelus is present in some portions of this viscus, and the stomach and intestines are contracted, so much so, indeed, that in these latter the thickened membranes have obliterated the canal. The œsophagus, in one subject, was inflamed and gangrenous; and, in another, there was an intus-susceptio of the ileon from above downwards, for the space of three inches. One individual alone had the intestines distended with excrementitious matter. In none have any remains of the mushroom been found; they had been either completely digested, or evacuated. The lungs were inflamed and distended with black blood; the same congestion had taken place in almost all the veins of the abdominal viscera, in the liver, spleen, and mesentery. Inflammatory and gangrenous spots occur on the membranes of the brain, in its ventricles; on the pleura, lungs, diaphragm, mesentery, bladder, uterus, and even on the fœtus of a pregnant woman. The blood in this subject was extremely fluid; in other persons, it was almost coagulated. Extreme flexibility of the limbs was not a constant appearance."†

* Orfila's Toxicology, vol. ii. p. 334.

† Cases of poisoning by mushrooms may be found in Orfila's Toxicology, vol. ii. pp. 313—333. Foderé, vol. iv. p. 62.

Transactions Coll. of Physicians of London, vol. ii. p. 216. Case by Dr. Heberden.

London Medical and Physical Journal, vol. xii. p. 385. Case by Dr. Bardsley.

Ibid. vol. iii. p. 41. Case by Mr. Brande, from the *Agaricus glutinosus*.

Ibid. vol. xx. p. 457. Case by Mr. Parrot.

Christison, pp. 768—779.

Dr. Drake, Note to De Salle's Tables, p. 68.

Percival's Essays, vol. ii. p. 187. *Agaricus clypeatus*.

Dr. Clendenning's Lecture on the Fungi, in London Medical and Surgical Journal, vol. vi. p. 168.

Lancet, N. S. vol. iv. p. 93.; vol. v. p. 758.

Braconnot and Letellier have analyzed poisonous mushrooms. The latter discovered in one of them a principle which he called *amanetin*, and which appears to be highly deleterious.*

Treatment. Mushrooms are best combated by emetics, cathartics, and particularly enemas.

Secale cornutum. (Ergot, spurred rye.) There is some diversity of opinion concerning the real nature of this substance. By some, it is supposed to be a diseased process from the juices of the plant. Decandolle, on the other hand, states, that it is caused by the growth of a parasitic plant, a mushroom of the genus *sclerotium;* while, probably, the most numerous party assert that it is the work of an insect. General Field, of Vermont, stated, that he had observed flies puncturing the glumes of the rye during its milky state; and imitating this process himself with a needle, found that in four days a little black point appeared, which gradually became a spur.†

Whatever the cause may be, it is certain that this substance, either alone, or contaminating rye, has long been deemed a poison. It is thus stated to have given rise to epidemic diseases at various times, in France, Silesia, Prussia, Bohemia, Saxony, and Sweden. Perrault mentions, that in travelling through Sologne, in France, he was informed by some physicians and surgeons of that country, that the rye there was sometimes so corrupted, that those who ate bread made of it were seized with a gangrene, some in one part and some in another; some losing a finger, others a hand or the nose; and that this gangrene was not preceded by any fever, inflammation, or considerable pain, but that the parts fell off of themselves: the early symptoms were numbness, cold, and livid skin, pain, and swelling.‡

Tissot, in a paper in the Philosophical Transactions, presents a very copious account of the disease in question, and divides it into two forms, the spasmodic and gangrenous. He observes, that the first accurate account of it was published in 1596. The spasmodic disease prevailed, according to Hoffman, in 1648, 1649, and 1675, in Voigtland; in 1702, in Friburg; in 1760, in Saxony and Lusatia, and in 1722 in Silesia. It was frequently attended with epilepsy. The gangrenous form was known in France as early as 1630, and in 1650, 1670, and 1674, it raged in Aquitaine and Sologne. In 1709 it appeared in Switzerland. The symptoms were similar to those already noticed. It attacked persons of both sexes and all ages, and in some instances only the lower extremities became gangrenous, while in others, both upper and lower were affected.§

Mr. Srine has described its effects as occurring, in 1736, in Bohemia.

* Vauquelin's experiments on mushrooms may be found in the Philosophical Magazine, vol. xliii. p. 292.

† See on this subject, Brande's Journal, vol. ii. pp. 273. 320.; vol. iii. p. 429. Dr. Tully, who supports the opinion of Decandolle, in Silliman's Journal, vol. ii. p. 45. Gen. Field, in ibid. vol. ix. p. 359. Christison, p. 783. Burnett (Outlines of Botany, vol. i. p. 206.) says that the mushroom is not a *Sclerotium*, but *Acinula clavus*.

‡ Philosophical Transactions, vol. xi. p. 758.; see also vol. lii. p. 529., where cases are related that occurred at Orleans and Blois.

§ Philosophical Transactions, vol. lv. p. 106.

It commenced with an uneasy, stinging sensation, about the feet. To this, severe cardialgia succeeded, and the hands and head were soon after affected. The fingers were strongly contracted, and there was a sensation of burning in the hands and feet. Giddiness, mania, or coma, succeeded, accompanied with opisthotonos, and a foaming at the mouth. These symptoms were followed by a canine appetite. All those who had epileptic symptoms died. The pulse was natural, and the spasms left a stiffness of the limbs. The disease continued two, four, eight, and sometimes even twelve weeks. Out of five hundred persons, three children died.* Gangrene of the extremities has also been observed in animals from the administration of ergot.

By those who are not willing to concede so much power to this substance, the combined influence of famine and poverty is urged as sufficient to explain these endemic diseases. But from the results of experiments made of late years, the probability is in favour of the noxious nature of ergot.†

Dr. Lorinzer, of Berlin, (Lorimer, according to Dr. Christison,) relates some experiments made on the healthy subject. A single dose, two drachms, for example, excited giddiness, headache, pain, and spasms in the stomach, nausea and vomiting, colic and purging.‡

Instances of the dangerous effects of this substance (independent of its peculiar action on the uterus) are not uncommon.§

The different attempts at the analysis of ergot have not led to very satisfactory results.‖ Dr. Hooker of New-Haven, obtained an oil from it which possesses narcotic properties, but apparently exercises no power on parturient women.¶

Spurred maize. It appears from the researches of Roulin that Indian corn is very subject to the spur in Columbia, and that in this state it is noxious to man and animals. Individuals lose their hair and teeth from eating it, but are never attacked with gangrene or convul-

* Orfila's Toxicology, vol. ii. p. 349. There is a late account of the disease occurring in a part of France, in 1828. (North American Medical and Surgical Journal, vol. vii. p. 192.)

† See Samuel Cooper, first Lines, vol. i. p. 48. Rees' Cyclopedia, Art. *Ignis sacer*, contains some valuable remarks in favour of referring these diseases to deficiency of nourishment, rather than to diseased grain. It was at one time thought by some that the spotted fever which ravaged several districts in the United States, some years since, had its origin in part or altogether from eating this substance, combined with grain. The facts adduced are very unsatisfactory, and lead to no definite conclusion. Some observations on the subject are contained in the New England Journal, vol. v. pp. 133. 156. (an article by Professor Bigelow,) and p. 235.

‡ Edinburgh Medical and Surgical Journal, vol. xxvi. p. 453., from Rust's Magazine.

§ Dr. Swett, in Boston Medical and Surgical Journal, vol. xi. p. 420. Dr. Hulse in North American Archives, vol. ii. p. 81. Medico-Chirurgical Review, vol. xxv. p. 435.

‖ Analysis of Battley, in London Medical Gazette, February, 1831; of Wiggers of Berlin, Lancet, N. S., vol. xi. p. 782.

¶ Boston Medical and Surgical Journal, vol. x. p. 298.

sions. Hogs and mules also lose the hair, and poultry frequently lay their eggs without any shell. *

Diseased wheat. When the farinaceous part of this plant becomes converted to a black powder, it imparts injurious qualities to the bread. Foderé states that he saw, in 1808, colics and diarrhœas which arose from this cause.

Lolium temulentum, L. (Darnel.) Naturalized in the United States. Bread made from the farina of the seed of this plant, and taken to the amount of six drachms, caused distraction of thought, indistinct vision, torpor, debility, and drowsiness, and these were followed by efforts to vomit. Tremors of the limbs, great depression, and difficulty of speech and vomiting succeeded. † Similar effects were induced in a family from eating oat-bread mixed with darnel. The tongue exhibited a very strong trembling, and Seeger indeed remarks, that the trembling of the body is one of the most certain signs of poisoning by this plant. ‡ Animals, and particularly dogs, are affected in the same manner as man. Chickens, however, eat the seeds with greediness, and without any bad consequences. §

The *Lathyrus cicera*, L. and *Ervum ervilia*, L. (Bitter vetch,) have each proved noxious in France, from their seeds becoming mixed with wheat or rye, and thus forming part of the food used. The symptoms induced are very similar to those from darnel. ‖

Cytisus laburnum, L. (Laburnum.) The seeds and flowers of this plant are poisonous. Mr. North, of London, relates a case of a girl, four years old, in whom the eating of the flowers caused convulsive twitchings of the muscles of the face, cold skin, short and laborious respiration, very weak pulse, with ineffectual retchings. She was gradually relieved by vomiting and stimulants. ¶ Dr. George Johnston, of Berwick-upon-Tweed, saw three young children all under seven years, extremely ill from eating the seeds. They were relieved by vomiting. **

The active principle is contained both in the seeds and flowers. It was discovered by Chevalier and Lassaigne, and denominated *cytissine*. This acts both as a violent emetic and purgative. Chevalier took eight grains, which operated most violently, and he had to combat its effects by large doses of acidulated drinks. In small doses, cytissine causes vomiting, convulsions, and death, when administered to animals. ††

* Christison, p. 788. Edinburgh New Philosophical Journal, vol. vii. p. 217.

† London Medical Repository, vol. xiii. p. 260. This is the result of an experiment by Dr. Cordier on himself, with six drachms, taken early in the morning.

‡ Orfila's Toxicology, vol. ii. p. 352. Another case of the noxious effects of darnel is related in the Edinburgh Medical and Surgical Journal, vol. i. p. 106. It happened at Genoa, during the scarcity occasioned by its blockade in 1800. See also Christison, p. 732. Burnett's Medical Botany, vol. i.

§ Edinburgh Medical and Surgical Journal, vol. i. p. 107.

‖ Christison, p. 792.

¶ London Medical and Physical Journal, vol. lxii. p. 86.

** Loudon's Mazagine of Natural History, vol. vi. p. 74.

†† Thomson's Materia Medica, vol. ii. p. 111. London Medical and Physical Journal, vol. lxii. p. 93. Christison, p. 793.

Alcohol. On the effects of this poison, when taken as it ordinarily is by persons in habits of intoxication, it is not necessary for me to enlarge. I have only to refer to the effects of it in a pure state and in large doses, and then by comparing these results with the table published by Mr. Brande, of the quantity of alcohol contained in various kinds of liquors, an idea may be formed of the injury, and indeed danger, to which life is so freely and generally exposed.*

Mr. Brodie injected proof-spirits into the stomach of a rabbit; in five minutes, he lay motionless and insensible; the pupils of the eyes were dilated; there were slight convulsive motions of the extremities; the respiration was laborious, and he finally died at the end of an hour and fifteen minutes. In his further experiments, he found the stomach highly inflamed by the injection of this poison, but never observed any præternatural appearances in the brain. The symptoms, however, produced by spirits, are very analogous, he observes, to those caused by injuries of the brain.†

Orfila found proof-spirits to be a violent poison when injected into the cellular tissue, and that it produced the same effects as when introduced into the stomach. In animals killed with it, the villous coat of the stomach was constantly of a cherry red colour. Dr. Christison remarks, that he has several times observed the same appearances.‡ There is a beautiful plate (8th) exhibiting the effect of injecting proof-spirits into the stomach of a dog, in Dr. Roupell's Illustrations of the Effects of Poisons.

In what may be styled poisoning by alcohol, apart from the ordinary effects of intoxication, the comatose state becomes deeper and deeper, with dilatation of the pupils, and inability to swallow. Apoplexy is excited in some cases. "These, however, can scarcely be considered as simple poisoning, but as the result of poisoning developing a tendency to apoplexy." In those instances, where large quantities of spirits are swallowed, as for example, in wagers for prowess in drinking, coma comes on suddenly. The face then is sometimes livid, but more generally ghastly pale; the breathing stertorous, the pupils sometimes much contracted, but more commonly dilated and insensible, and if relief be not speedily obtained, death takes place, sometimes immediately, or at least in a few hours.

Mr. Bedingfield, whose experience unfortunately has been quite extensive, supposes that the degree of danger from intoxication may be best estimated by the irritability of the iris. If it (says he) retain its contractile power, the patient will generally recover, however overpowered his senses may be; but if it remain in a state of extreme dilatation when a strong light is directed upon it, a feeble hope of recovery can only be entertained. This paralysis of the iris is generally accompanied with apoplectic stertor, laboured and imperfect

* See Mr. Brande's Tables in his Journal, vol. v. p. 152.

† Eclectic Repertory, vol. ii. p. 269.

‡ Christison, p. 800. The experiments of Segalas are to be found in the Medico-Chirurgical Review, vol. x. p. 218.

respiration, and a slow oppressed pulse. Next to the insensibility of the iris, want of energy in the stomach indicates the greatest danger.*

Dr. Ogston, of Edinburgh, has published a valuable paper on this subject. Having seen a number of extreme cases, many of which ended in death, he is disposed to classify them with reference to the state of the pupil. In six cases out of twenty-six, it was contracted, and the coma was profound. The body generally preserved its natural warmth; the countenance was pale, and the breathing stertorous. The remaining twenty, with dilated pupil, had the pulse either imperceptible or very feeble and slow; the coma was profound, as in the former, the extremities often cold, the face generally flushed, and the breathing either laborious or calm, but usually slow. Convulsions were not a common consequence. The most dangerous cases, I need hardly add, were in the last class.†

Appearances on dissection. There is some difficulty in accurately ascertaining these, from the fact that most of the subjects have been in long continued habits of intoxication, and the results of this, rather than the immediate indications of poisoning, are present. Congestion, and even actual extravasation of blood in the brain, are not unfrequently found in those in whom apoplexy has been superinduced, and this, although the individual may be quite youthful. In a female, who for fourteen days had been very little in her sober senses, and at the end of that period died comatose, Dr. Christison found an enormous extravasation in the ventricles.‡

Should this morbid appearance be absent, it is still very common to find serum in the ventricles, much beyond the natural quantity, with a congested state of the membranes. The lungs are also dilated with dark fluid blood, and there is more or less of frothy mucus in their substance. The air passages are red, but the stomach has seldom been seen to bear the marks of irritation which we should expect, from the result of experiments on animals.§ It is hardly necessary

* Bedingfield, in Edinburgh Medical and Surgical Journal, vol. xii. p. 493. There is a paper from the French, well worthy of perusal, on the symptoms of intoxication, in New England Journal, vol. viii. p. 389.

† Phenomena of the more advanced stages of intoxication, with cases and dissections, by F. Ogston, M. D. Edinburgh Medical and Surgical Journal, vol. xl. p. 276. Larrey, in his Surgical Memoirs (p. 6.), says, that many French soldiers died in the Russian expedition from drinking the *chenaps* (schnaps), the brandy of the country. It is obtained from corn; and to this fermented liquor, plants of the narcotic class are added. Those who died showed the following symptoms: loss of muscular motion; vertigo and drowsiness; the eyes half closed, dull and weeping, and the conjunctiva appearing as though injected. These are to be considered as the *ordinary* effects of intoxication, and not what we understand as poisonous.

‡ Christison, p. 801. He also quotes cases from Bernt. See also Newbigging's case, Edinburgh Medical and Surgical Journal, vol. xxix. p. 412. Ogston's cases, ibid. vol. xl. p. 290. Andral's Dissections, Medico-Chirurgical Review, vol. xxvii. p. 99.

§ Christison particularly remarks this. A case is also given in the Lancet, vol. x. p. 571., where a chimney-sweep drank eighteen glasses of rum in quick succession (upwards of a quart). He died in six hours. On dissection, the brain presented bloody spots; on being sliced, its sinuses were loaded with blood; there was but little serum in the ventricles, and the *stomach was natural.*

to add, that in habitual drinkers, the liver, kidneys, &c., will be more or less diseased.

It has been a curious question, whether, in persons dead from alcohol, the presence of that substance can be detected by the smell. We know that during life the breath is strongly tainted with it. Dr. Cooke, on the authority of Sir Anthony Carlisle, mentions an instance where the fluid found in the ventricles of the brain had the smell and taste of gin. Dr. Christison quotes Dr. Wolff for a similar case where the fluid in the ventricles had the smell of brandy, although the contents of the stomach had not. Dr. Ogston examined the body of a woman who drowned herself in a state of intoxication. "We discovered nearly four ounces of fluid in the ventricles, having all the physical qualities of alcohol, as proved by the united testimony of two other medical men who saw the body opened, and examined the fluid. The stomach also smelt of this fluid."

On the other hand, many cases occur of persons dying in a state of intoxication, in which this is not perceived; and Dr. Christison says, that he has "several times remarked, that the venous blood and brain of a fresh subject had a smell, which a prepossessed person might have confounded with that of alcohol, although no spiritous liquor had been taken before death." *

Treatment. From numerous observations, it would seem that carbonate or acetate of ammonia given internally, is one of the best remedies for counteracting the severe effects of intoxication. † The cold effusion is very useful, unless the temperature of the body be so low as to render it improper. In such cases, every effort to maintain or restore the natural warmth must be made. Emetics, or the stomach pump must also be used. As to venesection, unless the present symptoms indicate its necessity, it is not to be recommended. Many, no doubt, have sunk from its rash use.

Sulphuric ether, introduced into the stomach of animals, when the œsophagus was tied, produced vertigo, great weakness, difficult breathing, drowsiness, and death. The mucous membrane of the stomach was highly inflamed, as was also the duodenum; the blood in the heart was black, partly fluid, and partly coagulated. ‡

"Some years ago," says Dr. T. D. Mitchell, "a practice obtained among the lads of Philadelphia, of inhaling the vapour of sulphuric

* "A man was convicted at Perth, in 1818, of culpable homicide, for having given no less than nine glasses of spirits to a boy of ten years of age, and of which he died in a few hours. He was sentenced to twelve months' imprisonment." (Alison's Principles of the Criminal Law of Scotland, p. 99.)

† Dr. Dupuy, of Alfort, injected alcohol into the jugular vein of a horse. It caused all the effects of intoxication, staggering, redness of the conjunctiva, &c. Five grains of carbonate of ammonia, dissolved in water, were then also injected, and the above symptoms immediately ceased. (Lancet, N. S., vol. viii. p. 76.)

‡ Orfila's Toxicology, vol. ii. p. 342. Dr. Godman has announced a curious result from the inspiration of the vapour of sulphuric æther. It produces all the effects of nitrous oxide. Its exhilarating effects were striking, but in one individual, a female, predisposed to consumption, the muscular action induced left a cough, derangement of mind and pain. She had several attacks of violent syncope, and remained ill for some time. (Godman's Western Reporter, vol. ii. p. 111.)

ether by way of sport. A small quantity placed in a bladder, was almost instantly converted into vapour, by the application of hot water. By means of a tube and stop-cock, the gas could be easily inhaled. In some instances, the experiment excited mere playfulness and sprightly movement, but in several cases, delirium, and even phrenitis was induced, which ended fatally."*

Nitric ether. A gentleman communicated a case at the London Royal Institution, April, 1830, which had lately happened at a druggist's from a carboy of nitric ether being placed in a bed-room, and which, bursting in the night, the chamber became filled with the vapour. It had no chimney, and the door was shut. The servant who slept in it was dead. It is added, that this was the second case that had come to the knowledge of the writer. †

A female in the service of Mr. Thomas, druggist at Hay, Breconshire, went to bed in perfect health, but did not rise the next morning at her usual hour. On going to call her, the door was found fastened, and on breaking it open, she was seen dead, lying on the right side, with the arms folded across the breast, as in profound sleep, and the features calm.

The body was opened. The coats of the stomach were a little inflamed, and it contained a little fluid. The intestines were turgid and the lungs gorged. The uterus was found impregnated, and bearing a three months' male fœtus. The dissection proceeded no farther. In the room was a large jar, containing upwards of three gallons of nitric ether, broken, and the contents spilt about the room. The apartment, being small, and the atmosphere strongly impregnated with this vapour, the medical witnesses were of opinion that the effluvia caused her death, and such was the verdict of the coroner's jury. ‡

Empyreumatic oils. Some of these act powerfully on the human system, and two are mentioned by Professor Christison, which deserve a brief notice.

One is the empyreumatic oil procured by the destructive distillation of lard. Buchner found that five drops introduced into the throat of a bird proved nearly fatal. The symptoms were excessive exhaustion, slow respiration, and insensibility.

Dippel's oil, or rectified empyreumatic oil of hartshorn. Chaussier relates a case where an individual took a spoonful by mistake, and died immediately. No morbid appearances could be found. Another case is quoted from a French journal, where a female took designedly an ounce and a half. From what could be ascertained, it appears that she vomited, and not finding the action of the poison to her wishes, threw herself into a well and was drowned. The whole body exhaled the peculiar fœtid odour of the oil. The palate, tongue, throat, and

* Mitchell's Chemistry, p. 172.

† London Medical Gazette, vol. vi. p. 88.

‡ Midland Medical and Surgical Reporter, vol. i. p. 232. Edinburgh Medical and Surgical Journal, vol. xxxv. p. 452. "The woman seems to have died, as in cases of poisoning with carbonic acid, from slow obstruction of the breathing, from gradual asphyxia; and in no other circumstance is it usual to find such extensive and intense congestion of the mucous membranes." (Ibid.)

gullet were white and shrivelled. The stomach outwardly was of a rose tint, crossed by gorged black veins, which here and there had burst and formed patches of extravasation. The oil and some extravasated blood were found in it. Its villous coat was thick, covered with red points, and corrugated. The intestines had similar, but inferior marks of irritation.*

Oil of tar. A young man aged eighteen took two or three draughts of this substance, and soon became insensible; the pulse was scarcely perceptible, and the extremities cold. The stomach pump and external stimulants were used. Venesection was then tried, with an active enema, but without benefit. The coma continued, and he died in about twelve hours after taking it. On dissection, the mucous membrane of the larynx and trachea was seen highly injected: the lungs gorged with blood, and smelling strongly of the oil. The stomach paler than natural, and in one portion an orange yellow spot. The brain natural.† Other instances have occurred, where, in less quantity, it produced violent vomiting, prostration of strength, and pain.

In connection with these, I may mention the new substance lately discovered by Reichenbach, and termed *Kreosote* or *Creosote*. It is derived either from pyroligneous acid or from the tarry matter that distils over along with that acid. When in a concentrated state, it destroys the epidermis, and insects and fish thrown into it immediately die. According to Miguet, it acts by irritating the surfaces to which it is applied. Redness of the mucous membrane will hence be produced, and the poison may be detected by its odour, and by the alimentary matters coagulating albumen. In dogs poisoned by it, mucus was rapidly secreted in large quantities, and produced suffocation.‡

It has been suggested that Dippel's oil, oil of tar, &c., owe their noxious power to the creosote contained in them.

Cyanuret of iodine. Orfila ranks this among the narcotico-acrid poisons in consequence of the experiments of Scouteten. When it was given to dogs, convulsions almost instantly occurred, with immediate death. Half a grain was sufficient to destroy a rabbit, and five grains a dog. The stomach was generally found somewhat inflamed.§

Lassaigne appears also to have experimented with it. One grain and a half given to a dog produced attempts to vomit, paralysis of the limbs, dilatation of the pupils, and stiffness. Death succeeded at the end of fifteen minutes. The body was opened immediately. There was intense inflammation of the stomach, with an ulceration at the cardiac extremity. The upper part of the duodenum was also red.‖

The *cyanuret of bromine* would seem, from the experiments of

* Christison, p. 806. Edinburgh Medical and Surgical Journal, vol. xxxiv. p. 214.

† Lancet, N. S., vol. xiii. p. 902.

‡ Edinburgh Medical and Surgical Journal, vol. xli. p. 248. London Medical and Surgical Journal, vol. vi. p. 503.

§ Orfila's Toxicology, 2d edition, vol. ii. p. 344.

‖ London Medical Repository, vol. xxiv. p. 573., from Journal de Chimie Medicale.

Serrulas and Barthez, to be equally deleterious. One grain, dissolved in water and given to a rabbit, instantly killed it.*

Other compounds of cyanogen possess deleterious qualities; and until their nature is better understood, they may also be arranged under this head.

Chloride of cyanogen. (Chlorocyanic acid.) Serullas, who first obtained this substance in a pure state, found it highly poisonous. A grain dissolved in alcohol, and introduced into the œsophagus of a rabbit, killed it instantly. An ounce of water in which another grain had been agitated destroyed a rabbit in twenty-five minutes.† "It is corrosive to the skin, and highly injurious to animal life."‡

Cyanuret, or cyanide of potassium. A few grains placed on the tongue of a dog produced marks of inflammation. A tenth of a grain killed a linnet in sixty seconds, and less than one grain a Guinea pig in two or three minutes. These experiments were made by Robiquet and Villerme.§ It has also proved poisonous when given as an enema: six grains *moistened*, but yet in a mass, being added to six ounces of water. The effects were strong convulsions, violent contractions of the limbs, and dilated pupils. The patient, however, recovered soon from these. A fourth enema was subsequently given, of the same ingredients, except that the cyanuret was *boiled in it, and so moist* that it adhered to the sides of the injection bag. No bad effects followed. A fifth was given in thirty-six hours after, with the same quantity of well-dried cyanuret. Convulsions, difficult respiration, and dilated pupils followed, and the patient died in an hour. The difference in effect is ascribed to the decomposition of the cyanuret by moisture.‖

I have thrown in the following note a catalogue of such noxious plants and their products, unarranged in the various classes of poisons, as I have met with during the preparation of this work. Some are of our country, while others are foreign; and probably the majority belong to the narcotico-acrids.

Sanguinaria canadensis, L. (Blood root. Puccoon.) A native of the United States. This is considered by Dr. Bigelow as an acrid narcotic. A dose of from eight to twenty grains of the fresh-powdered root produces irritation of the fauces, heartburn, nausea, faintness, and frequently vertigo and diminished vision. Vomiting is occasionally produced. (Bigelow's Medical Botany, vol. i. p. 79.) Dr. Mease mentions on the authority of Dr. Muhlenberg, that a temporary insanity was induced in a female from swallowing the seeds. (Coxe's Medical Museum, vol. ii. p. 161.) Professor Tully's elaborate essay on this plant will be found in the American Medical Recorder, vol. xiii. p. 1. Professor Dana discovered an alkaloid in it, denominated *sanguinarine*.

Dirca palustris, L. (Swamp leather wood.) A native of this country. The berries are poisonous. (Rafinesque's Medical Flora, vol. i. p. 160.) From its affinity to the genus Daphne, it is probably an acrid poison.

* Philosophical Magazine and Annals, vol. i. p. 397. American Journal of Medical Sciences, vol. iii. p. 479.

† Silliman's Journal, vol. xvi. p. 258.

‡ Turner's Chemistry, 5th edition, p. 436.

§ Edinburgh Medical and Surgical Journal, vol. xxi. p. 494.

‖ Orfila in Annales d'Hygiène, vol. xi. p. 240. The case occurred to Dr. Trouvé.

Chailletia toxicaria, and *C. erecta*, Don. Mr. Don observes that these grow on the mountains of Sierra Leone. "The English name of the first species is *ratbane*. There is a deadly poison prepared from the kernel of the fruit by the negroes, which they use for the purpose of poisoning rats; whence its name." The kernels of the other species possess similar poisonous properties. (Edinburgh Philosophical Journal, vol. xi. p. 348.)

Robinia pseudo-acacia, L. Dr. Gendron of Montpelier relates of some school-boys who had chewed the bark of the root, and swallowed the juice, and in whom in three hours were presented symptoms of a narcotico-acrid poison, as vomiting, lethargy, and slight convulsions. (Philadelphia Journal of Pharmacy, vol. vi. p. 285.)

Piscidia erythina, L. (Fish wood, Jamaica dogwood.) The bark is thrown into the water to intoxicate fish. Dr. Hamilton tried its effects on himself in the form of tincture. It produced some irritation, which was succeeded by profound sleep. (Burnett's Outlines of Botany, vol. ii. p. 654.)

Abrus precatorius, L. The scarlet seeds of this plant are used as necklaces and rosaries. It is the common opinion that they are poisonous. Indeed a single one swallowed by a child is said to have caused death. (Edinburgh Encyclopædia, vol. xv. p. 808., American edition. See also Ainslie's Materia Indica, vol. ii. p. 80; and Penny Magazine, vol. ii. p. 211.) Burnett (Outlines, vol. ii. p. 666.), however, doubts this, and says that they are eaten in Egypt.

Hura crepitans, L. (Sand-box; Monkey's dinner bell, so called from the noise of its capsules breaking.) The seeds of this plant, according to Aublet, are poisonous. It vomits and purges in a dose of two grains. A native of Guiana. (Annales d'Hygiène, vol. vii. p. 200. Burnett's Outlines of Botany, vol. ii. p. 607.) Probably an acrid poison.

Anda gomesii, Jussieu. Grows in Brazil. The decoction of the bark is used by the natives for stupifying fish. An oil is obtained from the seeds, which is both cathartic and emetic. (Burnett, vol. ii. p. 609. F. Smith in Philadelphia Journal of Pharmacy, vol. iv. p. 26.)

Æsculus ohioensis, Michaux. *Æ. pallida*, Willdenow? (Buckeye.) Dr. Drake states that cattle are poisoned by eating the nuts. It induces gastritis, and they are previously affected with vertigo and trembling of the limbs. (Notes to Desalle, p. 9. Dr. Short in Transylvania Journal of Medicine, vol. i. p. 422.) It is undoubtedly an acrid narcotic. See Riddel's Flora.

Æsculus pavia, L. *Pavia rubra*, Lam. (Buckeye.) "The narcotic property of this shrub has given rise to a singular mode of taking fish, practised, though not frequently, in some parts of this State. The tender branches are bruised, and thrown into a pool of small extent; the water is then agitated, until it becomes sufficiently impregnated to affect the fish; they rise to the surface almost lifeless, and may be taken by the hand. The powdered seed may be used with equal effect. Fish taken in this manner are eaten with impunity." (Elliot's Botany of South-Carolina and Georgia, vol. i. p. 435.)

Melia azederach, L. (Pride of China or India, Poison-berry tree, China tree.) A native of the East, but also grows in our southern States. Elliot observes that its decoction is narcotic, and it was mentioned in the newspapers some time since that a child had died from eating the seeds. Dr. Heustis remarks, that if exhibited in too large quantities, "it is highly poisonous, affecting more especially the head and eyes, and sometimes causing total blindness." (Elliot's Botany, vol. i. p. 476. Barton's Materia Medica, part i. p. 41. American Journal of Medical Sciences, vol. viii. p. 82. Ainslie's Materia Indica, vol. ii. p. 456. Dr. Griffith in Philadelphia Journal of Pharmacy, vol. vii. p. 180.)

Amyris toxifolia, toxifera, L.? (Janca, or White candle wood.) This is said to be a native of Carolina; and a black juice which distils from the trunk of this tree is stated to be very poisonous. (Burnett's Outlines of Botany, vol. ii. p. 875.)

Polygala venenosa, Juss. A native of Java. Commerson says, "that even from gathering a few of its leaves and branches, he was attacked with giddiness, sickness, and other unpleasant symptoms." (Burnett's Medical Botany, vol. ii.)

Passiflora quadrangularis, L. (Barbadine.) A strong infusion of its root produced catalepsy and death in a dog; and on dissection, the arachnoid membrane was found injected, the vessels of the lungs all filled, and black blood in the heart. (Dr. Ricord

Madianna in Annals of the New York Lyceum, vol. i. p. 129.) It is a native of the Isle of France, but cultivated in Guadaloupe. It is said to owe its activity to a peculiar principle, called *passiflorine*.

Chenopodium murale, L. (Wormseed.) A native of the southern States. Dr. Henry Wilkins, of Baltimore, states that he has known of two instances of children convulsed for an hour from swallowing the seeds. (Coxe's Medical Museum, vol. v. p. 256.)

Gelsemium nitidum, Michaux. (Yellow jessamine. *Bignonia sempervirens*, L.) The flowers, roots, &c. of this shrub are narcotic, and the effluvia from the former are said sometimes to induce stupor. Dr. Mease mentions that a child died in Charleston, S. C, from eating the flowers. (Elliot's Botany of South-Carolina and Georgia, vol. i. p. 312. Memoirs of the Philadelphia Agricultural Society, vol. v. p. 244.) In the newspapers of May, 1823, it is mentioned that a child of Mr. Broughton of North-Carolina, aged two years, died in the space of two hours, after eating the flowers of this plant. Blindness ensued within a minute or two after swallowing it. See Prof. Tully's experiments, in Boston Medical and Surgical Journal, vol. vii. p. 117.

Kalmia latifolia, L. (Mountain laurel. Laurel in Pennsylvania, Bay in Virginia.) A native of the United States. Barton says that the Delawares (Indians) poison themselves with a decoction of this plant. It is poisonous to some animals, as cattle and sheep; and in man, a very small quantity of the decoction has produced vertigo and convulsions. (Barton's Medical and Physical Journal, vol. i. part i. p. 147. Barton's Materia Medica, part i. p. 18. Bigelow's Med. Botany, vol. i. pp. 137. 139.)

Gualtheria procumbens, L. (Spicy winter-green), and *Andromeda*, are allied genera to the Kalmias. In the Annals of Medicine, vol. iii. p. 364, is a case by Dr. Longmore, of a number of soldiers poisoned at Quebec, from a tea made of the andromeda, gualtheria, and sedum. It produced vertigo, weakness, vomiting, cold sweats, and in one case insensibility. They gradually recovered, after extreme debility. See also Barton's Materia Medica, part. i. p. 19. Bees which feed on the azalea, rhododendron, and kalmia, are supposed to produce poisonous honey.

Senecio obovatus, Willd. A native of this State. It is said to have proved a deadly poison to sheep. (Silliman's Journal, vol. xv. p. 358.)

Arnica montana, L. (Leopard's bane, Mountain tobacco.) Chevallier and Lassaigne have detected cytissine in it. (Duncan's Supplement, p. 27.)

Echites suberecta, Jacq. (Savanna flower of Jamaica.) According to Mr. Sells, two drachms of the expressed juice of this plant killed a dog. Animals and men have been destroyed by it. Some negroes attempted to poison an overseer by putting a quantity of the powdered root into water intended for drinking, but it was detected. Six grains of this powdered root were given to a dog, who died in less than three hours. (Brande's Journal, N. S., vol. iii. p. 502.)

Spigelia marilandica, L. (Pink root.) A native of the United States. This, in large doses, is a violent poison. Its decoction produced vertigo, dimness of sight, and pain, in two children who took it; one vomited, but was not relieved; staggering, incoherent talking, and delirium took place, until they fell asleep; they awoke relieved. The pupils were dilated during the influence of the poison. Dr. Chalmers attributes the loss of two children who died in convulsions to this article. (Edinburgh Physical and Literary Essays, vol. i. p. 438. Dr. Lining. Ibid. vol. iii. p. 149. Dr. Garden. Barton's Medical and Physical Journal, vol. i. part ii. p. 74. Dr. W. P. Barton's Medical Botany, vol. ii. p. 80. Bigelow's Medical Botany, vol. i. p. 146.)

Hæmanthus toxicarius, Aiton (The old Amaryllis toxicaria, or distacha), is the plant with which it is said the Hottentots poison their arrows. Weapons wetted with the juice of the bulb convey certain death by the slightest wound: dissolution is preceded by violent struggles and efforts to vomit. (Burnett's Outlines of Botany, vol. i. p. 448.)

Amaryllis atamasco, L. (Atamasco lily, Stagger grass.) Southern States. Generally supposed to be poisonous to cattle, and to produce the disease in calves called *staggers*. (Elliot's Botany of South-Carolina and Georgia, vol. i. p. 384.)

Helonias erythrosperma, Mich. (Red-seeded helonias, Fly poison.) Southern States. This plant is a narcotic poison, and is employed in some families for destroying the house fly. It is mixed with honey or molasses. The flies, unless swept into the fire or otherwise destroyed, revive in the course of twenty-four hours. (Elliot's Botany

of South-Carolina and Georgia, vol. i. p 421.) Dr. Tully has experimented on this. (Boston Medical and Surgical Journal, vol. i. p. 136.)

Caladium seguinum, Vent. I add this on the authority of some remarks extracted from Hooker's Exotic Flora. This plant is a native of the West Indies, and is there called *dumb cane*, from the fact that its virulent juice, when applied to the tongue, causes a swelling which deprives the sufferer of the power of speech. From its affinity to the genus *Arum*, it is probably an acrid poison. The *Caladium arborescens* is so caustic, that occasionally (says Merat) the lips of negroes are wetted with it, as a punishment for slight misdemeanours. (Edinburgh Philosophical Journal, vol. vii. p. 395. Coxe's Medical Museum, vol. i. p. 185. Burnett's Outlines of Botany, vol. i. p. 411.)

Symplocarpus fœtida, Salisbury. *Ictodes fœtidus*, Bigelow. (Skunk cabbage.) A native of the United States. This plant emits a very pungent odour from the spathe and flower. Dr. Barton was seized with inflammation of the eyes, in consequence of the necessary examination which he gave to it. A dose of thirty grains of the root has caused vomiting, headach, vertigo, and temporary blindness. (Dr. W. P. Barton's Medical Botany, art. *Symplocarpus*. Bigelow's Medical Botany, vol. ii. p. 48.)

Equisetum hyemale, L. (Scour grass.) A native of the United States. I formerly placed this among the irritant poisons, but am now convinced that its noxious qualities are owing to the silex contained in it. According to the analysis of Braconnot, out of the ashes furnished by the dried plant more than half is silex. There is no question that horses and cattle are sometimes destroyed from eating it; and on examination, the stomach is found cut and lacerated. (Edinburgh New Philosophical Journal, vol. viii. p. 101. Barton's Medical and Physical Journal, vol. i. part i. p. 149. Nuttall's Journey in the Arkansaw, p. 58.)

Oil of tansy (Tanacetum vulgare, L.) A female, aged twenty-seven, in Boston, took half an ounce. Spasms ensued; and although emetics and the stomach pump were used, she died in two hours. On dissection, a strong odour of tansy was perceived; the blood was dark and thick; the stomach and intestines were healthy. (Case by Dr. Hildreth, Boston Medical Magazine, vol. iii. p. 213.) Dr. Daniel Drake mentions, that within the year 1833, two persons (both young women) have died in Cincinnati, from the distilled oil of tansy. One took it by mistake; the other was probably a suicide. (Western Journal of Medical and Physical Sciences, vol. vii. p. 569.)

Oil of winter-green (Gualtheria procumbens, L.) An individual in New-York was supposed to be poisoned by this, in 1832. He had been intemperate, but was not otherwise disordered. Death ensued in fourteen hours; and on dissection, marks of inflammation in the stomach were seen. Probably a fluid ounce had been taken. (Philadelphia Journal of Pharmacy, vol. vi. p. 289.)

Oil of cedar. An individual at Saratoga Springs died in convulsions, about half an hour after taking some of this.

COMPOUND POISONING.

It is to be expected that when two poisons of different or opposite properties have been taken, their effects will vary materially from those produced by either singly. The known facts on this subject, however, consist at present only of individual cases, and I will mention some of the more important.

Arsenic and corrosive sublimate. An individual took about fifty grains of each, mixed together, for the purpose of suicide; but experiencing a burning heat in his bowels in about five minutes, took an emetic, which caused him to evacuate a portion of the poison. Excruciating pain and severe thirst were present. By the aid of emetics and diluents he became somewhat relieved. A diarrhœa ensued, which lasted eight days. On the second day, besides this, vomiting recurred, with convulsive twitchings. The treatment was directed to

the removal of inflammation. Under this he improved, but was delirious a portion of the time. On the sixth day, mercurial ptyalism commenced; and although extremely weak, the immediately dangerous symptoms subsided, and he gradually, but slowly, convalesced.*

Arsenic and laudanum. Mr. Jennings relates a case, where a female swallowed two drachms of arsenic and three ounces of laudanum at the same time. He saw her in four hours after. There was no pain or burning in the throat, stomach, or bowels; no tenderness of the abdomen, and no particular stupor. She complained merely of being tired and sleepy, from the violent effects of an emetic about two hours previously. The eyes were bloodshot and heavy, the pupils contracted, and the pulse 100. All the usual symptoms of arsenic were absent. An emetic, venesection, leeches, blistering, and the cold effusion were prescribed, and she was kept walking; but the drowsiness increased, and she finally became comatose, and died in that state, with dilated pupils and laborious breathing, about nine hours after taking the poison. There had been no pain in the stomach, and the bowels were but once moved.

On dissection, the membranes of the brain were found vascular, the sinuses gorged, the large veins filled with a treacly-like blood, the ventricles free of fluid, the brain firm, and its bloody points unusually numerous. The stomach was externally healthy. It contained half a pint of fluid. Its villous coat was generally pale, but at the great arch there were two small red patches. The small intestines were red, and some had patches. The heart was rather flaccid, and its great vessels were not gorged with blood. Arsenic was obtained from the fluids of the stomach.†

Arsenic and alcohol. Two cases of this description are mentioned by Dr. Christison. In one, the arsenic was taken after a meal. After ineffectual attempts to produce vomiting by emetics, the stomach pump was used, and a fluid brought up in which arsenic was detected; but no symptom of arsenical poisoning followed. Dr. Christison imagines that the operation of it was prevented by the narcotism previously induced by the ardent spirits. In the other instance related by Dr. Wood of Dumfries, where half an ounce of arsenic was taken early in the morning, after a night's debauch, there was no symptom, but languor and drowsiness. A few minutes afterwards he had slight vomiting, which was repeatedly renewed. In eighteen hours, he presented the usual constitutional symptoms of poisoning with arsenic, and in forty-one hours he expired. But from first to last he had scarcely any local symptom, except vomiting, although the stomach presented, after death, signs of violent irritation.‡

* Julia Fontanelle, in Archives Generales. Medico-Chirurgical Review, vol. vii. p. 565.

† Edinburgh Medical and Surgical Journal, vol. xxxv. p. 453., from London Medical and Physical Journal, October, 1830. There is another case by Mr. Scott, in which the effects of the arsenic decidedly predominated, and the mucous membrane of the stomach was readily detached, after death. (Medico-Chirurgical Review, vol. xi. p. 170.)

‡ Christison, p. 808.

Corrosive sublimate and laudanum. Two drachms of the former and half an ounce of the latter, were swallowed by a young soldier at Edinburgh. He had at first no violent symptoms whatever indicating the operation of corrosive sublimate, but afterwards suffered under purging, tenesmus, and bloody stools. There was, however, no pain or tenderness of the abdomen. On the fourth day, a violent salivation commenced, and under this and the dysentery he sunk; yet not so much but that on the day of his death, the ninth day after he took the poison, he was able to walk a little in his room without assistance. The stomach and intestines were enormously inflamed, ulcerated, and here and there almost gangrenous. Dr. Christison, who received this case from Dr. Mackintosh, imagines that the narcotic operation of the opium retarded the irritant action of the corrosive sublimate.*

Tartar emetic and charcoal fumes. An individual, after swallowing seventeen grains of the former, attempted to commit suicide by suffocating himself with the fumes of burning charcoal. He recovered from both attempts; suffered severely from the usual narcotic effects of carbonic acid gas, but showed scarcely any of the symptoms of the action of tartar emetic.

Opium and belladonna. The lady of a medical man took successively three injections, each containing a scruple of opium and half an ounce of the leaves of belladonna. They were all returned. This was in the evening. During the night, her husband became alarmed at her profound sleep, and sent for aid. The pupils were extremely dilated, the tongue dry, deglutition difficult, respiration short and frequent, and the pulse 130. The limbs were perfectly motionless, and the skin insensible to irritation. Purgatives, venesection, and sinapisms were used with success, but the vision remained indistinct for the next day.†

Laudanum and alcohol. The excitement of intoxication sometimes suspends for a time the action of laudanum, but the symptoms of stupor then occur. In one instance, seen by Dr. Christison, there was no delay; and the narcotism came on in one hour, and death succeeded in four more.‡

Orfila has published an elaborate memoir on the detection of mixed poisons. I can only mention a few of his formulæ.

Mixture of corrosive sublimate and arsenious acid. These are separated by adding sulphuric ether, and shaking the mixture until the sublimate is dissolved. The liquor is then evaporated to obtain it. This will apply, whether the mixture be in the solid or fluid state.

Corrosive sublimate and acetate of copper. Here also ether is to be used as in the last, the acetate not being soluble in it.

Corrosive sublimate and tartar emetic. The same process.

Arsenious acid and tartar emetic. Boil the mixture with carbonate of potash. Soluble arsenite and tartrate of potash, and oxide of antimony will be obtained. The latter is soluble in hydrochloric acid,

* Christison, p. 809.
† Medico-Chirurgical Review, vol. xvii. p. 563.
‡ Christison, p. 809.

affording hydrochlorate of antimony. Treat the fluid with sulphuretted hydrogen and a few drops of hydrochloric acid, and sulphuret of arsenic will be precipitated.

Laudanum and arsenious acid. Filter and apply sulphuretted hydrogen. The laudanum dissolves only a small portion of the acid.*

* The Memoir of Orfila may be found in the Annales d'Hygiène, vol. vii. p. 627; and an Analysis of it, in American Journal of Medical Sciences, vol. xi. p. 179.

CHAPTER XXII.

MEDICAL EVIDENCE.

Why physicians are called as witnesses; statutory regulations on this in various countries. Duties of the medical witness before the coroner and his jury. Neglect of medico-legal examinations. Capacity of all medical men to be witnesses. Necessity of the appointment of medico-legal examiners by the State. Regulations in Austria — Prussia; practical school of legal medicine in the latter country. Defects of the present system in England and the United States; duties of medical men while it remains in force. Medical witnesses before a court; rules for their conduct in the statement of facts — in giving opinions. Fluctuations of opinion on several subjects of importance — hydrostatic test in infanticide. The witness to avoid being a partisan. Testimony to be estimated according to the skill and knowledge of the witness. Difference of opinion; rule on this in the Scotch courts; a reference to authorities proper. Witness obliged to divulge secrets. Validity of death-bed declarations.

No treatise on Medical Jurisprudence is complete at the present day, unless it embraces some remarks on medical evidence: but I confess that I do not approach the subject with the same alacrity that I have done others, and principally from a conviction that what I may say or offer will pass unheeded by those to whom it is principally addressed. I refer to our lawgivers, with whom alone it remains to give a new and proper impulse to the science of medical jurisprudence, and to make that infinitely more available to the ends of justice and the prevention of crime than it has ever yet been in this country.*

The duties of the physician or surgeon are not bounded by his responsible and interesting attendance on the sick. He is often called upon to exercise other functions. His opinion is desired in cases of sudden death — of grievous bodily or mental injury — or on the nature of particular diseases and affections. This, indeed, is the natural result of a proper regard for the interests of society. Whenever the importance of equal laws becomes fully recognised in a country, and the necessity of distributing impartial justice fully understood, it will soon suggest itself to the legislator that if evidence is required, it should be of the most unexceptionable and satisfactory nature. When the controversy originated in mercantile disputes, the opinions of merchants were of course sought for and depended on, and their customs and usages have indeed become a part of the statutes of various countries. So also when unexpected death followed from known or supposed injury — when the suspicion of violence entered into the list of causes,

* Many of the remarks in this chapter are taken from the Annual Address delivered before the State Medical Society in 1828, when I was honoured with the office of president.

it was natural that, sooner or later, those should be called upon to examine and testify whose ordinary studies and pursuits best enabled them to decide. We find that it is now three centuries since a formal enactment in an European code recognised this principle. The Emperor Charles the Fifth (as I have already stated in the introduction), in the celebrated Criminal Code framed by him at Ratisbon, in 1532, ordained that the opinion of medical men should be taken in every case where death had been occasioned by violent means; such as child murder, poisoning, wounds, hanging, drowning, and the like. France and other continental states soon followed this example, and improved upon its directions. In England, the country from which we derive our laws, I believe I may say with perfect accuracy that no statutory provision on the subject is to be found. Custom, however, and sometimes legal dicta, have sanctioned what the necessity of the case has rendered imperious—an appeal to medical testimony.* The same remarks may, to a great extent, be applied to our country; and it is to be regretted that in both the qualifications for the office of coroner are so little regarded. It would seem indispensable that he be properly versed both in the legal and medical knowledge required from time to time in the discharge of his office.† It cannot be denied that a full and satisfactory medico-legal examination is avoided as often as public sentiment will permit; and even when judicially ordered, its proper objects are often thwarted, or not fully accomplished. The consequences may be seen in the result of many of our criminal trials. The public mind may be deeply and permanently impressed with the guilt of individuals, yet the imperfection of the early examination has been such as to leave no option to the jury but to release the accused.

In cases of violent death, and these are the most important as well as the most common, in which professional witnesses are summoned, their duties may be considered under two divisions—first, before the coroner's inquest; and secondly, before the court and jury that is to try the supposed criminal. In other words, the facts that are to govern are elicited before the former; while before the latter, these facts are to be stated, and opinions are to be advanced which frequently decide the fate of the accusation. This is the ordinary course of judicial proceeding, though of course it is often necessary to pronounce an opinion even before a coroner's jury, but with the

* "It is the duty of a coroner, in a case of death in a pugilistic encounter, to examine a surgeon as to the cause of death." (Rex *v.* Quinch, 4 Carrington and Payne's Reports, 571.) But again: A woman was wounded by a stone, and taken to the hospital in Dublin. The mayor required a certificate from the surgeon in attendance, as to her state. This was refused, unless a fee was paid. The mayor appealed to the government, and was informed by Mr. Stanley (Dublin Castle, Nov. 13. 1832) that no law obliges the surgeon of an infirmary to give an opinion in such a case.—(London Medical Gazette, vol. xi. p. 264.)

† See page 483. I do not mean by these remarks to urge that the coroner should always be a medical man, any more than that he should be a lawyer; but I contend for such a degree of knowledge as will enable him to aid the medical examiner in his duties, and at the same time properly direct the jury.

important distinction that its merits and weight are there seldom canvassed.

As to the first of these divisions, we may observe that it enters into the very essence of the duties of the coroner, and those of the jury whom he summons to *view the body*. He is to inquire into the causes which have produced the supposed violent termination of life; and if the injury be manifest, to ascertain its nature and the probable instrument used to effect it. It is in the discharge of this function that he *may* summon any medical man before him as a witness, and our own State law says he *shall* do it. It proceeds, however, no farther, nor does it establish any regulations as to examinations, or the compensation for them.* The result necessarily must be, a degree of carelessness and hurry which can only tend to favour the escape of a guilty person.

In Austria, though a despotic country, this subject is far better arranged. "A code of regulations is published, by which all medico-judiciary inspections are to be conducted throughout the empire, and reports to be drawn up. Public inspections are also made on the dead bodies of those found in suspicious circumstances, and which not being at first recognised, are carried to the dead room of the general hospital. Due notice is given to the students at what hour such inspections are to take place, and they have thus an opportunity of seeing those regulations put in practice which they themselves will one day be called to fulfil."†

The medical witness, when summoned, should satisfy himself as to the *cause of death*. He should proceed to a dissection if he entertains the slightest doubt; and he has the right to demand this, or as an alternative to deny his testimony. If this be properly understood, the doubt that some have advanced, whether in law, it is *imperative* on the coroner to have the body opened, is of little importance.‡ At the present day physicians at least need not to be told that an external view alone of the body is perfectly nugatory, and that it can lead to no certain deduction, and that a jury is quite as competent to form an opinion upon it as many practitioners. The jury is sworn "diligently to inquire and true presentment make," *how and in what manner* the deceased came to his death. Let the medical witness, when subpœnaed, impress this on the coroner and his jury, and decline any testimony unless he be permitted to satisfy his own mind and conscience.§

* In a letter from Mr. Aaron, surgeon of Birmingham, it is stated that it seems to be the legal opinion that a coroner cannot oblige a surgeon to open a body and give evidence thereon; but that a surgeon having examined a body at the coroner's request or not, and coming before him, may be committed for contempt if he refuse to answer. (London Medical and Surgical Journal, vol. vi. p. 22.)

† Quarterly Journal of Foreign Medicine and Surgery, vol. i. p. 40.

‡ London Medical Repository, vol. xxiv. p. 578. Medico-Chirurgical Review, vol. vi. p. 562.

§ "We cannot omit this opportunity of expressing our disapprobation of the conduct of coroners who presume to interrupt the medical practitioner called upon to examine the cause of death under suspicious circumstances; and of informing practitioners in general, that as soon as the body is delivered over to them for that pur-

The duties demanded of him cannot be satisfactorily or conscientiously discharged without competent knowledge. An acquaintance with anatomy is indispensably necessary, and peculiarly so in those interesting cases where it is necessary to distinguish the effects of disease or violence from ordinary appearances. Unless well grounded in that science, the phenomena that follow natural death may be mistaken for the effects of poison, or the consequences of severe injury. Anatomy, then, both physiological and pathological, must be applied to the case. Nor is this always sufficient. If the question of poisoning be agitated, chemistry is required to lend its aid; and if it be a case involving the presence of pregnancy or delivery, the knowledge of the man-midwife will be necessary.

Now the just application of all this must not be evaded. The members of our profession in every part of the country are liable to be summoned, and that on the shortest notice, to take a part in such an investigation. Are they all qualified to do justice to it? Am I doing them a wrong in saying that they are not? Medical men are constantly engaged in a most laborious and engrossing occupation; and after obtaining their education, their opportunities for pursuing practical anatomy are extremely narrow. Indeed, the prejudices of the community, strengthened by the restrictions and penalties of our laws, render it almost impracticable to do more than preserve their early information. The accessory sciences also are only cultivated by a few. Does it not then appear that a duty is required, which in many cases should rather be avoided? I am still confining myself to the preliminary investigation before a coroner; and need only allude to the additional force of these observations, when the examiner is transferred to the stand of the witness, and subjected to the inquiries of the bar and the court. How often is a fair reputation and great social worth tarnished by such an event? And would not all prefer having some regulations adopted, by which the liability to these appeals may be avoided? *

I have no novel proposition to offer on this subject. It is one that has been sanctioned by the experience of several continental countries, and has certainly led to the distribution of equal justice. It has done more. In the opinion of competent judges, it has led to the diminution of crimes, evidently from a certainty of their detection. I refer to the appointment of medical men in a county, a district, or a part of the state, who shall be specially charged with this duty.

pose, they are to proceed deliberately with their examination until they be satisfied. Upon this subject, we quote with great satisfaction, the opinion of the enlightened judge who now presides over the criminal court of this division of the empire. Dr. Cleghorn of Glasgow, having been examined in a trial for poison, the Lord Justice Clerk, after highly complimenting the learned professor on his luminous evidence, *took occasion to impress strongly on all magistrates and public officers present the absolute necessity of having the body of the deceased opened and examined by a medical man, in every case of suspicious death.*" (Edinburgh Medical and Surgical Journal, vol. xiv. p. 468.)

* The fact cannot be too distinctly stated, that a man may be a *judicious, correct, and excellent practitioner of medicine, and yet not competent as a witness.*

The germ of this regulation appears in the German code, to which I have already referred. It has for centuries been the practice in Austria to appoint individuals to superintend these examinations and to report on them. In 1606, Henry the Fourth of France gave letters patent to his first physician, by which he conferred on him the power of appointing two surgeons in every city or important town, whose duty it should exclusively be to examine all wounded or murdered persons, and to report thereon. It was soon discovered that in many instances the investigation would be incomplete unless physicians were associated with them, and accordingly in 1692 this was ordained by the council of state.* The form of the reports to be made by them, and the circumstances to be noticed, make a part of every work now published on the Continent concerning legal medicine.

Dr. William Cummin has recently favoured us with an account of the duties at present required of such an officer (Kries and Stad Physiker, as he is there styled) in Prussia.

"He shall bestow (these are the words of his commission) his especial attention on the salubrity of the district committed to his charge. As soon as any symptoms of contagious or epidemic disorders are discerned, he shall promptly adopt the speediest measures that prudence suggests, and apprise the boards whom such events chiefly concern. He shall comply with the laws of the medical profession, and strenuously see that they be complied with by others. He shall further, when called upon by the government board, superintend the treatment of the sick poor, and take a fair share of the business of the medical police of his district generally. Upon all occasions, when called upon, he shall be ready to engage in the *post mortem* examinations which devolve upon him, and in the medico-legal investigations relative to lesions and injuries to living persons, and concerning the state of mind and body of individuals submitted to his scrutiny, giving a deliberate judgment in each case. He shall also devote particular regard to the progress of vaccination. All this, as well as all other business confided to him by the proper authorities, he shall perform cheerfully. And, in fine, in all his official relations, he shall so conduct himself as a faithful and diligent Kreisphysikus should and ought to do."†

A practical school of legal medicine has, as a necessary consequence, arisen from these regulations. It is attached to the University of Berlin, and was opened in the summer session of 1833. From a report of Dr. Wagner, who is at its head, some idea of its value may be obtained.

"The mode of teaching pursued is as follows: At different hours of the day, according to the matter presented, each student is admitted in his turn to look into the cases of living subjects, to perform judicial post mortem examinations, and to analyse inorganic and inanimate substances; after which, he is required to make a report on

* Foderé, Introduction, vol. i. p. xxxii.

† London Medical Gazette, vol. xiii. p. 952.

what has been submitted to him, in the same style as the district physician does. Moreover, the physician meets the student twice in the week, either for the purpose of explaining and discussing the facts already observed, or to distribute new cases among them, or lastly to refute or pass judgment upon the reports that have been presented to them.

" The students are exercised in the proper mode of examining adult and infantile corpses, and every one is aware how much practice and skill is requisite to appreciate the pulmonary docimasia of the latter. Every six months a course is delivered on the modes of testing the presence of poisons, both mineral and vegetable, and these modes the students practise." *

The advantage of designating individuals for the particular duty of medico-legal examination, would thus seem to be striking and prominent. It would lead to more accurate study of the science. It would afford numerous and favourable opportunities of improving it. It would in a great degree prevent that disputation about facts which produces so many unpleasant collisions in courts of justice; and above all, it would spare to many the performance of the most unpleasant duties, often amidst the circle of their practice, and hence liable to injure its extent or impair its usefulness.

Indeed, we have only to look at the practical operation of the present system, to be conscious of its manifold imperfections. In France, where in consequence of the overthrow of social relations by the Revolution, the medical profession was completely remodelled, and many imperfectly educated persons, under the name of *officers of health*, were introduced, to supply the wants of the armies as well as of civil life, great difficulties are experienced and heavy complaints made. Collard de Martigny, in a series of observations on the subject, has demonstrated the extreme ignorance of many who appear as witnesses, either on anatomical or chemical investigations, and he justly ascribes this to an imperfect knowledge of legal medicine. † In a case of supposed abortion, before a coroner's jury in London, in 1829, a medical practitioner testified that the fulness of the breasts attendant on impregnation was the consequence of powerful medicines; that the natural openings of ducts about the os uteri were punctures; and finally, that the gall bladder was filled with *florid* bile. And for all this, the coroner's jury voted him their thanks. ‡ Similar instances might be quoted on this side of the Atlantic.

* London Medical and Surgical Journal (by Dr. Ryan), vol. vii. p. 442. During the first year of its establishment (from July 1833 to 1834) the practical school of legal medicine has been attended by 63 students, some of whom are already in practice. The course of instruction has comprehended 253 medico-legal questions, 217 of which refer to living individuals, and 32 to dead subjects (judicial post mortem examinations), and four required the analysis of inorganic substances.

The inquiries made in the cases of the living individuals turned in 183 instances upon the state of the body, and in 34 upon that of the mind. Of the latter, 27 were civil cases, and 7 criminal.

† Annales d'Hygiène, vol. vii. p. 160; vol. x. p. 115.

‡ American Journal of Medical Sciences, vol. iv. p. 517., from the London Medical Gazette.

"When (say the editors of the Edinburgh Medical and Surgical Journal) we read of coroners in England, in cases of suspected murder, directing the examining surgeon to be contented with the external inspection of the body, from the vulgar prejudice against dissection; when we are told of sheriffs in Scotland holding the opening of a body supposed to be poisoned with arsenic as unnecessary, and incapable of furnishing additional proof; when we know that professional men neglect to ascertain the cause of death, because they received no compulsory order to that effect — we must be satisfied that the only means of learning the truth exactly where it is most desirable are often culpably neglected."

"But the instances in which its discovery is prevented by presumption and ignorance, on the part of those who undertake such an examination, are still more numerous. We every day hear of medical practitioners giving their evidence with the utmost confidence on points which it is obvious they never considered with the requisite attention, stating facts as universal which admit of many exceptions and modifications, or rejecting them altogether, because exceptions do exist, and destroying evidence or failing to discover it, from not knowing where it is to be found, nor how it is to be obtained. On the other hand, we sometimes see well-informed medical men browbeat and baffled, from not knowing the estimation and respect they were entitled to claim for their opinion and skill. These evils can only be removed gradually by convincing the public and the profession of the great importance to society of the study of juridical medicine." *

All these remarks, however, only go to show the imperfections and faults of the present system. Medical men, until it be altered, have to act under it. Let me urge them, in no case to omit a medico-legal examination, where the cause of death is the subject to be decided; and in order to perform this duty with deliberation and accuracy, it is of the greatest importance that two or more professional persons should be associated together. They will assist each other not merely mechanically, but by suggesting various points of inquiry. While he who is most skilled in anatomy is pursuing his dissection, the other may note the appearances as they successively present themselves. And the same course may be adopted while performing chemical experiments. The advantage will thus be attained, of having a complete

* Edinburgh Medical and Surgical Journal, vol. xiv. p. 111. Review of Male and Bartley.

"It is impossible to resist the wish that special qualifications were required by law on the part of medical witnesses. There is something of this nature on the Continent; and though one of the last of my countrymen who would wish to see the customs and institutions of Great Britain shaped according to foreign patterns, yet I think we might in some matters take a hint from and improve upon their practice." *Dr. Gordon Smith on Medical Evidence*, p. 103.

See also Marc, in his preface to Rose, p. xvii. He urges that to every city and district a physician and surgeon should be assigned, who have made legal medicine their particular study. This will not, he adds, exclude others from pursuing it. Indeed it may be the means of prompting many who otherwise would neglect it, and who are contented with the indifference and want of knowledge that prevail because they are general.

statement of *facts* prepared at the moment of observation, which may be afterwards reviewed both in coming to a decision on the case, and in giving evidence before a jury.

Chaussier, in a memoir read before the Academy of Dijon as far back as 1789, insisted earnestly on the benefits of such a legal arrangement. He proposed that the report should be written on the spot, remarking that although the opinions to be deduced may require some reflection, yet the narrative of actual appearances needs none. He further proposed that this report should be filed in the clerk's office within twenty hours for the examination of a chamber of verification; and if disapproved by them, that the judge should cause a second visitation to be made by others. But if approved, that it should be received on the trial as a true account of the facts observed.*

A somewhat similar course is pursued in Scotland. Medical men are appointed to examine, and they make reports. The use made of these will be seen in the following extract from Alison: "Medical or other scientific reports which are lodged in process before the trial, and libelled on as productions in the indictment, are allowed to be *read* as a deposition to the jury, confirming it at its close by a declaration on his oath that it is a true report. The reason of this is, that the facts are often so minute and detailed, that they cannot safely be entrusted to the memory. The witness is, however, liable to an examination and cross-examination."†

A full statement of facts being prepared, it next becomes the duty of the witness to express an opinion on them before the coroner's jury. That this must be the result of due consideration, I need hardly insist. If it be an unfavourable one, it may consign an individual for months to a prison, and heap on him the imputation of the most horrid crimes. How necessary then is it that the decision be strongly fortified by facts and by authority!

When the examination before the coroner is completed, and the charge of guilt is made, the duties of the medical witness have but just commenced. He has to appear before another tribunal, to state the facts noticed, the opinion deduced from these facts, and the reasons for that opinion. He may, and indeed frequently is, called upon to defend them against the objections of other medical witnesses, and above all, he has to undergo a severe and minute inquiry by gentlemen of the bar, whose business it is to invalidate, if possible, all that he has said.

This branch of our subject cannot be approached without adverting with some feelings of professional pride to the certainty which has been attained in many branches of medical jurisprudence. It is surely no mean effort of human skill to be brought to a dead body, disinterred perhaps after it has lain for months, or even years in the grave, to examine its morbid condition; to analyze the fluids contained in it; (often in the smallest possible quantities); and from a course of deduc-

* Chaussier's Observations Chirurgico-légales sur un point important de la Jurisprudence Criminelle, &c. Dijon, 1790.

† Alison's Practice of the Criminal Law of Scotland, p. 541.

tions founded in the strictest logic, to pronounce an opinion, which combined circumstances, or the confession of the criminal, prove to be correct.* And this, if properly done, must be accomplished without listening to rumour, and without permitting prejudice to operate. Many, again, by their researches, have saved the innocent, showing that accidental or natural causes have produced all the phenomena.

The first point worthy of recommendation is the importance of stating the facts observed, in plain and perspicuous language. The use of technical terms is often unavoidable, and precision and accuracy must be sacrificed if they be not adopted; but there is a medium in all this. Many parts can be named by their common appellation, and the appearances observed designated by words in ordinary use. The imputation of pedantry is thus avoided, and every aid is given to a clear understanding of the case. The doctrine founded on the facts should next be mentioned in an unequivocal manner, so as at once to evince the decided belief of the witness in it, and the reasons on which it is established. If it be open to doubt, he should intimate this, and also the reasons for it, before they are drawn out by a cross examination.†

The inattention paid to medical opinion on one of the most important subjects in the science, is such as to demand a more extended reference to it. I refer to the proof of infanticide.

It is evident that the charge cannot be brought, unless it be previously ascertained that the child was born alive. For several centuries, a decisive proof of this was supposed to be attained in the various phenomena exhibited by the lungs, and particularly their floating in water. No subject has been so thoroughly examined by means of experiments as this. But it was the bad fortune of the hydrostatic test (as it is called) to find an enemy in the late Dr. William Hunter, a man of the greatest eminence in his profession, of no mean talents

* "It is such duties ably performed, that raise our profession to an exalted rank in the eyes of the world; that cause the vulgar, who are ever ready to exclaim against the inutility of medicine, to marvel at the mysterious power by which an atom of arsenic, mingled amidst a mass of confused ingesta can still be detected. It does more: it impresses on the minds of assassins, who resort to poison, a salutary dread of the great impossibility of escaping discovery." (Quarterly Journal of Foreign Medicine and Surgery, vol. iv. p. 45.)

† "Be the plainest men in the world (said Sir William Blizard, some years since, to his pupils,) in a court of justice; never harbour a thought, that if you do not appear positive you must appear little and mean ever after; many old practitioners have erred in this respect. Give your evidence in as concise, plain, and yet clear a manner as possible; be intelligent, candid, pen, and just, never aiming at appearing unnecessarily scientific; state all the sources by which you have gained your information. If you can, make your evidence a self-evident truth; thus, though the court may at the time have too good or too mean an opinion of your judgment, yet they must deem you an honest man; never then be dogmatic, or set yourselves up for judge and jury; take no side whatever, be impartial and you will be honest. In courts of judicature, you will frequently hear the counsellors complain when a surgeon gives his opinion with any the least kind of doubt, that he does not speak clearly; but if he is loud and positive, if he is technical and dogmatic, then he is allowed to be clear and right. I am sorry to have it to observe, that this is too frequently the case." (London Medical and Physical Journal, vol. xxi. p. 403.)

independent of his professional acquirements, and gifted with a fascinating mode of explaining and enforcing his opinions. He formed an idea that too implicit a reliance on this test might lead to error; that many circumstances might occur to weaken its value, and, indeed, that other causes besides respiration might produce the particular sign that was deemed indicative of independent life. The melancholy situation of those who were most liable to be charged with the crime of child murder gave an adventitious weight to his objections, and they formed the theme of every advocate for the unfortunate female who had fallen from virtue.

In themselves, they are worthy of due consideration; and on the Continent, though not altogether original to its students, they led to new investigations, by applying which, all the causes of fallacy might be avoided, while subsidiary proofs were furnished, strengthening the primary and leading one. This, however, seemed to have but little influence in England. Few men dared in the infancy of legal medicine to question the opinions of Dr. Hunter; and though he evidently had paid little attention to the point experimentally, yet his dictum was quoted as the standard of medical science. In process of time, some of the barristers of that day have ascended the bench, and carrying with them the ideas acquired at the bar, have on many occasions denounced the hydrostatic test. Baron Garrow, some years since, at the Worcester assizes, congratulated a grand jury, that that *scientific humbug*, as he styled it, was abandoned. Nothing, he added, could be more fallacious.* Justice Littledale, in a late trial, told the medical witness, — "You do not appear old enough to have seen the late Dr. Hunter, but you must know that he was one of the most celebrated surgeons of this country; and that he asserted that no dependence was to be placed on the test you rely on." It was answered, "I am aware that was his opinion, but I entertain a different one; and I believe mine is now the received theory among medical men." "Then it must be," said Justice Littledale, "within the last year or two if it is; for I have heard some of the most eminent of them deny it." And so is the fact. Physicians are not sufficiently firm in expressing their sentiments. They are too apt to yield to the decisive tone that is adopted, and permit doubts to escape them, when those doubts should apply only to the proper performance of the test, or to adventitious circumstances impairing its certainty. †

* Edinburgh Medical and Surgical Journal, vol. xix. p. 450. Gordon Smith on Medical Evidence, p. 46.

† In a case tried at the Essex assizes in March, 1820, where the circumstances were evidently extremely suspicious, and where the lungs were found to float, the counsel for the prosecution, the surgeon who examined them, and the judge on the bench, all agreed that it was a fallacious test. The judge (the Chief Baron) said there was no proof that the child was born alive. Again, in a case tried in Scotland, three medical witnesses, *who had not seen the body*, were examined for the prisoner, and all of these gentlemen agreed, that if the child had been dead for the period of eleven days, it was impossible for any medical man to come to a conclusion as to whether the child had been alive at the time of birth. (Edinburgh Medical and Surgical Journal, vol. xxi. p. 231.) The remarks of the journalist on this subject are so pertinent that I cannot forbear quoting them. "The more we turn our attention to

All this, however, cannot shake the validity of the test. It is founded on physiological principles, deduced from the broad and wide distinctions that exist between fœtal and independent life. Its prominent proof is strengthened by numerous accessary ones; such as the changes in the heart and large blood vessels, and the appearances observed in the various viscera.* The common sense of mankind, we might suppose, would teach all, that these *must* occur from so important a change to the new-born infant; and all anatomical knowledge is a mockery, if they be not founded in truth. Even allowing full weight to the scientific objections that have been made, they only prove that there may be cases where the test is not applicable: they cannot affect its *general* validity.

The result, however, in England, of these fluctuations, is not surprising. It has become proverbial there, to say that no female can be convicted of infanticide. And can we suppose that Dr. William Hunter, were he now living, with his love of knowledge and his ardent desire to acquire and diffuse it, would be satisfied with the construction put upon his writings? Would he not have joined in the general efforts to remove all doubts, by proper inquiries into their value?

The medical witness is often placed in a delicate situation, from the circumstances under which he is summoned. He is a witness for one or other party—for the prosecution, or for the prisoner; and he is so summoned, in the belief that his evidence will favour the side by which he is produced. It would be desirable, that at least the person who has made the previous examination before the coroner's jury should be divested of this, so far as to enable him to give a full and fair statement of all the circumstances that make for either side. I am aware that he can now do so, and indeed his oath obliges him to it. He ought to put the judge and jury in possession of the "*whole truth*,"

the subject, the firmer is our conviction; and in this conviction, we are borne out by every one of the few persons in this country entitled to the name of medical jurists, that to procure a satisfactory and irrefragible opinion in cases of infanticide and in all other difficult medico-legal questions, it is only requisite to submit the matter to a dispassionate and skilful investigation. Those little acquainted with medical jurisprudence, whether professional or unprofessional, universally confound together *doubt* and *difficulty*. The question involved in the trial must be allowed to be almost always difficult; but we are certain, that when properly examined, scarcely one instance in a hundred will prove doubtful."

I add the following extraordinary case, to show how far judicial interference has been carried. The infant was found dead in a box, with several wounds on its neck and breast, and marks of injury to the skull. The lungs were distended with air, and they, with the heart attached, floated in water. The mother had been delivered alone a few hours previous, but denied it. On the trial, the medical witness, Dr. Robinson of Bridport, was not allowed him to state his experiments on the lungs, and the judge (Baron Garrow) interrupted the counsel for the prosecution to state to him that the test was a vulgar error. (London Medical Repository, vol. xxii. p. 347.)

* "The pulmonary test (says Ristelhueber) is no longer a simple trial whether the lungs are buoyant or not, though this phenomenon is of high importance and great value in the estimate, but it consists, moreover, in examining the thorax, the lungs, and, indeed, every part that undergoes a change in consequence of respiration." (*Rapports et Consultations de Médecine Légale, par J. Ristelhueber*, p. 140.)

even if he be not questioned to that extent.* But often the technicalities of an examination, and particularly by an adverse counsel, overcome that self-possession which is so essential. Pressed by perplexing questions, and probably irritated in his feelings, he is apt to make declarations more strongly corroborative of opinions that he has formerly advanced; and as his examination advances, he may incur the charge of being *biassed*, more than facts will warrant.

Would not this difficulty be avoided, by having the written report to which I have referred presented to the court, as the *medical facts in the case?* The examiner before the coroner's jury will always have time to prepare this deliberately and cautiously; he can state in it his doubts, and mention the circumstances which are favourable or unfavourable to the accused person. *He can avoid all imputations of being a partisan;* and having once signed it as his deliberate opinion, he ought, of course, not to be allowed to alter or amend without showing the most satisfactory reasons.

We have now supposed the facts to be settled. The next difficulty that may occur, is the difference of *opinion* that unfortunately too often arises in courts of justice between members of our profession. They disagree on the bearing and weight of certain facts, and on the deduction to be drawn from them. The most common cause of this, in my judgment, is *the delivery of testimony as to the facts viva voce.* That class of witnesses who are called upon to give opinions on a certain statement of facts, have generally been unable to examine it before the trial. They often hear it imperfectly, sometimes confusedly; and at all events, even if detailed in a succinct and clear manner, they have but a few moments to reflect on its various import, before they are called to decide upon its relevancy. Another circumstance must not be forgotten; and that is, the want of knowledge in one or the other witness. It is seldom that you can find any two persons who are equally skilled on a subject; and so it is here: *one is ignorant in comparison with the other.*

Both these would certainly be greatly obviated by having the written reports to which I have adverted, as the basis on which to found their opinions. These could be examined with deliberation, and the objections offered would then bear the impress of due reflection.

But allowing that all this could be effected, differences will still exist. How are these to be decided? The rule of law is applicable, with proper explanations. "When a witness," says Starkie, "testifies to a fact, which is wholly or partially the result of reason upon particular circumstances, it is obvious that the reasons of the witness for drawing that conclusion are of the most essential importance, for the purpose of ascertaining whether the conclusion was a correct one; and these observations apply with peculiar force to all questions of skill and science." †

* G. Smith's Forensic Medicine, p. 8., 1st edition.

† Starkie on Evidence, vol. i. p. 460. It is important also to recollect, that when "scientific men are called as witnesses, they are not entitled to give their opinions as to the *merits of the case*, but only as to the *facts proved on the trial.*" (Jameson *v.* Drinkald, 2 Moore's Reports, p. 128.)

If we carry out this principle, we shall find that all practitioners are not proper witnesses. In a case where anatomical knowledge is particularly necessary to elucidate the case, most importance should be attached to the opinion of him who has cultivated that science. When any question relating to the treatment or symptoms of disease is agitated, he should be consulted whose opportunities are extensive, and whose judgment is approved. So also with other departments of our science. The regrets of John Hunter are a lesson to all of us. Standing at the height of his profession, and to which he had been elevated by the force of genius alone — eminent as an anatomist and physiologist, he was summoned in 1780 as a witness on the remarkable trial of Captain Donellan, for poisoning his brother-in-law, Sir Theodosius Boughton. Although he evinced great knowledge, yet, says Sir Astley Cooper, "he regretted that he had not made more experiments on the subject of poisons, before giving an opinion in a court of justice. He found himself a good deal embarrassed, and he used to express his regret publicly in his lectures, that he had not given more attention to the subject before he ventured to give an opinion in a court of justice." *

It is evident that the difference of opinion originates, in most cases, from a want of knowledge in one or the other. "Doctors will differ," says Dr. Smith; "but medical jurists cannot differ." † The expression is too strong, but it is far from incorrect. Look at the works of our most approved authors on surgery — on midwifery — on chemistry, and observe on how many points they agree, and on how few comparatively they differ. Accordingly, when the nature of a mineral poison is the subject before a criminal court, we are not to place the evidence of an individual who has only attended a course of lectures on chemistry, and possibly not even that, against one who has made that science his study. Let men of equal standing be confronted, and do not weaken the hands of justice, by neglecting their services in a prosecution, when they are certain of being summoned on the defence to break down testimony that is already falling to pieces through its own imperfection and incorrectness. ‡

Doubtless there is too little discrimination exercised in receiving all who are called *doctors* as witnesses. In England, not only physicians,

* Lectures in the Lancet, vol. iii. p. 171.

† Introductory Lecture, 1829, p. 23. Dr. Smith entertained for some years a favourite plan of the medical witnesses on a trial consulting together, and agreeing on the substance of the testimony to be given by them. He was once arguing in support of this, when he was put *all aback* by the remark, "*You must also agree on the questions to be propounded by counsel in their cross-examinations.*" (Lancet, N. S. vol. vii. p. 421.)

‡ In another place (Hints on the Examination of Medical Witnesses) Dr. Gordon Smith suggests, that a proper preliminary question would be to ask the medical witness, Whether he has studied medical jurisprudence, and if not, what is his opinion of the science? It is well insisted on in the North American Medical and Surgical Journal (vol. iii. p. 171.), as a principle in medical evidence never to be lost sight of, that the opinion of one man of acknowledged ability and skill should outweigh a mass of negative testimony delivered by those who are known to be inferior in knowledge.

surgeons, and apothecaries, beyond whom it should not be extended, but hospital dressers, students, and quacks have been permitted to act as medical witnesses. "We could point out a case of poisoning (say the Editors of the Edinburgh Medical and Surgical Journal), where the most essential part of the evidence depended on the testimony of a quack alone, and it was admitted."*

When medical men, deserving that title by their knowledge and learning, meet as witnesses, they owe it to their own characters, and the honour of the profession, to treat each other with respect. Even if opposed in sentiment, they may still express themselves with courtesy, and with a due regard to their respective reputations. If they do not guard these, others will with pleasure join in the work of depreciation.†

* Edinburgh Medical and Surgical Journal, vol. xix. p. 610.

† I quote two cases, one of which illustrates the *cruelty* which practitioners sometimes exercise towards each other, while the other is worthy of its excellent and kind hearted narrator. "A surgeon had reduced a dislocation of a child's elbow, for which the father resisted payment, on the ground that the injury was merely a sprain, and that the charge was excessive. To recover his fee, the practitioner brought an action. The ordinary medical attendant of the defendant's family *saw the arm on the following day, accidentally, and in his opinion there was no dislocation.*"

"Sir Wm. Blizard, who had already spoken in favour of the plaintiff's character, and professional qualifications, was again examined upon this point, and very properly discountenanced such an inference — stating that it was *impossible for any one, after twenty-four hours,* to say whether a dislocation had taken place or not, if it had been properly treated." (London Medical Repository, vol. xxi. p. 264.)

Mr. Abernethy states the following in his lectures. His characteristic manner would seem to be preserved in the report. "A medical man was prosecuted for killing a child by giving it opium, at least that was said. I happened to be in the country at the time, and was strongly solicited by him to attend and give my opinion. I considered that the character of the profession was at stake, and, although rather against my inclination, I went. After waiting in a crowded court the greatest part of the day, I was called upon, and placed in the witness-box. The lawyers had taken it into their heads that the child had died from maltreatment on the part of the surgeon; the child had been scalded severely, and he had given opium, and they thought they should be able to make the jury think as they did. The first question put to me was, 'Mr. Abernethy, will you inform us what is considered the proper treatment for scalds?' This was a question broad enough to be sure; I was puzzled a little how to answer it: I did not know but that they would require a lecture on burns and scalds. I considered a minute, and then said, 'That which was adopted in the present case.' Oh! that was what they did not expect; it was giving a turn to the case which they did not like. 'You have heard the evidence, have you not?' 'Yes, but it is contradictory.' 'But judging from the evidence?' 'I have no right to judge; you may judge if you please, or the jury may judge, but I shall not.' — 'But I ask you, for the information of the jury, your opinion respecting the opium, whether you do not consider it too large a quantity for a child?' 'The statements respecting the opium have been contradictory; but admitting that the child had, as was said, eight drops immediately after the accident, and ten drops two hours after, I should say that the child had not taken one drop too much.' 'But are you aware that the child had no pain?' 'Yes, perfectly. When the skin, or any other part of the body is severely injured, the nervous system of the part is so affected that the peculiar actions of the nerves on the brain or spinal marrow, by which alone pain can be felt, do not take place. A man may have a serious injury inflicted by a mechanical cause, may have his leg smashed, and nearly torn off by machinery, and yet feel little or no pain; and we

The practice in the Scotch courts is somewhat peculiar, and I therefore quote it in detail.

"Witnesses are not allowed to remain in court to hear the deposition of other witnesses; but in this there is an exception in the case of medical witnesses, who should remain to hear the deposition of the witnesses who depose to the facts of the case; but they should be examined on matters of medical opinion apart from each other. This mode of being in court applies only to medical witnesses who are to give a *professional opinion, properly so called.* If they are examined as to the facts in the case, they must be enclosed as other witnesses.

"Though the medical witnesses who are to give a professional opinion should hear the whole *facts* of the case detailed by the other witnesses, whether professional or ordinary, who are examined in the cause, yet it is usual when one medical man begins to give an opinion on the case to cause the other medical men to retire. The reason of this is, that it has been found by experience, that medical men, even of experience and information, are generally so prone to contradict each other, or to adhere to the side on which they are cited, that it is never safe to let them hear each other's testimony. The proper way to do, therefore, is to allow the medical men who are to be examined as to opinion, to hear the whole evidence relating to the facts, whether from the ordinary or the medical witnesses, and to remove them as soon as medical opinion is about to commence.

are in the habit of giving, in such cases, wine and opium, not to act as a narcotic, but to arouse the energies of the vital powers, and call them again into exercise; the nervous system has sustained a great shock, from which it requires to be roused.' The judge said, 'that he understood it, he saw the principle on which the treatment was founded, and had no doubt but it was correct.' 'But, my lord,' said the counsel, 'the child slept to death.' 'So he may have appeared to sleep, but he would have done so, if no opium had been given; it was the torpid state into which the nervous system had fallen, which caused that appearance, and from which the child could not be roused.' Here the business rested, the treatment was admitted to be correct, and the character of the gentleman exculpated." (Lancet, vol. vi. p. 229.)

In some cases, medical witnesses have met with deserved reproof. On the trial of Donnal, Mr. Ticknor, a surgeon, was asked, "Supposing a person to have retchings and purgings for several hours, and that you found these attended with a frequent and fluttering pulse, in that state of the illness, what should you have prescribed? *Ans.* I should have prescribed diametrically opposite to the prescription of Dr. Edwards. I should consider that prescribed by Dr. Edwards as adding weight to a porter's back."

Mr. Justice Abbott (afterwards Lord Tenterden) to the witness. "Don't speak metaphorically: you were speaking just now of a gentleman of experience and respectability. I don't wish you to conceal your opinion, but only to speak it in different language." (Paris and Fonblanque's Medical Jurisprudence, vol. iii. Appendix, p. 304.)

In another case, mentioned in the printed lectures of Mr. Amos, a medical man at Lincoln flippantly replied to a question, by slighting the information which was to be obtained from medical writers, saying that the writers of books would advance any thing. Chief Justice Dallas reprimanded the witness, and remarked, that he would not sit in a court of justice and hear science reviled, and the recorded researches of the medical world represented by ignorant tongues as leading only to uncertainty. (London Medical and Surgical Journal (Dr. Thomson's Lectures), vol. vi. p. 421.)

"It is not yet settled whether, when one medical man contradicts another, on a point of opinion, it is competent to re-examine the first, in order to clear up the difficulty. In a late case, this point occurred. Lords Gillies and Meadowbank were for admitting the re-examination, and the Lords Justice Clerk and Hermand against it. The examination in these circumstances was not pressed by the crown." *

But *personal experience*, however comprehensive it may be, cannot always be satisfactory, nor indeed sufficient. It has then been a subject of considerable discussion whether *authority*, or in other words, the observations of others, should be adduced as testimony. There appears to be no settled rule on this subject, although certainly some judges have decided against its introduction. When Dr. Neale, on the trial of Donnal for poisoning, quoted Thenard, whose work on chemistry is as much authority with physicians as Starkie and Phillips are with lawyers, Judge Abbott said, "We cannot take the fact from any publication; we cannot take the fact as related by any stranger." † So also on the famous trial of Spencer Cowper, when some of the witnesses referred to medical authors on the subject of drowning, it was objected to by the bench. The expostulation of Dr. Crell on this deserves repetition. "My Lord" (said he), "it must be reading, as well as a man's own experience, that will make any one a physician; for without the reading of books in that art, the art itself cannot be attained to. I humbly conceive, that, in such a difficult case as this, we ought to have a great deference for the reports and opinions of learned men; neither do I see any reason why I should not quote the fathers of my profession in this case, as well as you gentlemen of the long robe quote Coke upon Littleton in others." ‡ It is well to add that he was allowed to proceed.

On the other hand, in order to show that the doctrine of exclusion is not fully established, I need only allude to the frequent mention made by judges themselves of the writings of Dr. William Hunter. Surely, if these be authority, the works of other eminent men are equally so.

In this country, I believe the objection has never been made. There is scarcely a case of any note, where medical testimony has been required, in which frequent reference has not been had to medical works. They are quoted and commented upon by the bench, the bar, and the professional witnesses.

"The practice of the English judges in excluding a reference to authors evidently arises from the principle in law, that nothing is evidence which is not delivered upon oath. But is an oath more binding than the solemn act of sincerity between the author and the world, by the very act of publication? Would Paris and Fonblanque be better authority, if they swore to it before the twelve judges?

* Alison's Practice of the Criminal Law of Scotland, p. 542, &c.

† Paris and Fonblanque, vol. iii. Appendix, p. 299.

‡ Hargrave's State Trials. "It appears to us that no witness could follow this advice (to shun quoting authorities) without compromising the right and dignity of his profession, as well as the force of his evidence; for it would not be difficult to show that medical evidence altogether is little else than a reference to authority." (Edinburgh Medical and Surgical Journal, vol. xix. p. 480.)

And is it not manifest that if the exclusion be made to act systematically, it must inevitably end in excluding medical and scientific evidence altogether? For scientific inquiries at law can scarcely be any thing else than a tissue of references to written authorities. Of what use would be all the personal experience of any physician, unless he knew, by referring to that of his predecessors, the conclusions he is entitled to draw from it?" *

I must not refrain from mentioning, that the responsibility of the physician is often greatly increased by the mode of the examination. "A dexterous advocate (as has been well remarked) has a great advantage over any witness, however learned or self-possessed. He may be led into a train of admissions, the inferences from which are afterwards to be turned against him." † Many of these undoubtedly originate from inquiries into the import of *individual facts*, instead of the *whole collectively*. The consequences of such attempts may be easily conceived. "In a vast majority of cases, for example, in all cases of insanity, infanticide and poisoning, the witness may be made to express the very opposite of his real opinion." ‡

If the duties on which I have enlarged are important to the community, in promoting the proper administration of justice, ought not the individuals engaged in them to receive adequate compensation? I advert to this, not only because it is just in principle, but because it would remove all imputations of volunteering in criminal cases. No one can refuse being a witness when legally summoned; every one, I presume, may decline the dissection of a dead body, or the chemical examination of a suspected fluid; and yet there is not, I believe, an individual attending on any of our courts, who is not paid for his time and services, with the exception of such as are engaged in these investigations. §

There remain two points, of which it is proper to apprise the medical witness.

One is, that he may be called upon to divulge *secrets* intrusted to him in professional confidence. It was solemnly decided in the case

* Edinburgh Medical and Surgical Journal, vol. xix. p. 610.

† Gordon Smith on Medical Evidence, p. 42.

‡ Edinburgh Medical and Surgical Journal, vol. xix. p. 611. The difficulties attending this have induced some to advise that *no opinion* should be given, and to refuse it when asked; but I cannot well see how an answer is to be evaded, except by pleading ignorance.

§ By a decision in England (Severn *v.* Olive), the expenses of *experiments* to elucidate or determine points in dispute cannot be allowed in costs. This (says Dr. Paris) may be a check to prevent intelligent practitioners from attending. (Medical Jurisprudence, vol. i. p. 157.)

In France, every medical man summoned by legal authority to make a medico-legal report receives fees fixed by law. (Hubert, Manuel des Lois et Réglemens sur les études et l'exercise des diverses parties de la Médecine. 18mo. Paris, 1826. p. 133.)

In Ireland, by an act (10 George IV. chap. 37.) passed June 4. 1829, the coroner is empowered to remunerate medical witnesses, attending inquests pursuant to summons, to any amount not exceeding *5l.* by an order, to be paid by the treasurer of the county or city where such inquests are held.

of the Duchess of Kingston, that in a court of justice, medical men are bound to divulge these secrets, when required to do so. In a recent case, where a female was indicted for the murder of her infant child, Mr. Cozzens, the surgeon, was called to prove certain confessions made by her to him. He objected, on the ground that he was, when she made her statement, attending her as a surgeon. But Justice Park observed, that this was not a sufficient reason to prevent a disclosure for the purpose of justice, and he was ordered to answer, but the prisoner was acquitted on other grounds. *

The law in France is of an opposite description. The Penal Code, Art. 378., directs, that if physicians, surgeons, officers of health, and also apothecaries, midwives, and all other persons, depositaries of secrets, either through their condition or profession, shall reveal these secrets (except in cases where the law obliges them), they shall be punished with fine and imprisonment. And in another place, it is clearly indicated that the exception has reference to crimes that *put the safety of the state at hazard.* †

Death-bed declarations must be made under the apprehension of impending death. It is not essential that the party should apprehend *immediate* dissolution — it is sufficient if he apprehend it to be impending; and under such circumstances, these declarations, if made to the medical attendant, or any other person, are received as valid testimony. But the "person making them must entertain no hopes of recovery." On the trial of Mr. Christie and Mr. Trail, for the murder of Mr. John Scott, the editor of the London Magazine, and author of various works, in a duel, Dr. Darling, who had attended the deceased after he had received his wound, deposed that he heard Mr. Scott on his death-bed say —— *Mr. Justice Bailey.* Did Mr. Scott at that time think himself in danger; did he give up all hopes of recovery? *Dr. Darling.* No; to the last he entertained hopes of recovery. *Mr Justice Bailey.* The declaration made by a dying man cannot be received as evidence, unless the party at the time of making it were satisfied that recovery is impossible. ‡

I will close this chapter by a single quotation. Although it refers to another country, yet physicians should understand that in our own the legal profession is paying great attention to Medical Jurisprudence. How imperative, then, the duty of fitting themselves as medical witnesses!

"Medical practitioners should be aware that all the rising barristers of our courts attend lectures on legal medicine, and often does forensic fame arise from the ability with which an advocate examines a medical witness." §

* 1 Carrington and Payne's Reports, p. 97. Rex *v.* Gibbons.

† Briand's Manuel, p. 499. 2d edition.

‡ Starkie on Evidence, vol. ii. p. 460. Ryan, p. 301. Paris and Fonblanque, vol. i. p. 166.

§ Ryan, Preface, p. ix.

CATALOGUE OF BOOKS REFERRED TO.

☞ As many of the systematic works on Medical Jurisprudence, together with several periodical publications, are very frequently quoted, I preferred to prepare a catalogue of them. In this way, the references have been rendered much more concise. The words in italics, at the commencement of every title, are used in the body of the work.

Addison and Morgan. An Essay on the Operation of Poisonous Agents upon the Living Body. By Thomas Addison, M.D. Assistant Physician to Guy's Hospital, and John Morgan, F.L.S. Surgeon to Guy's Hospital. 8vo. London. 1829.

Ainslie. *Materia Indica*, or some Account of those Articles which are employed by the Hindoos, and other Indian Nations in their Medicine, Arts, Agriculture, &c. &c. By Whitelaw Ainslie, M.D. &c. &c. late of the Medical Staff of Southern India. 2 vols. 8vo. London. 1826.

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American Cyclopedia of Practical Medicine and Surgery. A Digest of Medical Literature. Edited by Isaac Hays, M.D. Surgeon to Wills' Hospital, Physician to the Philadelphia Orphan Asylum, M.A. P.S., &c. 8vo. Vol. I. Philadelphia. 1833–34; and Parts 6, 7. 1835.

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Godman. The Western Quarterly Reporter of Medical, Surgical, and Natural Science. Supported by Physicians and Naturalists of the Western Country. Edited by John D. Godman, M.D. &c. &c. &c. 6 Nos. Cincinnati (Ohio). 1822. (*This work contains some very valuable essays on Medical Jurisprudence, translated from the French.*)

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* I quote this work, for the purpose of stating that it is a wholesale robbery of Dr. Paris's treatise and my own. Indeed the reprint is so exact, that on one page (p. 344.), Mr. Forsyth quotes the *American* edition of Baillie's Anatomy.

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1. *El Frider. Heisteri*, de principum curâ circa sanitatem subditorum.
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5. *Laurent. Heisteri*, Diss. de summe necessaria inspectione cordis vasorumque majorum sub legali infantum sectione. Resp. *I. Dan. Farenholz.*
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8. *Laurenti Heisteri*, Diss. quâ partus tredecimestris pro legitimo habitus proponitur, et simul partui nullum certum tempus in universum tribui posse ostenditur. Resp. *Ioan. Gerard. Wagner.*
9. *Rud. Augustin. Vogel*, Diss. de partu serotino valdè dubio. Resp. *Ioan. Christoph. Harrer.*
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12. *Phil. Conr. Fabricii*, Diss. de lethalitate vulnerum ventriculi secundum principia anatomica et medica expensa. Resp. *Ægid. Iungen.*
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17. *Joan Dan Reisseissen*, Diss. de veneficio doloso. Auct. et Resp. *Joan. Franc. Ehrmann.*
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23. Dr. *Phil. Conr. Fabricii*, Progr. quo causæ infrequentiæ vulnerum lethalium præ minus lethiferis ex fabrica corporis humani anatomica et situ partium præcipuè eruuntur.
24. Dr. *Joan. Ern. Hebenstreit*, Progr. de corpore delicti, medici secantis culpa, incerto.
25. Dr. *Christ. Gottfried. Gruneri*, Diss. de causis melancholiæ et maniæ dubiis in medicina forensi cautè admittendis. Resp. *Martin. Ludov. Wittwerk.*
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36. Dr. *Dan. Wilh. Triller*, Diss. de mirando cordis vulnere post xiv. demum diem lethali. Resp. *Ioan. Traugott. Weitzmann.*

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39. Dr. *Petr. Imman. Hartmann*, Diss. de controversa pulmonum in declarandis infanticidiis æstimatione. Resp. *Mich. Orgovany de Fagaras.*
40. Dr. *Ioan. Henr. Schulze*, Diss. quâ problema, an umbilici delegatio in nuper natis absolutè necessaria sit? in partem negativam resolvitur. Resp. *Ioan. Car. Dehmel.*
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THE END.

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