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THE

MORBID ANATOMY

OF THE

GULLET, STOMACH, AND INTESTINES.

BY

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&c. &c. &c.

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TO THE

RIGHT HONOURABLE

LORD VISCOUNT MELVILLE.

My Lord,

The deep interest which you have invariably taken in the prosperity of the University of Edinburgh, and especially in the advancement of medical science, has had more influence in inducing me to inscribe this Volume to your Lordship, than even the high estimation in which your public and private character is deservedly held.

Nor will this Work, I presume, be the less acceptable to your Lordship, that it treats of Ruptures, Dysentery, and other diseases to which Seamen are particularly liable, whose comforts and health have ever been your chief care, in your exalted station of First Lord of the Admiralty.

Twenty years have nearly elapsed since the First Edition was published. During that period, my own field of investigation and observation has been much extended, and several original and important observations have been made by certain

distinguished British and foreign writers, which have given still greater interest to this department of Medicine.

To concentrate the information thus acquired, and place the Morbid Anatomy of the Alimentary Canal in that light in which it ought to be viewed, are the motives which have led me to publish this Edition; and I trust it will not prove unworthy of your Lordship's Patronage.

I have the honour to be,

My Lord,

Your Lordship's most devoted Servant,

ALEX. MONRO.

Edinburgh, *October* 3. 1823.

CONTENTS.

I.—GENERAL OBSERVATIONS ON THE ALIMENTARY CANAL, - - - - Page 1

II.—OF EXTRANEOUS BODIES WITHIN THE ALIMENTARY CANAL, AND THEIR EFFECTS, 10

Of Alvine Concretions, - - - - - 16
— their Colour, Size, and Structure, - - - 21
— their Symptoms, - - - - - 39
— their Chemical Analysis by Drs Thomson, Duncan, J. Davy, Turner, Kennedy, and Wollaston, - - - 32
— the extraction of Concretions from the Intestines, - 48
— Calculi in the Tonsils, - - - - - 55

III.—OF DISPLACEMENT OF A PART OF THE ALIMENTARY CANAL, - - - 59

Of Intus-susception, - - - - - - 59
Double Intus-susception, - - - - - 64
Portion of Intestine passed by Stool, - - - - ib.
Of Procidentia Ani, - - - - - - 65
Observations on Herniæ, their Varieties, Causes, and Symptoms, 66
——— and consequences, - - - - - 88
— Diverticula, or Unnatural Appendages, - - - 93
— the Anatomy of the parts concerned in Abdominal Herniæ, 99
Inferences from the Anatomy of the Parietes of the Abdomen, 109
Of the formation of the Inguinal Canal, - - - 116
— the situation of Bloodvessels in relation to Inguinal and Crural Herniæ, - - - - - 122
— Inguinal Hernia, its varieties, - - - - 127
— Ventro-Inguinal Hernia, - - - - - 135

Page

Of Inguinal Hernia, connected with Malformation, - 126
— Crural Hernia, different forms, of - - - - 141
— Umbilical Hernia of Children, - - - - 154
———————— the Adult, - - - 157
— Hernia of the Linea Alba, - - - - 159
— Congenital Hernia of the Male, - - - - 160
— the Varieties of Congenital Hernia, - - - 163
— Congenital Hernia of the Female, - - - ib.
— Ventral Hernia, - - - - - - 166
— Internal Herniæ, - - - - - 168

IV.—WORMS PECULIAR TO THE HUMAN ALIMENTARY CANAL, - - - 184

New Arrangement of Intestinal Worms, by Dr W. E. Leach, 185
Of the Symptoms of Worms, - - - - 197
— Hydatids, General Observations, - - - - 198
— the different kinds of Hydatids, - - - - 200
— the Coats of Hydatids, - - - - - 203
— the Effects of Hydatids on the Organs which contain them, 206
— the Distoma Hepaticum of Men, Sheep, and Oxen, - 222
— a New Species of Oxyuris, - - - - 223
— Imperfect Worms, Rev. Dr Fleming's Observations on them, 224

V.—ORGANIC DERANGEMENTS OF THE MUSCULAR COATS OF THE ALIMENTARY CANAL, 222

Of Spasm and Palsy of the Alimentary Canal, - - 233
— Hydrophobia, - - - - - - 254
— Spasm of the Gullet, - - - - - 264
— Spasm of the Stomach and Intestines, - - - 270
— Palsy of the Gullet, - - - - - 289
— Palsy of the Stomach and Intestines, - - - 293
— other Organic Derangements of Muscles, - - - 296

VI.—ORGANIC DERANGEMENTS OF THE MUCOUS COAT OF THE ALIMENTARY CANAL, - 309

Of Acute Inflammation of the Mucous Membrane, - - 310
— the Effect of Diseases upon the Colour of ditto, - 316, 317
— Inflammation of the Mucous Membrane of the Gullet, 324

Page

Of the Effects of Swallowing Sulphuric and Nitric Acids, 327
— the Effects of Swallowing Caustic Alkali and some of the Oxides of Arsenic, - - - - 328, 329
— the Action of Opium as a Poison, - - - 336
Mr Reid's Analysis of the contents of the Stomach of a person poisoned by Laudanum, - - - - 338
Of the Acute Inflammation of the Mucous Membrane of the Stomach, - - - - - 340
— Thickening of the Mucous Membrane of the Alimentary Canal, - - - - - - 347
— the Inflammatory Stricture of the Gullet, - - 352
— the Consequences of that Stricture, - - - 357
— Stricture of the Intestines, - - - - 361
— of an Artificial Opening into the Sigmoid Flexure of the Colon, in cases of Stricture of the Rectum, - - 369
— Ulceration of the Mucous Coat of the Gullet, - - 372
— Chronic Inflammation and Ulceration of the Mucous Membrane of the Stomach and Intestines, - - 373
— Gangrene of the Mucous Coat of the Alimentary Canal, 385
— Dysentery, - - - - - - 387
— the Conversion of the Mucous Membrane of the Stomach and Intestines into a soft pulpy substance, - - 394
— Scrofulous Ulceration of the Alimentary Canal, - - 395
— Blood discharged from the Mucous Membrane - - 405
— Ulcers like to Small-pox Pustules upon the Mucous Membrane, - - - - - - 107
— Tympanites Intestinalis and Abdominalis, - - - 409
— Acids generated in the Stomach, - - - 412
— a brown fluid secreted in the Stomach, - - - 413
— the milt-like Tumour of Mucous Membranes, - - 414
— Polypi from the Mucous Membrane of the Alimentary Canal, 422
— Fatty Tumour of the Mucous Membrane, - - - 432
— Fungus of the Mucous Membrane of the Alimentary Canal, 433
— Medullary Sarcoma of the Stomach, - - - 436
— Melanosis of the Mucous Membrane of the Stomach and Intestines, - - - - - - 443
— Warty Excrescences of the Mucous Membranes, - - 447
— Deposition of Cartilage and Bone upon Mucous Membranes, ib.
— Scirrhus and Cancer of the Alimentary Canal, - - 450
— Hæmorrhoids or Piles, - - - - - 475

VII.—ORGANIC DERANGEMENTS OF THE CELLULAR COAT OF THE INTESTINES, - Page 482

Of Inflammation of the Cellular Coat, - - - ib.
— the deposition of Albuminous Matter in the Cellular Coat, 488
— Tumours in the Cellular Substance, - - - 492

VIII. — ORGANIC DERANGEMENTS OF THE PERITONEUM, - - - - 494

Of Inflammation of the Peritoneal Coat, - - - ib.
— Ascites, - - - - - - - 509
— Pus effused within the Abdomen, - - - 511
— Inflammation of the Serous Coat of the Stomach, - - 498
— Inflammation of the Serous Coat of the Intestines, - ib.
— Chronic Inflammation of the Serous Coat of the Intestines, 506
— Puerperal Peritonitis, - - - - - 508
— Ulceration of the Peritoneum, - - - - 514
— Tubercles of the Peritoneum, - - - - ib.
— Gangrene of the Peritoneum, - - - - 517
— Ossification of the Peritoneum, - - - - ib.
— Discharge of Blood from the Peritoneum, called Hæmenteria, 518
— Fungus Hæmatodes of Peritoneum, - - - 519
— Accidental development of Serous Membranes, - - ib.

IX. — ORGANIC DISEASES OF THE MUCOUS GLANDS OF THE INTESTINES, - - 520

Of Inflammation of the Mucous Glands, - - - 522
the Cholera which lately appeared at Clapham, - - 523

INTRODUCTION.

It is the object of Morbid Anatomy to classify and to explain all deviations from the healthy structure, and the symptoms connected with organic derangements.

The importance of the study of Morbid Anatomy to the accurate knowledge of Physic and Surgery, must be obvious even to the cursory and inexperienced inquirer. It is, indeed, the very foundation of Medical Science; for without an intimate acquaintance with the morbid changes that take place, as the causes or the effects of disease, the practice of Physic and Surgery can be directed only by ill-founded hypotheses or blind empiricism. "Et quis denique," says Dr Sandifort *, "vel ipsius Hippocratis aurea scripta attento volvens animo, non animadvertit sæpius summum hunc naturæ observatorem longe plures sanaturum fuisse morbos, si cultri ope illorum inquirere causas ipsi fuisset concessum." He adds, under the influence of the same strong impression, "Revera enim in permultis casibus causâ morbi inventâ, inventam etiam esse sanationem, et plurimos ab hostili morborum insultu esse liberatos."

The diseases incident to the Human Frame may be

* Vid. Oratio de circumspecto Cadav. examine optim. Pract. Med. adminic.

divided into two great classes: the First comprehending those which proceed from some evident derangement of the organic structure; and the Second, those which originate in some derangement of the functions only of the part affected.

As the former class is by far the more numerous, the study of Morbid Anatomy is one of the principal sources from which the knowledge of the nature of diseases can be obtained; and it has contributed to raise the different branches of medicine from their original state of rudeness and imperfection.

The science of Medicine was anciently very imperfect, and it made, during many ages, but little progress; for the success of medical investigations had not corresponded to the genius or industry of those who pursued them, because some fundamental assumption was made, which ought first to have been patiently ascertained, and little or no attention was paid to the dissection of Morbid Bodies: And it is surely a matter of regret, that a subject abounding with so much useful instruction, should not sooner have been cultivated with the same zeal and success as many other branches of philosophy.

There are many advantages which are peculiar to the study of Morbid Anatomy, which it may not be improper to enumerate.

In the 1st place, this study, by elucidating the nature and progress of diseases connected with derangement in the Organic Structure, affords a sure foundation upon which an opinion may be grounded, respecting the nature and progress of such diseases.

2d, As this study proves, that parts similar in their structure are subject to the same organic derangements, it exposes the fallacy of many hypotheses which have been propagated respecting organic diseases.

3d, If parts of similar structure be subject to similar organic derangements, Morbid Anatomy tends to unfold the structure of the smaller parts of the human body, which have hitherto escaped observation, as it shews that many of these are subject to the same organic derangements as those organs whose structure is obvious to our unassisted senses.

4th, MORBID, like COMPARATIVE ANATOMY, assists in distinguishing those organs which are essential to life, from others of less importance, and also shews that every part, even of the same bowel, is not equally sensible, or equally necessary to the prolongation of life.

5th, This study points out the uncertainties and deficiencies of medical science, particularly as to the method of cure, and hence may pave the way to a new and better mode of treatment.

There is reason to apprehend, that some students of medicine are not sufficiently apprized of the importance of Morbid Anatomy, and of the light which it reflects on the diagnosis and treatment of diseases: hence they direct their attention chiefly, or almost solely, to the anatomy of the body in its sound state.

But this limited range of investigation is altogether inadequate to supply correct ideas of morbid structure; and, as diseases generally produce a change, not in the situation only, but also in the bulk and texture of the part affected, such a course of study is evidently incomplete, serving to give no information concerning the cause, or the means of its counteraction.

There is another description of students, who, though they acknowledge the intimate connexion between Morbid Anatomy and the practice of the different branches of Medicine, do not fully comprehend the extent of that connexion.

Disease is very frequently productive of remarkable alterations, by diminishing or enlarging the organ affected, and thus changing the relative situation of the diseased parts; or uniting parts originally distinct, and forming preternatural communications.

By a change of place or of bulk, in consequence of injury or disease of an organ, the functions of contiguous viscera may be deranged.

Thus, the pressure of the enlarged Liver disturbs the functions of the stomach; or by impeding the circulation of the blood through the bowels of the belly, produces dropsy.

The enlarged Liver is the source of still farther mischief; by pressing upon the gall ducts, it impedes the free passage of bile into the intestinal canal; and the bile, thus obstructed, is taken up by the lymphatic vessels, and occasions jaundice.

Nor is this the only evil to be apprehended from the affection we are considering.

By means of inflammation, the enlarged Liver may be united with the neighbouring parts; and if, in such circumstances, an abscess should take place within it, the contents of the abscess might be discharged into the cavity of the peritoneum, into the sacs of the pleuræ, or even into the lungs.

The progress of the disease called a Rupture or Hernia, affords another and very striking example of the importance of the study of Morbid Anatomy; for even the most accurate knowledge of the body in its sound state, conveys but an imperfect idea of the condition of the displaced bowels, or of the state of the canal through which they have been protruded.

The displaced portion of intestine pushes before it the thin, slippery, and elastic peritoneum; and, after

such an occurrence, it soon loses its natural characters, being converted into a dense, lamellated membrane, which frequently contracts adhesions with the neighbouring parts.

The intestines, during the different stages of the disease, are more or less twisted, compressed, and inflamed. In consequence of the displacement, their coats become thicker, and are frequently fixed to each other, or to the containing sac.

The aperture through which the bowels have passed no longer preserves the same relation to the neighbouring parts as in a state of health, and, from inflammation, its sides become thicker, as also the neighbouring cellular substance.

Of the preceding remarks, the disease called Stricture of the Urethra affords also a very strong illustration.

In its earlier stages, the disease is produced by a growth, only membranous, which, in its progress, is converted into ligament, and even into cartilage; and the neighbouring parts are frequently reduced to a morbid state. In addition to the pain and difficulty in discharging the urine, the usual concomitants of stricture, the disease often occasions various constitutional symptoms: among these may be enumerated great nervous irritation, despondency, in some cases, bordering on delirium, and, in other cases, symptoms similar to those which accompany the ague.

Now, even from these slight observations, it evidently results, that though the medical practitioner, whose anatomical knowledge has been derived solely from the study of the human body in a sound state, might perhaps form probable conjectures with regard to the various consequences of a diseased Liver, yet he would be soon constrained to confess his ignorance of many of the

peculiarities of the disorder, and his inability to discover the root of the mischief, and the means of eradicating it. A few trials would convince him of the necessity of submitting to the task of examining the succession of morbid changes characteristic of the disease, by the repeated dissection of patients who had been its victims; or, at least, of directing his attention to the exhibition of these changes in morbid anatomical preparations, and to the description of the modes of treatment which the series of appearances had suggested.

This first law of the healing art, strongly impressed on the mind of CELSUS, led him to deliver the following observation in the form of an axiom:—"Eum recte curaturum, quem prima causæ origo non fefellerit." In truth, that practitioner only who has accustomed himself to trace, by dissection, the progress of diseases, or who has devoted his attention to those morbid specimens which exhibit and explain the results of dissection, can be qualified either to distinguish their nature and progress, or to form a just prognosis, and proper indications of cure.

On the same principle, the surgeon acquainted with the under abdominal aperture only in its healthy state, must be greatly embarrassed while performing the operation of Inguinal Hernia; for in such a case, that aperture retains neither its former size nor situation; and when to these sources of embarrassment are superadded the great changes produced upon the displaced bowels, and their coverings, his perplexity must be proportionally increased.

With regard to the last disease to which I alluded, the Stricture of the Urethra, some of the valuable remarks which occur in the treatise of Sir E. HOME, appear to me to apply with particular force to the condition of those

surgeons who have not acquired, by the study of Morbid Anatomy, an accurate idea of its nature and progress.

" For want of some criterion," he observes, " to guide our judgment in the investigation of diseases, we too often mistake the occasional symptoms for the disease itself; which, from the obscurity of its situation, or its apparent insignificance, is totally neglected.

" Practitioners who are not in the habit of investigating diseases, but are satisfied with treating the symptoms which present themselves, are naturally very often led into this error.

" The constitutional symptoms," he adds, " which belong to a Stricture of the Urethra, have been more frequently mistaken for an original disease, than those of any other local complaint *."

In short, the knowledge of Morbid Anatomy contributes essentially to solve the above, and many other difficulties, which occur daily in judging of the origin, progress, symptoms, and treatment of this great class of organic diseases.

By comparing the internal organization of different animals, we are enabled to distinguish those parts which are common in the structure, and essentially necessary for the performance of the vital functions, from such as are peculiar to certain animals only, and exclusively subservient to their economy and habits of life.

There are certain bowels on which life more immediately depends, and which, with great propriety, have been termed Vital. There are others, which, though highly useful to the animal, are not absolutely necessary to the prolongation of life.

* Vid. Practical Observations on Strictures, Vol. ii. p. 14.

The Thymus Gland and Spleen seem to rank in this class; the former is absorbed before the fifteenth year, and the latter may be diseased, and in the inferior animals has been extracted without occasioning any manifest disorder.

On this interesting subject, Morbid Anatomy conveys still farther information; for it proves, that the functions of the animal economy may be continued, even though a considerable part of some of the bowels be in a diseased state, every part of the same organ not being equally important.

Thus, life has been prolonged, though one side of the Lungs, or one of the Kidneys, has been destroyed; though a part of the Liver has been much diseased; though several inches of the Intestinal tube have been lost; and even though a considerable number of the lacteal vessels were obstructed.

Morbid Anatomy likewise shews, that particular parts of certain organs are much more sensible than others. Thus, pressure upon the upper part of the Brain may often be endured for a time; but when made upon the under surface of that organ, it very soon creates the most alarming symptoms, and often terminates fatally.

The study of organic derangements, in all their variety of appearances, must also prove a sovereign antidote against premature and ill-founded hypotheses, and conduct the profession to that species of experimental research, and inductive reasoning, which the genius of the great BACON so happily introduced into other branches of philosophy; and we may thence learn to cherish with the greater anxiety that science which has so close a connexion with the healing art, and which points out the most effectual remedy against those disorders which originate in a derangement of structure.

In the University of Edinburgh, the importance of Morbid Anatomy to the liberal and scientific study of medicine, has always been sensibly felt; and both my GRANDFATHER and FATHER endeavoured, as far as their other duties allowed, to introduce the most prominent features of that science into their lectures on Anatomy, Physiology, and Surgery.

But in a course of Medical Instruction, comprehending so wide a field of inquiry as had been assigned to their charge, even though the term of lecturing extended to six months, it may easily be supposed, that only a small portion of time could be appropriated to a branch of the subject still overlooked or undervalued, and but too generally left, in the hurry for obtaining what was erroneously conceived to be more essential information, to the research and experience of a more advanced period of life.

The opinions of professional men are now more enlarged; and this department has become so interesting, and promises such valuable and extensive assistance to the healing art, that it can be treated with complete success only when it is converted into a distinct object of study.

These considerations, strongly impressed on my mind by the practice of my predecessors, and by the general current of medical opinion, induced me to deliver a separate course of Lectures on Morbid Anatomy, and to prepare the materials of the following Work.

My situation in the University naturally led me to bestow the most vigilant attention on the progress of anatomical knowledge, and its useful applications in the details of practice. These I was anxious to extend, and many local advantages favoured my design; for in addition to the opportunities obtained by private dissection, our Infirmary and Dispensary afforded me va-

rious occasions of observing the more interesting forms of disease, and of examining morbid appearances.

Besides, in the prosecution of such researches, I received the greatest assistance from the extensive field of observation and experience which my FATHER long enjoyed, and which (for even the partialities of a son do not disqualify me to bear witness to the fact) he most anxiously laboured, through a long life of varied and useful exertion, to improve.

From the commencement of his professional career, he made it an invariable rule to collect and register the important cases that had fallen under his notice, to subjoin his observations on each, and, in the event of the patient's death, to examine the body with minute attention. He also, as often as circumstances permitted, preserved the affected parts, with an accurate description of the morbid appearances.

The extensive collection of diseased preparations formed by the industry of my FATHER, and lately much augmented, has afforded me an opportunity which few have had, of investigating the nature of morbid changes; for that collection now contains specimens of almost every disease connected with organic derangement, so disposed as to exhibit a regular view of its progress.

In these circumstances, I should hold myself inexcusable, were I to neglect so fair an opportunity of improving, or at least of attempting to improve, this part of my profession, by communicating to the world a great number of facts, collected from actual observation of the dead body, the force or import of which cannot be weakened by false reasoning or ill-founded hypothesis, and which constitute a chain of evidence to which few can refuse their assent.

Having offered these preliminary remarks on the nature and importance of the subject, and on the considerations which strongly recommended it to my attention, I proceed to explain the general plan of the Work. It consists of two Parts: the First containing a description of the morbid appearances discovered by dissection; the Second a relation of the symptoms which preceded the patient's death. On this relation, a comparison is instituted between the symptoms which preceded death, and the appearances discovered by dissection.

With the exception of a few cases, which seemed to require particular consideration, I have confined my statements within these limits, leaving the reader to draw his own conclusions. And though this instance of reserve may expose me to criticism, I am persuaded, that, in the present state of the science, the more enlightened practitioner will do justice to the motive by which I have been actuated; facts being of more importance than opinions, till the former can be generalized, and reduced into a common law.

In justification of this method, and of the views from which it has proceeded, it may not be unnecessary to remark, that, in treating of Morbid Anatomy, different authors have adopted different plans. With some, it forms an appendage only to a book on Natural Anatomy; but a subject so extensive, so complicated in its nature, and so unspeakably useful in its practical applications, can never be treated with the requisite precision, till it be converted into a distinct branch of inquiry.

Other authors, impressed with this conviction, have swelled their books to an immoderate size, by the insertion of superfluous cases.

Where the diseased appearance is so frequent as to ad-

mit of generalization, particular illustrations seem superfluous, but where a diseased appearance is singular, or uncommon, it then becomes necessary to enter into a fuller detail, by an insertion of particular cases: for these, as Mr Abernethy has justly observed, "will probably convey more information in less words than description or narrative, as they identify the kind of disease which is meant to be described, and inform as it were by example *."

The arrangement which I have adopted differs a little from that of preceding authors; for, instead of describing in continuance all the organic derangements of the Gullet, of the Stomach, or of the Intestines, I have classed under one head the same diseases in these different parts of the alimentary canal.

While this plan precludes unnecessary repetition, it seems to me to give more clear and precise ideas on the subject, serving farther to point out the distinction between the anomalous and the characteristic symptoms of the disease.

To the description of the morbid appearances, a brief enumeration of the concomitant symptoms is subjoined.

This is a very interesting, but a very difficult branch of the subject.

It would constitute the perfection of medical science, were we capable of deciding, in particular cases, what changes have taken place in the living body; for on such a decision, a correct diagnosis would be established, speculative opinions would be converted into demonstrative evidence, and a foundation truly rational laid, for regulating the details of medical practice. In confirmation of these sentiments, it is justly stated in the

* Vide his Classification of Tumours, p. 23.

preface to Dr STARK's Works, "That a frequent, careful, and impartial comparison of the symptoms which have preceded death, with the appearances of the dead body, can alone lead to this desirable perfection."

Every medical practitioner who has enjoyed the benefits of experience, must be fully aware, that several circumstances concur in rendering the history of diseases imperfect, besides those which have been enumerated by Dr CULLEN in the subjoined note from the Preface to his Nosology *. Among such circumstances, the following will be admitted to hold no unimportant rank.

* "A tempore igitur Sydenhami in hac re multum laboris nec frustra impensum est; rem tamen minime adhuc absolutam esse censeo. Multa parum accurata, multa erronea, multa denique prorsus falsa, historiis morborum, quas jam habemus, inesse, novit quisque in his aliquantulum versatus; et novit etiam ex variis causis hæc vitia subrepsisse. Scriptores enim, alii ad theorias sibi placentes stabiliendas, alii ad fidem remediis ab ipsis sive inventis sive multum laudatis conciliandam; vel veritatem, præconceptis occæcati, non percipiebant, vel etiam fictis et falsis corrumpebant. Plures, re omni quovis modo mirabili capti, quod, ipsi facile crediderunt, alios credere cupientes, rem omnem præter modum amplificarunt. Plures denique, ut observationibus, hodie adeo expetitis, famam sibi compararent, historias in museo fictas, pro veris tradiderunt. Hæc omnia, si specialius indigitarem, de imperfecta hactenus morborum historia satis clare constaret; sed hæc omnia impræsentiarum prætermitto, et unum solummodo, in historiis morborum conscribendis, vitium, ad rem nostram maxime pertinens, indicatum volo.

"Multi optimæ etiam fidei medici, in morbis observandis diligenter versati, in historiis eorum conscribendis sæpe nimium fecerunt. Non solum enim symptomata morbi cujusvis semper præsentia et inseparabilia, sed plura etiam, et cuncta quidem quovis tempore morbum comitantia, recensuerunt. Ita symptomata rarius, nec necessario cum morbo conjuncta, et plura omnino adventitia et fortuita, notarunt; dum simul illa inusitata et fortuita ab usitatioribus et inseparabilibus distinguere penitus neglexerunt. Hinc, historiam morborum plenissimam reddere conantes, quæ ad distinctionem cujusque ab alio quovis conferre possent, omiserunt, immo difficiliorem reddiderunt."

1st, Peculiarity of constitution, sex, manner of life, the imperfect manner in which patients describe their ailments, and the erroneous account which many physicians lead their patients to give of their situation, from taking up too hasty an opinion respecting the nature of the case.

2d, The imperfect knowledge we possess of the functions of some of the organs of the body. Thus, it is difficult to determine whether the Spleen be diseased, unless it has attained so great a bulk, as to be felt by an external examination.

3d, The different diseases to which several of the bowels are subject. Thus, in the diseases of the Heart, palpitation often obscures those less obvious symptoms which are characteristic of the particular disease; and, in the same manner, jaundice is a feature of very different diseases of the Liver, and delirium of very opposite diseases of the Brain.

4th, The remarkable sympathy between neighbouring, and even distant organs, renders the source of the disease doubtful. Thus, the Stomach sympathizes with the bowels; and the functions of many of the bowels are deranged by a disordered state of the stomach.

It is also to be taken into account, that distant sensations, or sympathetic feelings, frequently create the most acute pain, and give probably the earliest notice of the internal mischief.

From the nature or cause of the disease being imperfectly understood, or mistaken, the most baneful consequences originate.

The disease is neglected, or unskilfully treated at its beginning; the opportunity is lost of arresting its progress or mitigating its severity; or it is aggravated by an improper method of treatment. How often, for example,

are the various causes of colic mistaken? How common is it in all colics to have recourse to spirits?

If wind in the stomach, or indigestion, be the cause of the malady, the colic will be removed; but if it should originate from inflammation, a worse remedy cannot be prescribed: it adds fuel to the fire.

5th, Diseases, during their different stages, assume different shapes, and there are various causes which accelerate or retard their progress.

6th, As medical aid is seldom required until the disease has made considerable progress, it may be difficult to detect the source of the evil, because diseases, and especially inflammation, is in many cases propagated with great rapidity from one part of the body to another. Such are some of the causes of deception respecting the nature of organic diseases.

Before concluding, I cannot refrain from stating, that I have not attempted, by means of numerous quotations, to render my book an index to those already published; and to enter into an exact criticism of the works of preceding pathological authors, would exceed my present purpose.

My avocations do not allow me the leisure necessary to execute so delicate and laborious a task, with the requisite exactness and impartiality; for I have persevered in writing, amidst varied engagements and much distraction, which left little time for weighing the evidence of opinions, or studying the elegancies of language, and the harmony of periods. All that I have aimed at is simplicity of expression and perspicuity of style.

I am also apprehensive, that, after the most careful attention in collecting and arranging the materials of the volume, many defects may still be discovered, resulting not only from the omission of many important

facts, but also from the misapplication of those which have come under my notice.

No one can be more sensible than myself of these defects; and I rely upon a favourable reception at the tribunal of the public, rather from the utility of the subject than from the manner in which it has been treated.

With the candid, I trust that the difficulties attending the execution of such a design, will plead in excuse of the imperfection of this treatise. To readers of this description, the appeal, perhaps, is unnecessary, as they are always disposed to join Mr POTT in opinion, "that he who thinks he can produce any benefit to society, needs not to be anxious about any apology for the publication of his ideas."

BY the publication of a Second Edition, I discharge a debt to the public, who were pleased to receive in a very flattering manner, the First Edition of this work, now many years out of print. Various circumstances, which it is unnecessary to enumerate, have concurred to prevent me from fulfilling my intention at an earlier period. I trust, however, that the work has not suffered by the delay.

No pains have been spared to render this volume more perfect than the former, by a very careful revisal, and by adding several new Chapters, and a great variety of new facts and observations, deduced chiefly from extensive opportunities of confirming my former remarks, and from the large additions made to the valuable collection of morbid specimens contained in the Anatomical Museum of the University *.

* By the liberality of the Honourable Patrons of the University, a most useful Catalogue of this Museum, drawn up with much care by my assistant Mr MACKENZIE, with the aid of the Medical Professors,

When the facts relative to an order of diseases, and the known modes of cure, are fully ascertained, it may be permitted to the philosophical inquirer to begin the process of generalization, and to draw the ultimate conclusions which the knowledge thus acquired may seem to warrant. This is the order of science, and the only method of procedure, from which can be expected any improvement substantial or useful.

Every addition to our knowledge concerning the origin, the progress, the symptoms, and other concomitants of disease, is an instrument of further discovery, and a source of power to the skilful practitioner; at once correcting and extending his vision; directing him in the examination of his patients; enabling him to detect the latent cause of the evil, to which he is called to minister; and awakening his ingenuity to disarm or oppose its malignant influence.

At the same time it ought to be remembered, that to discover the reasons of the failure of the different attempts made to remove the cause, or obviate the effects of organic derangement, constitutes an acquisition of the first importance in the Practice of Medicine.

Even in those distressing cases, where there is no hope of an ultimate cure, such knowledge may still be valuable in directing us to the means of soothing and sustaining the patient during his lingering conflict, and of giving him all the relief of which his condition is susceptible.

Reflections like these are not ill calculated to rouse the industry and ambition of those who are engaged in

has lately been published. This Catalogue, which contains not only a description of the morbid appearances, but also of the symptoms of the more remarkable cases, will be found to be frequently referred to in the following work.

medical pursuits, and to stimulate them to the vigorous cultivation of Morbid Anatomy, from which, as yet, we cannot predict all the benefits that our successors are destined to derive.

Were I to state my own sentiments, the importance of Morbid Anatomy might appear overrated. I shall, therefore, adopt those of my much esteemed friend Dr Wilson Philip, whose researches have thrown so much light upon the function of Digestion.

"No arguments," says he, "are necessary to convince us of the importance of that function, on which all the parts of our frame depend for their nourishment. In one respect, its organs may be regarded as of greater importance than even those which are more essential to life.

"The sympathies of the stomach and first intestine are both more powerful and more extensive than those of any other part, and consequently more generally, and in a greater number of ways contribute to the cause, and influence the course, of all our more serious diseases *."

A great number of singularly illustrative cases will be found in the following pages.

To this kind of information it has been objected that it adds more to the bulk than to the value of a book. It has been attempted to obviate this objection, by giving only the more prominent features.

In preparing this edition, I have received much useful assistance from my medical colleagues and friends, for whose valuable communications, and the honour they have done me, I feel sincerely grateful.

* Phil. Trans. 1829.

With the view of reducing the price, a smaller type has been adopted. The engravings represent certain Intestinal Worms, an unusual distribution of the EPIGASTRIC and OBTURATOR arteries, and some diseased appearances with which the professional eye is not yet quite familiar. The engraving representing the Medullary Sarcoma of the Stomach, was taken from a drawing of a very remarkable specimen of that disease, which was copied from nature by my friend Dr SAVAGE, and it conveys, in my opinion, a very faithful delineation of this malignant disorder. The engravings of the Intestinal Worms and the albuminous Tumour of the Liver, were taken from drawings executed by that distinguished artist Mr P. SYME.

Should this work, by unfolding the nature of diseases, accompanied by organic derangement, and by an exposition of the concomitant symptoms, tend to suggest the means of obviating such diseases—should it lead to the advancement of Morbid Anatomy, by stimulating those engaged in the medical profession to the prosecution of a study which forms the most solid foundation of medical science, and which must be regarded as the groundwork of a great building, to be finished by the united labour of future ages, it will afford me the most heartfelt gratification, and compensate the time and labour I have devoted to the subject.

1*st October* 1829.

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MORBID ANATOMY.

GENERAL OBSERVATIONS UPON THE STRUCTURE, FUNCTIONS, AND MORBID ANATOMY OF THE ALIMENTARY CANAL.

From the nature, variety, and importance, of the functions of the Alimentary Canal, and from the number and complexity of the organs that contribute to digestion, any disorder of a function of such primary necessity, and on which all the others so immediately depend, will necessarily derange the system to a greater or less extent; hence an investigation of the organic diseases incident to this part of our frame, constitutes one of the most extensive, and, at the same time, one of the most important branches of pathology.

Before proceeding to the more immediate object of our inquiry, and in order to explain more clearly the various bearings of this interesting subject, it may not be unprofitable to premise a few general observations upon the structure and functions of the Alimentary Canal.

The tube through which the food passes, which repairs the waste, and sustains the strength, of the body, is, in the lower classes of animals, of a very simple structure, consisting solely, or chiefly, of a bag which contains the food, and of an aperture through which it is received and discharged. But in the higher classes of animals, it is more complex in its construction, being of considerable length, and enlarged in one or more places, so as to constitute a Stomach, or Stomachs. In such animals, the term Gullet is applied to the canal which leads into, and the term Intestine, to that which passes out of, the stomach, and

through which latter the refuse of the food is conveyed out of the body.

The food is first minutely divided by the teeth, and mixed with the saliva and mucus of the mouth and throat; and is then propelled, by means of the muscular power of the pharynx and gullet, into the stomach, where it remains for a longer or shorter time.

Owing to the particular figure, position and structure of the two orifices of the human stomach, the food is retained within that organ, until it has been submitted for a sufficient time to the action of the gastric juice, by which it is transformed into a uniform pultaceous, greyish substance, called Chyme, which is gradually discharged through the pyloric orifice of the stomach into the Intestinal Canal.

The human intestinal canal is about six times the length of the body, in order that the food may undergo the necessary changes; that there may be sufficient space and time for the absorption of the more nutritious part of the chyme, by the lacteal vessels; and that the chyle which escapes one set of lacteals may be taken up by another, and be mixed sufficiently with the mucus, bile, and pancreatic liquor within the intestines, so that the process of digestion may be completed. The internal surface of the intestine is much more extensive than the external, the inner coat being folded into doublings, which, from their resemblance to imperfect valves, have been named by anatomists Valvulæ Conniventes. Thus, the internal surface is extended, and more space is afforded for the absorption of the nutritious part of the aliment, and also for the action of those secreted fluids, which have a chemical effect upon the food.

The length, diameter, and structure of the coats of the alimentary canal, and the manner in which its different parts communicate with each other, being more or less favourable to the exit or detention of the food, are by no means the same in different animals, but bear a relation to the kind of food on which they instinctively feed. Thus, the alimentary canal of a graminivorous animal is not only much longer, but it is also much more capacious and complex, than that of a carnivorous.

The alimentary canal of an animal designed to live partly on vegetable and partly on animal food, holds a middle place between that of a carnivorous and graminivorous animal. In this class man is included, and when the individual reaches to maturity, the alimentary canal is generally between thirty and thirty-six feet long.

The food is carried through this long and circuitous route by a series of powerful muscular fibres, which constitute one of the coats of the alimentary canal; and perform their office so accurately, as to propel the contents contrary to their gravity, and even to push forward air or quicksilver. To this effect, the muscles of the walls of the belly, and that muscle between the belly and chest, called Diaphragm, essentially contribute.

The muscular coats also produce the peristaltic and antiperistaltic motion, which is kept up by the stimulus of the food. Thus, the various parts of the contents of the alimentary canal are intimately united, by which some are dissolved, others enter into new combinations; and thus also, the alimentary mass is presented to the lacteal vessels, which take their origin from the inner surface of the intestines. The discharge of that part of our food which is useless, is accomplished by the muscular contraction of the coats of the intestines.

Without the addition of other coverings besides the muscular coats, the alimentary canal would be exposed to be torn; therefore, the membrane called Peritoneum, which fixes the alimentary canal to the back-bone, is continued over the stomach and intestines, forming their external covering; and by the addition of this covering, the alimentary canal is enabled to resist over-distention, from air or fæces.

There is still another property, which is indispensably necessary to the alimentary canal, viz. a power of accommodating its capacity to the quantity of its contents. This is provided for by the elasticity and expansive power of all the coats, and owing to the introduction of a quantity of loose cellular substance between the muscular and villous coats, and also by the loose manner in which the stomach and intestines are fixed to the body.

Lest the alimentary canal should be injured by the acrimony

of its contents, and in order to facilitate their passage, the innermost coat, called, from its resemblance to velvet, Villous, is moistened and besmeared by a considerable quantity of a mucous fluid, which is derived from a number of glands, imbedded in the cellular substance uniting the muscular and villous coats.

The bile and pancreatic liquors are added to the bolus of food during its course through the alimentary canal, in order to produce the necessary changes upon it, and to stimulate the coats of the intestines to their proper functions.

Such being the complex structure, and complex functions, of the alimentary canal, it follows that it is much exposed to disease.

The aliment may be of a noxious quality, and various hurtful substances are occasionally swallowed along with it by accident or intention; besides, as the canal is of considerable length, and at the same time moveable, it is apt to be displaced.

The coats of the alimentary canal, being of a different structure, are subject to diseases peculiar to each, as has long ago been observed by Dr CARMICHAEL SMYTH *. The peritoneal coat is subject to those of other serous membranes; the muscular coat to those of other muscles; the cellular coat to those of the cellular substance; and the villous coat to those of other mucous membranes.

Moreover, the mucous glands of the alimentary canal are liable to the diseases of other glands of a similar structure, which perform a similar office.

Independently of those various sources of organic diseases in the coats of the alimentary canal, the bile and pancreatic liquor are sometimes so much altered in their nature, as to be incapable of producing the necessary changes upon the food, or of rousing the coats of the alimentary canal to their due functions.

The ORGANIC DISEASES of the alimentary canal, investigated in the following pages, may be included in the four following classes:

* Vid. London Med. Communications, Vol. II. p. 170.

The first class explains the morbid effects which have resulted from hurtful substances swallowed by design or accident.

The second comprehends the nature and distressing consequences of the displacement of a part of the alimentary canal.

The third class gives a description of the Worms that occasionally infest the human alimentary canal: And

The fourth is dedicated to an explanation of the organic affections peculiar to the coats of the alimentary canal.

Before entering into detail respecting these various organic derangements, it may not be improper to premise some general observations on the subject.

The greater part of the diseases of the alimentary canal, included in the above five classes, tend to obstruct the passage of the aliment to a greater or less degree, creating, in some instances, a permanent, but in others only a temporary obstruction.

The permanent obstruction, the effect of organic disease, is of slow growth, but constant in its operation, and becomes greater and greater, either from the gradual increase of the concretion or tumour causing it, or from the gradual approximation of the opposite sides of the canal; whereas the obstruction from spasm comes on suddenly, is generally of short duration, and the spasmodic contraction frequently goes off spontaneously, or after the exhibition of proper remedies.

But on some occasions, the spasmodic contraction is not removed during life; and upon dissection we find the affected muscular coat of an unnatural hardness.

There is in some constitutions a remarkable disposition to diseases which obstruct the alimentary canal. I have met with several patients who have been so unfortunate as to labour under two very different causes of obstruction at the same time, or in succession.

The symptoms originating from very different causes of obstruction, are in some respects similar; the patient suffers much from a sense of tightness, pain, and soreness in the diseased part.

If the mucous membrane be much irritated, the mucus, which is secreted in extraordinary quantity, instead of being

a mild fluid, becomes thin, of a light green or yellow colour, and acquires an unnatural acrimony, so as sometimes to excoriate the neighbouring parts. It is either discharged in considerable quantity from the mouth, by hawking, or passes down, and is discharged along with the fæces.

Those mucous glands, and their ducts, which are situated above the seat of the obstruction, being much irritated, acquire an unnatural size, whilst those under it are not at all affected.

The above symptoms are occasionally aggravated by the influence of cold; by which, from the irritable nature of the patient's constitution, an unnatural local spasmodic contraction is sometimes excited.

The constitution is at first but little affected, but, with the duration of the obstructing cause, the digestive powers become ultimately much impaired. The patient loathes his food, and what is taken becomes acid; he loses his spirits, and is occasionally very costive, but at other times is much weakened by a bilious diarrhœa. He becomes weak and emaciated, with a quick pulse; and, after a time, suffers very great pain, owing to the distention by air.

The Air accumulated within the stomach and intestines sometimes distends these organs to such an uncommon size, that the convolutions of the intestines may be distinctly traced through the parietes of the abdomen.

I have seen the stomach and intestines distended to two or three times their natural size, and sometimes even ruptured by the unnatural distention.

It has been matter of dispute among physiologists, from what source the air is derived.

It is not compatible with the object and limits of this volume to enter at large into this question, which has afforded matter for much controversy. I shall therefore only observe, that, so far as I can judge, a part of it is swallowed, a part is formed by secretion, and a part is generated by fermentation.

As we sometimes meet with cases, where the distention, although so considerable as to cause great pain and uneasiness, yet

has gone off gradually, and without the discharge of air by the mouth or anus, it is probable that a part of the accumulated air has been taken up by the absorbent vessels.

When the stomach and intestines are distended by air, the abdomen becomes tense like a drum; hence the name TYMPANITES INTESTINALIS has been employed by nosologists, to express this morbid state.

As the air sometimes escapes from the intestines into the general cavity of the abdomen, in consequence of wounds, ulcerations, and other diseases, nosologists also describe the TYMPANITES ABDOMINALIS.

It is of some moment to distinguish the one species of tympany from the other, the former being a much less dangerous affection than the latter.

The Abdominal Tympany comes on suddenly, the belly is uniformly distended, in whatever posture the patient is, and also smooth; the patient is not sensible of wind moving within his bowels, nor does he hear the sound of it; and he is not relieved by passing wind, nor is the tension of the belly diminished by a purgative.

The Intestinal Tympany, on the other hand, comes on very gradually, the turns of the intestines may be traced by a careful examination, and the sound of the air, passing from the contracted to the dilated portion, may be perceived, even by the patient himself, who often suffers pain whilst the air passes from one portion to another.

The patient also discharges an unusual quantity of air, upwards and downwards, by which he is much relieved.

It may not be unnecessary to add, that the intestinal tympany has been mistaken for a dropsy of the belly; and, on the other hand, when a small quantity of water is contained within the cavity of the belly, and when the intestines have at the same time been filled by air, the distended intestines float upon the water, and render it difficult, unless the patient be examined in different attitudes, to discover the water within the belly.

An acute inflammation is sometimes the sequel of the im-

moderate distention of the stomach and intestines; it is rapidly communicated from one part of the abdomen to another, and very frequently proves fatal in a short time, by terminating in gangrene. But, in other cases, in the vicinity of the obstruction, we find the coats of that portion of the alimentary canal, immediately above it, much thickened, in the same manner as the muscular substance of the heart and of the bladder of urine becomes much thickened, where there is an extraordinary impediment to the exit of the blood or urine.

In such cases, the muscular fibres become thicker, redder, and stronger, to overcome the unnatural resistance.

In addition to the above changes, in some cases the part immediately above the obstruction is extended into a pouch. I have seen the gullet, when an unnatural body has been lodged within it for a considerable time, or when it has been obstructed by any other cause, dilated into a large pouch, which still farther obstructed the swallowing, and also the breathing; and when that pouch is placed near to the termination of the gullet in the stomach, it may press so much upon the heart and lungs as to derange the functions of these organs.

The stomach, when the pylorus has been obstructed, sometimes becomes so prodigiously enlarged as to reach the pelvis; and the intestines, in like manner, are much dilated, from obstruction in any part of the intestinal canal.

I have seen the intestinum rectum, in consequence of obstruction, so much dilated, as to be capable of containing a child's head.

The veins in the vicinity of the obstruction sometimes become enlarged, or varicose, and add materially to the bulk of the tumour; so that when the rectum has been extended, in consequence of an unnatural obstruction, it proves an additional impediment to the free discharge of the urine, or the contents of the uterus.

But the part beneath the seat of the obstruction undergoes a very opposite change; it is always somewhat contracted in its diameter.

The unnatural pouch, created by the obstruction in the alimentary canal, generally adheres to the neighbouring parts.

From the distention continuing, a part of the pouch becomes thinner than the rest; the absorbent vessels are roused to act more powerfully than usual, by the stimulus of the unnatural distention; the sac becomes thinner and thinner, and at length bursts; or the unnatural sac is destroyed by ulceration. Thus a communication is formed between neighbouring organs, as between the gullet and windpipe, between the stomach and colon, or between the contiguous turns of the intestinal canal. Through this unnatural communication, the contents of the one part pass into another, which proves, on some occasions, the cause of instant death, as when the contents of the gullet escape into the windpipe; but, in other instances, life is thus prolonged, as when the pylorus is obstructed, and the contents of the stomach pass directly into the colon.

CLASS I.

OF EXTRANEOUS BODIES, WHICH, BY THEIR MECHANICAL EFFECTS, INJURE THE ALIMENTARY CANAL.

SECTION I.

OF EXTRANEOUS BODIES LODGED WITHIN DIFFERENT PARTS OF THE ALIMENTARY CANAL, AND OF THEIR EFFECTS.

THE structure of the gullet is peculiarly adapted to allow substances of considerable size to pass through it.

This is provided for by the expansive power and elasticity of all its coats, and by the quantity of cellular substance which intervenes between the muscular and innermost coat; so that, when it is divided transversely, it resembles one tube included within another.

Of the above observation, the following cases afford a strong illustration. The late Mr ALEXANDER WOOD gave my father a glass ball, three inches in circumference, which had been swallowed by a child two years old; it passed through the alimentary canal in two days, and did not produce a bad symptom. Even substances of considerable length, and sharp at one end, have passed through the alimentary canal, without injuring any part of it. A celebrated artist of this place gave me a small pair of compasses, two inches and a half long, which his daughter, a child three years' old, had swallowed, and which passed through the alimentary canal in three days, without creating at the time, or afterwards, a distressing symptom.

But extraneous substances have frequently been detained in

the gullet, or some other part of the alimentary canal, and have given rise to various disagreeable consequences.

A sharp body, sticking in the gullet, has sometimes proved the cause of convulsions.

Bartholin * has related the case of a young woman who was thrown into convulsions, by a small portion of glass sticking in her gullet.

Notwithstanding the muscular structure, the elasticity and expansive power of all the coats of the gullet, and more especially of the innermost coat, and the quantity of mucus by which the gullet is besmeared, pieces of our food are sometimes detained in their passage to the stomach for a time, and occasion much pain, anxiety, and a sense of suffocation. In these circumstances, it is not necessary at the moment to endeavour to push the substance into the stomach, unless there be a risk of immediate suffocation; because, by remaining within the gullet, being lubricated, softened, and perhaps partially dissolved, it will probably slip down into the stomach.

It sometimes happens, that when the extraneous body sticking in the gullet is of considerable bulk, and when it is not soon dislodged, it presses so much upon the windpipe as to interrupt the breathing.

Mr C. Cheyne of Leith was so obliging as to send me a quadrangular piece of hard cartilage, which he took from the gullet of a woman who was choked by it, and the subsequent account of the case. "Upon cutting into the gullet and windpipe, it was found fixed in the gullet by two of its angles pressing upon the sides of it. One of the angles protruded a few lines above the gullet: it was fixed so as not to press upon the windpipe; but, distending the gullet in a great degree, its removal was not difficult. When taken out, it measured exactly two inches and a half in length, and one and three fourths in breadth."

Wierus has related the history of a patient who was suffocated by an egg which had stuck in the gullet †.

* Vid. Cent. V. Hist. 66.

† Vid. Tom. I. Mem. de l'Acad. Chir. Paris.

Mr Forster of Hull sent my father a sole, which, by jumping into the throat of a fisherman, while he was endeavouring to secure it with his teeth, killed him. In the same manner, many cattle have been suffocated by a turnip or potato sticking in the gullet.

Even coagulated blood produces the same effect. I am acquainted with a gentleman who had nearly lost his life in the following manner. On account of an inflammation in the upper part of his pharynx, scarifying had been recommended. That operation was unskilfully performed, a very large quantity of blood was discharged, which rapidly coagulated, and by which he certainly would have been suffocated, had not a friend thrust his fingers into the throat, and extracted the masses of coagulated blood.

But flat bodies, such as pieces of money, do not occasion instant death when lodged within the gullet; for they do not press much upon the windpipe, nor do they prevent fluids from getting into the stomach.

There is a specimen of this description in the Museum of Edinburgh, from which I published an engraving in my Thesis.

A halfpenny had stuck in the gullet of a boy, which he had been attempting to swallow; it remained there for three years, and possibly would have remained there for a much longer period, had he not been seized with consumption, which proved fatal to him.

Upon dissection, the gullet was found closely embracing the halfpenny, and considerably expanded by the piece of money.

A halfpenny stuck in the gullet of another boy for six months, and was afterwards extracted by his father, with the blunt hook which is represented in Tab. IV. Fig. 1. of my Thesis.

When an extraneous body has been detained at the origin of the gullet, a sac is, in some cases, formed of some length, which, passing down behind it, proves an additional impediment to the descent of the food, of which I met with a remarkable example.

But all danger is not over when the extraneous body has gotten into the stomach or intestinal canal.

When an extraneous substance has been retained for some

time within the stomach, it irritates the villous coat of that organ very much; and in some cases is contained in a sac within the stomach, from which it cannot be dislodged, and proves a constant source of irritation and pain.

A pin, or other sharp substance, getting into the stomach, may occasion vomiting of blood, by wounding some of the larger bloodvessels of that very sensible organ, which is very amply supplied with blood by various bloodvessels, and which very freely communicate with each other.

A case occurred some time ago, in this place, in which the patient's death was imputed to a prune stone which he had swallowed, and which had occasioned a very great discharge of blood from the stomach.

The stomach has been perforated by sharp-pointed bodies, as by pins and needles; and these have escaped from it into distant parts of the body, as into the muscles of the neck, into the ureter * or bladder of urine †. Dr Carmichael Smyth informed me of the case of a woman who swallowed a number of pins, some of which were thrown up from her stomach, whilst a considerable number were afterwards taken out at a wound in her side, where a seton had been put.

Extraneous substances which have been swallowed, by perforating the rectum, near to its termination, have been found to operate as a cause of Fistula. My father furnished me with a case of this description. He was requested to visit a gentleman, who had for a long time complained of an acute degree of pain around the anus; this was followed by inflammation of the part, and a collection of pus. An incision was made, in order to give a discharge to the fluid; and one of the bones of the head of a fish was discovered sticking in the bottom of the abscess. Upon the bone being extracted, the patient in a short time recovered.

My father was consulted by another gentleman on account of a large flat tumour in the cellular substance above the sphincter ani, between the coats of the rectum, which created much

* Vid. Jul. Cæsar, Claudin Resp. Med. 40.

† Vid. Plater, Tom. III. Lib. II. Cap. 10. De Mictione; also Diemerbroek, Lib. Anat. Cap. 173.

uneasiness. Notwithstanding the remedies prescribed, the pain continued. Eighteen years afterwards the patient perceived a hard substance, which proved to be a small bone. It was cut upon and extracted, and the patient was cured. In this case, the bone, which had been retained for a long time, had created an ulceration of the rectum, and a sac had been formed, in which the bone had been lodged.

A pin, fish bone, or other sharp body, may excite an inflammation of the intestines, or may perforate them, and occasion a Tympanites Abdominis ;—as in the following case, which affords a good illustration of the consequences of local inflammation in the intestines, which had been occasioned by two pins, tied together with their points in opposite directions, which the patient had swallowed in soup, and from which, during his life, he had suffered the most excruciating torture, especially while riding on horseback. The pins had pierced the intestine, and the air escaped from the intestines by a hole, about the size of a goose quill.

On laying open this part of the intestine, after death, the pins, which had been seen projecting, were found tied firmly to each other, of the same size, but with their points turned the reverse way. Each of the pins measured in length exactly one inch and three-eighths of an inch.

Both pins were of a black colour on the surface, and, when examined by a magnifying glass, seemed rougher than new pins, and somewhat rusted.

The bowels of the belly adhered slightly to each other, in different places, and had lost their natural colour and smoothness. The small intestines were thickened, and of a deep-purple colour, approaching to a black, and were enlarged considerably beyond their natural size. About two pounds of fœtid pus were found in the cavity of the abdomen. On the left side of the body, the jejunum had contracted two preternatural adhesions with the mesocolon. These adhesions were formed by two smooth and tough cords, like ligaments, each about the size of a goose-quill, and had the effect of considerably straitening the gut.

A fish bone sticking in any part of the Alimentary Canal *, proves, according to the late Dr GREGORY, an exciting cause of stricture, as in the following case, communicated to me by the Doctor :—

" SIR,

" Inclosed you have a small fish bone (supposed of a flounder), which was found to-day in the coats of the rectum, about three inches above the anus of a gentleman, æt. sixty-eight, who had long been very healthy ; but for three or four years had been subject to frequent severe attacks of pain in his left flank, and obstinate costiveness, alternating with diarrhœa. He had an attack of this kind on Tuesday last, 25th April 1809, which did not yield to repeated doses of oleum ricini (his usual medicine), nor to clysters, two of which were thrown up that night, with little or no effect. No vomiting ; pulse sixty ; skin cool all that day, and till past midnight, as Dr KERR, the Staff-Physician assured me.

" A quarter before nine yesterday morning, the symptoms of inflammation were plainly marked ; pulse an hundred and ten, and strong ; skin hot ; no vomiting, no stool ; pain more severe, and, as usual, increased on pressure. He was bled immediately to ℥xvi, and got every hour a tea-cupful of a strong decoction of senna with tamarinds. No buffy coat on the blood ; no vomiting ; no stool from the senna.—Eleven o'clock. Abdomen growing tense ; pulse one hundred and thirty-two, weak ; extremities growing cool. By two o'clock, pulse not to be felt at the wrist ; head still clear ; no vomiting ; one small, thin, very fœtid stool. He died twenty minutes past four. Abdomen before that time much swelled ; much more after death. Open-

* In the Medical Essays and Observations from Members of the French Academy, translated by Dr SOUTHWELL, vol. i. p. 285, the case of a lady is described who had swallowed the bone of a carp, which stuck in the lower part of the gullet. It occasionally created vomiting when she attempted to swallow. She died fourteen months afterwards. On dissection, a stricture was found to be so complete, that at the part affected, the caliber of the gullet was scarcely a line in diameter.

ed at four to-day; much air in the bowels, not in the abdomen, but in it much reddish serum; no adhesions; extensive redness of the small intestine, and almost general lividity of the great intestine. In the rectum, a remarkable stricture, externally like the contracted scar of a wound; internally, a foul gangrenous ulcer; coats thick and hard. In them was found the fish-bone. His servant, who saw it taken out, said his master was very fond of boiled flukes (flounders.)

"J. Gregory.

"St Andrew's Square,
27*th April* 1809."

Lastly, pins, needles, small nails, pieces of bone, stones of fruit, when swallowed, do not always pass through the alimentary canal, but are retained, and often form the nuclei of alvine concretions.

SECTION II.

OF ALVINE CONCRETIONS WITHIN THE ALIMENTARY CANAL.

Alvine Calculi or Intestinal Concretions have occasionally been found within the human alimentary canal, and in a number of the class Mammalia, but especially in those that live purely on vegetable substances, as in the horse, the cow, and the deer.

The term Concretion is, with great propriety, applied to those substances which have been discharged by vomiting or by stool, or which have been discovered within the alimentary canal by dissection; most of these being composed of fibres intimately matted together, like those of the felt of a hat, and formed on a central nucleus, as a prune or cherry-stone, a fragment of bone or wood, or a biliary calculus.

It is more common to meet with such concretions within the

human intestines than in the stomach; but, in quadrupeds, they are more frequent in the stomach than the intestines.

The following observations apply chiefly to the human alvine concretions, and are descriptive chiefly of the large collection of these which has been formed by my father.

After having examined the above extensive collection, I consulted, from a desire of obtaining farther information on the subject, the works of the most eminent pathological authors, and subjoin the result of my researches; from which it is evident, either that such concretions are much more frequently formed within the alimentary canal of the inhabitants of Scotland, or that they have been overlooked by the medical authors of Holland, Prussia, Italy, France, Germany and England.

The museum at Leyden, formed of the joint anatomical collections of Rau, Albinus, Ledeboer, Van Doeveren, and part of the museum of Ruysch, and of the numerous dissections of the pupils of that seminary of medical instruction, contains, according to Dr Edward Sandifort (who has published a description of it in two large folio volumes), only one specimen of an alvine concretion, and that was found in the ilium.

Dr Walter of Berlin has published, in three large quarto volumes, a descriptive Catalogue of the Anatomical Museum which he sold to the King of Prussia, but has described only one case in which he met with an alvine concretion, "qui inter membranam muscularem et nerveam ventriculi hæsit."

Morgagni, who practised in Italy, has published, in his thirty-seventh letter, and twenty-fourth article, the histories of several calculi which he met with in the alimentary canal; but from his description of these, I am inclined to suppose that the greater part of them had been formed originally within the gall bladder, or biliary ducts, and had passed afterwards into the intestinal canal.

He has described very accurately the external characters, and also the internal structure of biliary calculi. He observes, speaking of those calculi found in the intestinal canal, "Interna substantia meros ostendebat circulos striis intersectos;" and in another passage he adds, "Interius ex circumjectis stratis com-

pactos, et propius centrum ex striis radiatim pergentibus quas inter disjectæ erant albæ splendentesque particulæ." He adds, " Facile pro biliariis habeas."

Lieutaud of Paris has described, in the 17th page of the first volume of his Historia Anatomico-Medica, nine cases taken from other authors, in which what he calls Lapides were found in the stomach; and, in the 77th page of the same volume, nine cases, also borrowed, in which lapides were found in the intestinal canal.

Dr Portal of Paris, from the manner in which he has expressed himself in the fifth volume of his Anatomie Medicale, seems to me to have met with only one example of an alvine concretion within the stomach, and only one case of a concretion within the intestines, which he observes was *bileuse*.

In the German Ephemerides, several cases are described, in which what are called Calculi were found within different parts of the alimentary canal *.

Baron Haller, who was for many years a professor at Goettingen, has not described a single case in his Opuscula Pathologica, in which he met with an alvine concretion.

Dr Baillie of London, in his Morbid Anatomy of the Human Body, says of calculi in the stomach, " they have never come under my observation, and are to be reckoned very un-

* Ephem. Nat. Cur. Dec. I. Ann. II. Obs. 89. 136.
Ann. IV. & V. Obs. 99. 125.
Ann. VIII. Obs. 50. 70.
Ann. IX. & X. Obs. 90. Obs. 122.
Dec. II. Ann. I. Obs. 96. Ann. VII. Obs. 136.
Obs. 185. *(tophacea dejectio.)*
Obs. 202. *(arena.)* Obs. 244.
(cholelithi.) Ann. VIII. Obs.
184. Ann. X. Obs. 90.
Dec. III. Ann. III. Obs. 21. 94. Ann. X.
Obs. 108.
Ann. VII. & VIII. app. p. 71.
Ann. IX. & X. Obs. 246.
Cent. I. Obs. 57.
Cent. III. & IV. Obs. 136.
Cent. IX. Obs. 21.

common *." And he has added, † "Calculous matter has sometimes been known to be accumulated in some part of the cavity of the intestinal canal, especially in the great intestine; but this has not come under my own observation, and, at least in the human subject, is a very rare occurrence."

I also consulted the Lithologia of MARTIN SCHURIG, published at Leipsic, who appears to have met with only three or four cases of calculi in the alimentary canal; but he has many quotations from authors. He appears to me to have arranged under one head extraneous bodies that have been swallowed, and alvine concretions; for he names some of those substances, which have been passed by stool, or been found within the intestines, Silices ‡, others Lapillos durissimos §, others Albicantes, rufos, griseos, tophaceos ‖, and others, as he says, were like biliary calculi. He seems to have met with but one case in which the concretion was like to most of those in the Museum of the University of Edinburgh, which he calls Substantiæ raræ et spongiosæ, magnitudine dimidii ovi ¶.

As there is so little mention made by the most eminent authors on pathology respecting alvine concretions, I hope the reader may be induced to pardon the length of the following article.

Size.

The size of these concretions is extremely various. Some do not exceed a garden pea in size; but others are as large as an orange. My grandfather has described several he met with as being five, six, seven, and even eight inches in circumference; and from the body of a woman who consulted my father, a concretion was three years thereafter taken out of the colon, by Mr RENTON, surgeon in Pennycuik, which weighed four pounds.

Figure.

The larger concretions are more irregular in figure than the smaller; the former have an outer hard crust, which gives them a

* Vide Morbid Anatomy, 2d Edition. † P. 194.

‡ Vid. p. 161. § Vid. p. 154. ‖ Vid. p. 154. ¶ Vid p. 157.

very unequal surface, whilst others seem to be made up of a congeries of smaller calculi. This may be probably owing to the additions made to the surface of the calculus during the time it remains fixed within a certain portion of the intestinal canal. Thus a concretion which had been moveable becomes fixed, from the convexities on the surface being adapted to the concavities within which the concretion has been lodged.

Some such concretions impress each other, as was the case with those which Dr DUNCAN lately sent to the museum. This specimen, which he received from Mr TORBET, weighed twelve and one-fourth ounces, consisted of three parts, and occupied a considerable share of the colon, measuring at its greatest circumference seven and a-half inches *.

Some alvine concretions are perforated by a number of small holes, like some corals.

The smaller concretions are of a somewhat oval or spherical shape, and a little flattened at the sides, which is probably occasioned by the friction and pressure of one concretion upon another.

My grandfather has observed, when describing a case in which several concretions were passed, " That the largest of these five balls, which was the first voided, is five inches in circumference, and something globular, but with several prominences, and flat surfaces. Most of the flat parts had a smooth shining tartarous thin coat; the rest of it was more rough, and of a spongy appearance. The two last brought away are less in bulk, and without so much tartarous crust; the two small ones are all covered over with a shining tartarous crust, which, in several places, is prettily variegated with different shades of an ashy colour. One of them has some resemblance in shape to the shell of a tortoise; the other, or smallest, may be compared to two pyramids, joined by a common base †.

* A full account of the symptoms occasioned by this large concretion, which consists of three pieces, is given in the Edinburgh Medical and Surgical Journal, vol. xxiv. p. 87, &c.

† Vid. Quarto Edition of his Works, p. 668.

Number and External Colour of Concretions.

There are very seldom above two concretions within the intestinal canal. My father, however, perceived, by the touch, within the arch of the colon of a boy, who was much emaciated, twelve concretions.

A very considerable number of concretions has been found within the stomach. LAZONI met with ten; and BILGUER has related the history of the case of an old man, in whose stomach he met with thirty calculi of different sizes.

The colour of the smaller concretions differs from that of the larger, the former having no external coating.

The colour of the surface of thirty-five of the smaller concretions in the Museum of Edinburgh, is nearly the same, resembling that of bad yellow ochre of iron; whereas most of the larger calculi are encrusted by earthy matter, of a coffee-colour, and purple, and others by white matter, which seems to have been deposited in thin successive layers.

Structure of such Concretions.

All the human alvine concretions which were collected by my father, are (with one exception) similar as to structure; all are more or less porous, and somewhat like to dried sponge; and, when examined by the aid of a magnifying glass, seem to be made up chiefly of a number of very small fibres, intimately interwoven with each other, like those in a beaver hat, or in chamois leather; and the interstices between the fibres are filled up by earthy matter.

There are small holes on the surface of a few concretions, which pass for about half an inch into the substance of the calculus; and in one of the specimens there were twelve cavities, of a cylindrical form, which penetrate as far as the very centre of the concretion, and are filled with a viscid mucus.

When the urine gets access to an intestinal concretion, as happened in the case of a child (which Mr LISTON lately shewed me), whose rectum communicated with the bladder of urine, the intestinal concretion is encrusted by a substance, to the eye similar to that of urinary concretions.

The external crust of the larger concretions seldom exceeds two or three lines in thickness, is deposited in layers, and, when dry, is friable, and apt to split and crack off.

In some of the specimens, the external earthy crust covers only a part of the calculus.

Upon making a section of most alvine concretions, they are found to be composed of distinct layers of a yellow or brown colour; but, in some concretions, the layers do not pervade every part of the calculi. In four or five of the concretions there are no layers observed. Some concretions which are found in the deer, form an exception to the above observation; for some have a radiated structure, like biliary calculi.

The lamellæ, which are about two lines in thickness, are generally of a lighter colour than the rest of the calculus, but sometimes darker. The external form of the calculus seems to determine the course of the layers. If the calculus be of an oval shape, the component layers of it follow a similar direction; but if the surface of the concretion be irregular, the layers are disposed so as to correspond in their course with the irregular surface.

The lamellæ, upon a minute examination, do not form one continued line, as in biliary or urinary calculi.

In the centre of the concretion, a prune, or a cherry-stone, or a small piece of bone, piece of cinder, glass, or a biliary calculus, is generally found.

Within some alvine concretions there are cavities, filled by small grains of sand, and fixed to each other by several small fibres.

From what has been stated as to the structure of alvine concretions, it is probable that these substances are frequently formed upon an extraneous body; and also that they increase in bulk, in consequence of the deposition of successive strata.

I received from Dr HENRY of Manchester a concretion which had been lodged for some time within the intestines, which he discovered, upon analysis, to be composed solely of magnesia, which the patient, during his life, took in very large quantities.

Calculi, in all respects similar to biliary calculi, have also been found within the alimentary canal *.

There is a third kind of concretion, which consists chiefly of inspissated lymph; and this inspissated lymph sometimes serves to bind together cherry stones, or other extraneous bodies, which have been accidentally swallowed.

Concretions of this description sometimes acquire a considerable bulk, and produce costiveness, distention of the bowels, and symptoms of incipient inflammation.

Some authors have described a species of white calculus, which has been discharged by vomiting, by persons afflicted by gout; but I have never seen any specimen of that sort, and may be permitted to suggest, that it has probably some relation to that kind of biliary calculus which resembles spermaceti.

In order to throw farther light upon the nature of these concretions, I have subjoined descriptions of three of the more common kind of alvine concretions, drawn up according to the manner of WERNER, by my colleague Professor JAMESON.

"No. 1.—*Colour* of the cut surface, intermediate between yellowish-brown and chesnut-brown.

Shape, tuberose, and perforated.

Lustre, dull.

Fracture, delicate, promiscuous fibrous.

Transparency, opaque.

Streak, not altered in the streak.

Hardness, yields readily to the nail, and receives an impression from the finger.

Tenacity, sectile.

Frangibility, difficultly frangible.

Feel, feels fine and rather meagre.

Is light.

"*N. B.*—The external shape is coated with a dark-brown coloured crust, which is soft, brittle, resinous in the streak, and

* Vid. MORGAGNI, Epist. 37. Art. 24.

light. Some parts of this crust are covered with an ash-grey coloured crust, which is softer than the brown crust, and is sectile.

"No. 2.—*Colour* of the external surface dark ochre-yellow. The cut surface exhibits concentric stripes of different breadths. The broadest stripes are nearly olive-green; the narrower yellowish grey, and ash grey.

Shape, botryoidal; in some places inclining to tuberose.

Lustre, dull.

Fracture, of the broad stripes very delicate promiscuous fibrous; of the narrow apparently even.

Transparency, opaque.

Streak, unchanged in the streak.

Tenacity, sectile.

Frangibility, difficultly frangible.

Feel, feels fine, and rather meagre.

"No. 3.—*Colour*, external surface is pale ochre-yellow, inclining to wood-brown. Internal surface exhibits concentric stripes, and the colour of these inclines more or less to wood-brown.

Shape, pyriform.

Lustre, dull.

Fracture, delicate promiscuous fibrous.

Distinct concretions, appears to be composed of concentric lamellar concretions.

Transparency, opaque.

Streak, not altered in the streak.

Hardness, soft.

Tenacity, sectile.

Frangibility, difficultly frangible.

Feel, feels fine, but rather meagre.

Light."

Effects of Alvine Concretions upon the Alimentary Canal.

I. Such alvine concretions as have been detained for years within the alimentary canal, become gradually larger, and cannot be moved from one part of the intestines to another. They then disturb the functions of the alimentary canal, prove a source of great irritation, by interrupting the progress of the fæces, and frequently occasion an enlargement of the intestines, which is sometimes followed by inflammation.

II. In more favourable circumstances, the coats of the intestines are expanded into a sac, which lodges the concretion; and, in process of time, the sac acquires considerable thickness.

There are in the museum of the University three specimens, in which the caput cæcum coli has been much extended. In one of these, the muscular fibres, towards the ilio-cæcal valve, had attained an unusual size, and the mucous membrane lining the sac was thickened and corrugated. The colon communicates with the cæcum by a circular opening, nearly an inch in diameter. In a second specimen, the cavity in which the concretion was lodged seems to be formed by the extension of the extremity of the ileum, and the mucous membrane of that intestine has lost its villous surface. The right colon communicates with the caput cæcum by an aperture about a quarter of an inch in diameter.

III. As alvine concretions are a source of much irritation, we sometimes find the organ which contains the extraneous body contracted upon it. "Ventriculum valde parvum rugosum, extrinsecus plicis refertum atque veluti contractum," says Schenk *.

IV. Stricture of the intestine is another effect of the irritation occasioned by an alvine concretion.

V. Intestinal concretions have been said sometimes to adhere to the inner coat of the intestinal canal †.

* Vid. Lib. iii.

† Vid. Horstii Observ. 321.

My grandfather has described particularly the dissection of one of his patients who died from an intestinal concretion.

He has observed, in the caput coli "there was a ball of more than seven inches in circumference, with a depression at opposite ends. The intestine had contracted so much at the side of the ball next to the cavity of the colon, that I could not force it through the aperture there, but was obliged to cut the sac in which it was lodged, to take it out."

I examined the body of a woman, whose intestinum ilium contained a couple of intestinal concretions, and found immediately beneath the place where the concretions were lodged an evident contraction, of a livid colour, as if a piece of string had been tied around the intestine very tightly.

The intestines above the contracted portion were much dilated; and their coats, which were much thicker than usual, had lost their usual structure, and very much resembled thick leather which had been soaked in water.

Upon opening the intestine above the constricted part, a small aperture was found in its coats, through which pus had been discharged into the cavity of the abdomen.

The peritoneal coat, and the greater share of the small intestines, were highly inflamed.

VI. Alvine concretions sometimes irritate so much as to occasion an ulceration of the stomach or intestines.

Chemical Analysis of Intestinal Concretions.

MORGAGNI* and Dr PORTAL† have represented intestinal concretions to be similar to biliary calculi, and VAN SWIETEN, LASSUS‡, and RICHERAND, have compared them to indurated fæces.

The only authors who, so far as I can learn, have made any chemical experiments upon human alvine concretions, are Mr CADET§ and Dr PORTAL‖.

* Vid. Letter XXXVII. † Vid. Anat. Medic. tom. v.

‡ Vid. Lassus, Pathologie Chirurgicale, tom. ii. p. 566.

§ Vid. Mem. de l'Acad. Royal. de Chir. tom. iii. p. 15.

‖ Vid. Anat. Med. tom. v. p. 192.

It is incumbent upon us, in the prosecution of science, to receive the opinions which have been handed down to us with much respect, but not without much caution and circumspection; and especially such as relate to the science of chemistry. By suffering these to pass unexamined, by neglecting to weigh the evidence by which they are supported, we are incapable of separating those which are plausible from such as are the result of much patient inquiry and experimental research.

In these circumstances, I thought it of great moment that the large collection of alvine concretions formed by my father should be examined by several distinguished chemists. I applied to my ingenious colleague Dr DUNCAN, in the first instance, who informed me that intestinal concretions consisted principally of woody fibre,—an opinion which he adopted from the characteristic smell evolved, by burning portions of these concretions upon hot iron.

In the former edition of this book, the results of the elaborate analysis of Professor T. THOMSON of Glasgow were published at large: the following is the sum of it:

"1. At first these secretions swim in water; but that is owing to the numerous pores filled with air which they contain. Accordingly, they soon sink to the bottom, and remain there.

"2. When left in cold water they soon communicate a brownish tinge. The water was found to have taken up the following substances:—1. Albumen, which was separated in white flakes by boiling the water. 2. A brown substance, which I consider as peculiar. It dissolved at first in water, but became nearly insoluble, by the slow evaporation of the liquid. It dissolved in alcohol. It approached most nearly in its properties to vegetable extractive, but the quantity which I obtained was too small for an exact examination. 3. Common salt, which crystallized when the water was allowed to evaporate spontaneously in an open vessel. 4. Phosphate of lime, which was precipitated by ammonia. 5. Sulphate of soda, in a very minute proportion. 6. Perhaps also sulphate of lime; but the quantity of this salt must have been very small.

"3. Alcohol dissolved the peculiar brown matter, and some of the salts, but extracted nothing particular.

"4. Potash ley separated the albumen, the brown matter, and perhaps some of the salts.

"5. Muriatic acid separated a notable portion of phosphate of lime.

"6. After the action of all these re-agents, there remained behind a peculiar substance, having the colour and texture of the calculus. Ten grains of calculus left 1.2 grains of this matter. It was very light, and had the appearance of cork, or rather of the peculiar fungus which is used on the continent for tinder, and which the French call *Amadou*.

"7. The calculi consist essentially of alternate layers of this peculiar substance, and of phosphate of lime. Sometimes the substances are intimately mixed, instead of being in alternate layers. The albumen and brown matter seem to serve as a cement. The other substances are in a small proportion.

"The crust on the outside of some of the calculi consists of phosphate of lime, mixed with a brown animal matter.

"In a few specimens I observed crystals of phosphate of ammonia and magnesia upon the outside crust of the calculi; but these appearances are uncommon.

"In two calculi, the phosphate of lime amounted to rather more than half the weight of the whole. In one specimen, the albumen separated was one twenty-seventh of the whole; but I have reason to believe that a portion still remained. The quantity of common salt and sulphate of soda was small."

I also prevailed upon Dr JOHN DAVY, during his residence in Edinburgh, in the winter of 1814, to analyze several of the human intestinal concretions which had not been examined by Professor THOMSON, and the following is the communication with which he *then* favoured me:

"No. 1.—This concretion, nearly of a spherical form, was covered with a very thin crust of light-brown earthy matter,

rough to the feel, destitute of polish, and capable of being scratched by the nail. Internally the concretion consisted very uniformly of fine greenish-yellow fibres, closely and compactly interwoven in all directions, without any appearance of layers, and this part was soft, easily compressible, and slightly elastic.

" The following experiments were made on the internal part chiefly, though never separated entirely from the external crust:

" When heated it afforded much smoke, which had a strong ammoniacal odour; it entered into a state of semifusion, and, intermixed, took fire, burnt with a bright flame, and continued to emit ammoniacal fumes. From 20 grs. 4.3 grs. of a light-brownish ash were obtained. This ash, digested in water, did not yield any saline matter.

" Treated with muriatic acid, it effervesced slightly, after several hours; 1.7 grs. remained undissolved, which consisted chiefly of silicious sand, with traces of sulphat of lime.

" The muriatic solution yielded ammoniaco-magnesian phosphate, and phosphate of lime, traces of carbonate of lime, and also of iron.

" Forty grains of the concretion were macerated in two ounce measures of water, for about twenty-four hours. The filtered liquor, of a light straw-yellow colour, was divided into two equal parts; one part, evaporated to dryness, afforded about 1 grain of a light-brown coloured matter; the other part was tried with some re-agents. It was not altered by a solution of corrosive sublimate. A slight white precipitate was produced by acetate of lead. Nitrate of silver darkened the colour of the liquor; dark-brown flocculi in a short time formed and subdivided, and the supernatant fluid was rendered colourless. Hence it appears that the colouring matter taken up by the water is vegetable substance, capable of being precipitated by acetate of lead or nitrate of silver, which appear to act the part of mordants. A second digestion was performed, with an equal quantity of water, but no farther solution was effected. It was next digested with alcohol, and nearly with the same result; the alcohol only acquired a just perceptible greenish tinge, and afforded, when evaporated, a residue far too minute for examination.

" To obtain the fibrous matter more pure, it was digested for a considerable time, about three days, in diluted muriatic acid. The solution thus formed was of a light-yellow colour, and was found to contain phosphate of lime, and the ammoniaco-magnesian phosphate in abundance.

" The fibrous matter, well washed and dried, was of a very light-brownish hue, soft and shining, and in appearance not unlike tan. It was not affected by concentrated muriatic acid, even when boiling. Cold sulphuric acid produced no change; but when heat was applied, the acid became black, sulphurous acid gas was disengaged, and the fibrous matter appeared cleared. Nitrous acid immediately reddened it, and, when heated, nitrous gas was copiously evolved, and a reddish solution formed, which evaporated, left a yellow, transparent, slightly adhesive, bitter acid substance, reddening litmus, partially soluble both in water and alcohol, not precipitated by muriate of lime, fusible and volatile, and the fumes of an oleaginous odour. Potash-ley acted powerfully on the fibrous matter, and, assisted by heat, readily formed a solution of a light-greenish hue. When heated, it burnt like the impure fibrous matter, intermixing, affording much smoke, but destitute of ammoniacal odour, and most like that from vegetable matter, yielding a bright flame, and leaving very little ash.

" Such were the experiments I made on this concretion, and from these it appears to consist of a peculiar fibrous matter, insoluble both in water and alcohol, and both menstrua, excepting nitric acid and potash-ley, of a little yellow colouring matter, soluble in water, of ammoniaco-magnesian phosphate, phosphate of lime, traces of carbonate and sulphate of lime and iron, and of silicious sand. 100 parts may be said to consist of about

78.0 Fibrous matter.
.5 Yellow colouring matter.
21.5 Saline matter.

" No. 2.—This, and the following, were very similar in appearance to those alvine human concretions so well described

by Dr Thomson; and, consequently, it will be unnecessary to detail their external characters; and, as to the sensible properties of this, I have merely to mention, that it was of a light-brown colour, that it had a slight bilious taste, but no smell.

"When heated, it became semifused, enlarged in bulk, emitted much dense smoke, with the smell of vegetable matter, and perfectly free of ammoniacal odour; burnt with a brilliant flame, and left a very voluminous coal, which, incinerated, afforded a brownish ash; 7 grains of which were obtained from 10 of the concretion.

"This ash was found to consist of phosphate of lime, a small proportion of carbonate of lime, and a little silicious sand.

"Twenty-nine grains of the concretion were macerated in an ounce of water for twenty-four hours. The water acquired a pretty dark yellow colour, fæcal smell, and bitter taste. This infusion, after filtration, was divided into two equal parts; one part was evaporated to dryness; it afforded 2 grains of brown matter, which was bitter, and partially soluble in alcohol; it appeared analogous to the colouring matter of fæces, for it had not the peculiar bitter of bile, and it had the fæcial smell. The other half of the infusion was boiled, but without any change being occasioned; solution of corrosive sublimate had no effect. Acetate of lead produced a brown precipitate, and the supernatant liquid was left colourless; nitrate of silver operated similarly, the precipitate only being a little darker. Infusion of nut-galls had no effect. A slight turbidness was produced by muriatic acid. These results are agreeable to the idea that the matter taken by the water is the bitter-brown colouring matter of fæces, with a little mucus.

"The undissolved part of the concretion was next digested in an ounce of alcohol; the solution formed was of a greenish colour; to extract all the soluble matter several digestions were required. The alcohol being driven off by distillation, 5 grains of a greenish-brown matter were obtained. This substance readily fused when heated, and, below a red heat, rose in dense fumes having a resinous smell, the heat being increased, it darkened and took fire, burnt with a brilliant flame, and the ash it

afforded was only just perceptible. I need not remark that this substance was insoluble in water. It appeared nearly as soluble in cold as in hot alcohol. A ley of potash dissolved it. It did not appear affected by muriatic acid, even hot; sulphuric acid dissolved it; a little sulphurous acid gas was evolved. The solution produced was of a bright-brown, by transmitted light, and of a dark-green, when viewed in the opposite direction. It effervesced with cold nitric acid, nitrous gas was disengaged, and a yellow solution formed, evaporated to dryness, yielded a yellow matter, insoluble in water, very soluble in alcohol, and without any peculiar taste. From these experiments, a considerable portion of resinous matter appears to exist in this concretion.

" The fibrous matter that remained, after the action of water and alcohol, was of a light-brown colour, and perfectly similar in its properties (comparative experiments being made) to the fibrous substance of the first concretion examined.

" 100 parts of this concretion may be said to be composed of about

7.0	grs.	Saline matter.
1.4		Brown fæcal matter,
17.2		Resinous matter.
74.4		Fibrous matter.
100.0		

" No. 3.—This had an alvine smell, but no taste.

" It burnt with a bright flame without intermixing, afforded a smell of vegetable matter, and 10 grains yielded 5.6 grains of a light-grey ash. This ash was found to consist of phosphate of lime, with slight traces of carbonate of lime, and of a little silicious sand.

" Twenty grains of the concretion were digested in water; the water acquired a slight yellow tint, and evaporated, gave very slight traces of the brown alvine matter.

" By digestion in alcohol, a solution of a light-greenish brown colour was formed, which evaporated, yielded one-half grain of a

brown matter, slightly viscid, of soft consistence, admitting to be moulded into any form, and very fusible, melting below 212°. With the small quantity obtained, no more experiments could be made to ascertain more exactly its nature.

" The residual fibrous matter was similar to that from the two preceding concretions, with the exception that it was very slightly, if at all, acted on by solution of potash, and it did not enter into a state of semifusion when heated.

" 100 parts of this concretion appear to consist of about

56.0	Saline matter.
2.5	Viscid fusible matter.
	Traces of alvine matter.
41.5	Fibrous matter.
100.0	

" No. 4.—This concretion had an alvine smell, but no taste.

" It burnt like the last; 10 grains afforded 4 grains of a white ash, which seemed to consist of phosphate of lime, with traces of sulphate of potash and sulphate of lime, and a little silicious sand.

" I had not a sufficient quantity to try the effects of water and alcohol.

" No. 5.—This had an alvine smell.

" It burnt like the two preceding. From 5 grains, 2 grains of grey ash were obtained, which appeared to be composed of phosphate of lime, traces of carbonate of lime, and a little sand.

" The smallness of the quantity prevented any farther examination. Most probably both the last would have been found to be similar, as to their other ingredients, to No. 3.

" From the preceding details, it appears that, in different specimens, the composition of the alvine concretions varies, both as to their saline and their inflammable contents.

" The fibrous matter which they all contain seems, as Dr Thomson who first examined it considers, a peculiar substance. That obtained from the two first concretions, being soluble

in potash, approached it one step *nearer to woody* matter, but it widely differs in the effect which heat produces, intermixing, not retaining, its form like wood.

" The resinous matter which the second contains may be also peculiar; but for this to be satisfactorily proved, farther experiments are yet required.

" Their analysis throws, if any, but a very imperfect light on their formation. *The most probable conjecture appears to me to be, that they are produced from the remains of the ingesta, during their stay in the large intestines.* Thus there would be no difficulty in accounting for the saline ingredients, all of which exist in the fæces; neither would there be any difficulty in imagining *the formation of the resinous substance found in No. 2, and it is easy to conceive, and most natural, that the fibrous matter, like the saline, is derived from the food.* In opposition, it may be said, that the fibrous matter is a new substance, which is granted; but yet it may be contained in vegetables, and it would be desirable to examine those in most common use with this object in view. The idea of the formation of these fibres in the intestines, from chemical changes there taking place, is difficult of conception, and the idea of their secretion still more difficult.

" It is to be regretted, that no clew is derived from analysis, as to their removal, during the life of the patient. Their size, in general, is so great, before they create afflicting symptoms, and their solubility, even in the most active menstrua, so little, as to banish all hope."

I used to mention the above opinion of Dr J. Davy, as to the nature of the human intestinal concretions, in my lectures.

In the year 1814, I gave the half of one of these human intestinal concretions to my very intelligent pupil Dr J. Silveira. Dr Marcet informs us (P. 138. of his valuable Essay on the Chemical History and Medical Treatment of Calculous Disorders, London, 1819), that Dr Silveira presented it to him, and that he shewed it to that acute philosopher Dr Wollaston, who, profiting by a hint of Mr Clift, found it to consist chiefly of the beard of the oat.

In the Edinburgh Medical and Surgical Journal, vol. xxiv. an account is given of several experiments which were made by Dr E. Turner, upon a very large intestinal concretion, which, has confirmed the observations of Dr Wollaston, as to the nature of the principal ingredient of intestinal concretions. I have observed also in intestinal concretions, portions of the skin of the seeds of oranges, or of nuts, and portions of woody substances, probably the stalks of fruit; and one of them contains a small portion of glass.

Dr Kennedy of Glasgow met with a human intestinal calculus, which, upon being analysed by Dr Ure, proved to be in its composition very similar to ambergrease *.

The three following concretions, denominated *Bezoars*, were examined by Dr John Davy, at my request:

"No. 1.—This concretion was of an oval figure, much compressed at both its extremities. Its external surface was slightly irregular, but smooth, and possessed of some lustre. Its colour approached light olive green, and blackish streaks made their appearance in different parts. The fresh fracture was earthy and dull, not unlike that of chalk. Its colour was much lighter than the exterior, and resembled light apple green. It was friable, and easily scratched by the nail. From a large transverse fracture, it appears to consist of concentric lamellæ, round a small nucleus. It had no perceptible taste or smell.

"Heated before the blowpipe, it became of a light brown colour, and emitted a slight smell, similar to that from vegetable matter in combustion, but it did not inflame, nor appear diminished in bulk; by a continuation of the heat it was rendered white, similar to quick-lime.

"A small portion of the bezoar, introduced into diluted muriatic acid, effervesced briskly, and, in a short time, with the exception of the colouring matter, very minute in quantity, was perfectly dissolved. Ammonia added to the solution, produced

* Vid. an excellent account of Intestinal Concretions, by Dr Kennedy, in Dr Johnson's Medico-Chirurgical Journal for September 1817.

a slight cloudiness, which, from the action of oxalic acid, appeared to be phosphate of lime.

The smell afforded by the concretion, when heated, indicated that the green colour depended on the presence of vegetable matter, and this indication was confirmed by the effect of an alkaline ley. When the bezoar, in powder, was digested in a solution of potash, it became colourless, and the solution was pretty strongly tinged green.

" From these results, this bezoar seems to consist of carbonate of lime, with slight traces of phosphate of lime, and green vegetable matter. The quantity of the concretion I examined was too small to allow the proportions of the ingredients being ascertained.

" No. 2.—This concretion was of an irregular globular form, with a slightly concave base. Its surface was irregular, smooth, slightly shining, and of a nut-brown colour, with light-brown spots, and incrustations. It was soft, just sufficiently hard to resist the nail, and compact. From a fracture, it appears to be composed of concentric layers of finely radiated shining matter.

" Heated before the blowpipe, it emitted the smell peculiar to animal matter in combustion; did not inflame; blackened, and, strongly heated, became white, and phosphoresced, yet still retained the original structure: 3.5 grains, thus treated, afforded 2.7 grains fixed residue, which was found to consist of phosphate of lime, and of a very little carbonate of lime. A small portion of the bezoar was heated in a glass-tube, and it afforded water in considerable quantity, that did not affect either litmus or turmeric paper. Thus this bezoar seems to consist of hydro-phosphate of lime, with traces of animal matter, and carbonate of lime, very analogous to one species of urinary calculus. 100 parts may be said to be composed of

78.5 Phosphate, with a little Carbonate of Lime.
21.5 Water, with a little Animal Matter.

" No. 3.—This specimen, which passed for a true bezoar, but which I believe to be an artificial composition, was of an irregular spherical form, smooth surface, light impure greenish co-

lour; fracture and texture chalky; soft, full of small air-holes, and both scented, and externally partially gilded. From the experiments made on it, it appeared to be carbonate of lime, coloured by a little vegetable matter. The small cavities it contained; its uniform earthy structure, without any appearance of successive depositions, its gilded surface, and perfumed state, are circumstances all favourable to the notion of its being an imposture."

"Of the three following concretions, two were found in the intestines of horses; and the other, a hair ball, in the intestines also, but of what animal is not known. Of neither of these has the examination been minute, and it has been chiefly confined to the earthy part:

"No. 1.—This concretion, obtained from a horse which belonged to a distillery, and had been fed on grain, was of an irregular oval figure, with an unequal and slightly undulated surface. It was soft and elastic, and readily yielded to pressure; smooth, and, from very fine projecting fibres, just visible to the eye, it had a velvety feel; its colour was light and dull brownish; and it possessed no lustre. From a section that had been made, it appeared to consist of different kinds of matter, arranged in irregular concentric layers; thus, towards the surface, brown fibrous matter, with two or three layers of a greyish, hard, and slightly crystalline substance, chiefly prevailed; and towards the centre layers, apparently earthy, of different shades of colour, whitish, brownish, and greenish, most predominated.

"The external fungus-like matter burnt with a bright flame, emitted the smell of vegetable matter, and ten grains of it afforded two grains of ash.

"The internal part, when heated, did not inflame, emitted a strong ammoniacal odour, and afforded 4·8 grains of grey ash.

"This ash did not yield any saline matter to water, in which it had been digested.

"It did not effervesce with dilute muriatic acid, but the greater part was quickly dissolved; the residue, weighing only

four grains, chiefly consisted of fine silicious sand, with very slight traces of sulphate of lime.

" The part dissolved was found to be phosphate of magnesia, with a little phosphate of lime, as the precipitate with ammonia was almost entirely redissolved by oxalic acid.

" This concretion, therefore, seems to consist of animal matter, ammoniaco-magnesian phosphate, a little phosphate of lime, slight traces of sulphate of lime, and some silicious sand.

" No. II.—This concretion, of a pretty regular oval figure, is rough and pitted, of a light brown colour, with black shining spots, compact, and just sufficiently hard to resist the impression of the nail. Internally the structure is earthy, and there is a very indistinct appearance of layers and nucleus. Its cohesion is such as to admit of its being cut into slices; and when broken, a slight fibrous appearance, with a few glittering particles, presents itself.

" Before the blowpipe, it behaves like the internal part of the last concretion; ten grains yielded 5·2 grains of greyish ash.

" From trials similar to the preceding, this concretion seems to be composed of some fibrous matter; of phosphate of lime and ammoniaco-magnesian phosphate, nearly in equal quantities; of slight traces of sulphate of lime, and of a little silicious sand.

" No. III.—This hair-ball, in size nearly as large as a common orange, and to appearance perfectly spherical, is covered by a dark brown, almost black, crust, which is very thin, slightly shining, rough, and easily scratched by the nail. Beneath this crust is found brown hair, most intimately matted together.

" The crust, not indeed quite freed from hair, when heated, emitted the smell of animal matter and of ammonia, and neither inflamed nor swelled; and was at length reduced to a brown ash, 5·3 grains of which were obtained from 10 grains of the crust.

" This ash I found to contain ammoniaco-magnesian phosphate, phosphate and carbonate of lime, slight traces of sulphate of soda and potash, and some silicious sand, not to mention the animal matter present, which appeared to be hair."

When this sheet was about to be sent to press, Mr Dick,

(who gives a valuable course of Lectures upon Veterinary Surgery), shewed me a number of intestinal concretions which he had extracted from horses. He informed me he had found twenty of these in a miller's horse.

Some of these were of a large size, one weighed twelve pounds; the majority of the larger are of an oval shape, but the smaller are irregular. The larger were tuberculated on their surface, and internally had the same structure as those taken from the human body; and they are generally buried in the caput cæcum coli. Mr Dick, who had never heard of Dr Wollaston's observations, told me that these concretions were composed of the husk of the oat or of barley, mixed with a greater or less proportion of sand; and added, that they generally have as a nucleus, a piece of a nail or bone, or a small pebble.

Concretions of a different kind are sometimes found within the intestines of persons who had died from dysentery; and these are formed of the *fibrine of the blood*. A very remarkable specimen, which is represented by Plate III., fig. 1., is preserved in the Museum of the University, in which the mass of fibrine is of very large size, and had taken a mould of the cells of the colon. I have had occasion to see, in several instances, a considerable quantity of fibrine passed along with the fæces, in the form of cylinders; and sometimes it assumes an arborescent appearance. It also frequently happens, that a quantity of a substance resembling *spermaceti*, probably stearrhœa, is discharged by those who have concretions within the intestines.

Concomitant Symptoms.

Intestinal concretions have, on many occasions, for years, proved a source of much irritation and derangement of the functions of the alimentary canal, and also to those of the neighbouring parts. They give rise to tension, to more or less pain in different parts of the intestines, and to occasional looseness, nausea, and vomiting.

The pain in the bowels is, in some cases, fixed to one part, is much more severe upon one occasion than another, especially after taking acids, or food of difficult digestion.

Some patients are much constipated for two or three days, and have yet a constant inclination to go to stool. Others have watery stools, and discharge, along with these, a quantity of a viscid ropy mucus, or blood, after which they are much relieved.

Some patients discharge their stools involuntarily.

Upon relaxing the parietes of the abdomen, on laying the patient on his back, a very hard, painful, globular tumour may generally be felt, most frequently in the course of the larger intestines.

It can seldom be made to change its place within the intestine; but often appears to do so in consequence of the change of place of the intestine which contains it. Hence the change appears greatest when the concretion is within the smaller intestines or arch of the colon, which, from the length of mesentery, or mesocolon, are very moveable.

The digestive powers being much impaired, the patient, from the continuance of the disease, becomes very weak, and much emaciated.

The pulse, in the earlier stage of the disease, is but little affected. When the disease has been of some duration, the patient has constant pain in his bowels.

Concretions have in some cases remained for years before they have been dislodged.

In the more fortunate cases, the concretion, after exciting severe nausea and vomiting, has been ejected along with the contents of the stomach, or discharged by stool, or extracted from the rectum.

It is not a little remarkable, considering the bulk of some of these concretions, that the intestinal canal is not more frequently completely obstructed.

From the duration of the disease, the intestines are so much obstructed, that laxatives by the mouth, or clysters, are necessary to procure a passage. Some patients are under the necessity of abstaining from solid food; and others reject the greater part of their food.

Upon the alvine concretion changing its place, and passing down into the sigmoid flexure of the colon, or into the rectum, it creates excruciating torture in the region of the pelvis and fundament, and the bowels become obstinately constipated, and much distended, from the passage being suddenly interrupted.

An intestinal concretion lodged in the rectum, only a little way above the sphincter ani, sometimes creates much pain while the patient is sitting; and the pain becomes still more excruciating upon his going to stool.

When the rectum has become very much distended, in consequence of the intestinal concretion, this last is sometimes discharged along with the fæces; or may be readily extracted by the forceps; and when there are two or more concretions, upon extracting one of them by the forceps (which are used for extracting calculi from the bladder of urine), the others are commonly discharged along with the fæces.

My grandfather has made mention of the case of a man, (quarto edit. of Works, p. 666), "who had no excretion of fæces for several days; and often he could scarce make any water, and that only in drops. During two days before our visit, the tenesmus was constant, and he felt something hard within the rectum, near to the anus, which he and several others had endeavoured in vain to bring away with their fingers. On extracting this substance with a forceps, such as is used for extracting stones from the bladder, he was much easier than he had been for a considerable time. Next day he passed two other balls; and on each of the two following days, a ball, which he could not force out at the anus, was extracted with the forceps."

My father received from Mr R. Marshall of Peebles, from the late Mr Mein of Dunse, and Mr Goodsir in Largo, concretions which were extracted in the same manner as by my grandfather.

Mr Goodsir's patient had laboured for many years under very acute pain in the region of the stomach; and at length passed, in the course of two or three weeks, nine concretions, some of which were as large as a hen's egg.

From what has been stated respecting the effects of alvine concretions upon the alimentary canal, it follows that these may at first be moved from one part of it to another, but become afterwards immovable; a circumstance which merits the most particular attention, as it marks the progress of the disease, and points out the chance there may be of dislodging the concretion.

In consequence of the increased bulk of the concretion within the intestines, the obstruction becomes daily greater and greater, and an inflammation of the intestine follows, which proves fatal.

In order to illustrate more fully the symptoms occasioned by concretions within the intestines, I have subjoined the following cases from my father's case-book.

CASE I.—This patient came from the country, and brought with him a letter from Sir ALEXANDER DOUGLAS, physician in Dundee.

"SIR,—The bearer of this letter, Mr M., comes to consult you about a disorder of many years standing, and I believe of a very singular nature. You will learn much better from himself, than from any account I am able to give you, of the rise and progress of it. I think it only necessary to inform you, that within these two months he has had frequent attacks of violent pain in the region of the spleen, preceded by vomiting, and tension of the stomach and abdomen, sometimes attended with a looseness. No evacuations or medicines, however, give the least relief, excepting opiates, and external fomentations of poppy heads, or the warm bath, which give always present ease; and sometimes the paroxysm, if I may call it so, keeps off for three or four days. I have never observed the least degree of fever, or quickness of pulse, during the most severe fits of pain.

"I shall be extremely glad to know your opinion of Mr M.'s case. I am, Sir,

Your obedient servant,

ALEXR. DOUGLAS."

"*Nov.* 25. 1768."

My father, in a personal interview with the above patient, learnt that he had laboured under acute pain in the belly for seven years; and that about five years ago, he had passed three excrementitious-looking concretions, after which a tumour was observed between the ribs and ilium of the left side.

He therefore wrote the following letter to Sir A. Douglas.

"*Edinburgh, Nov.* 28. 1768.

"Sir,—Having carefully examined and considered Mr M.'s case, I am altogether certain that his complaints proceed from a concretion lodged within the left side of the colon, of the same kind probably with those he passed some years ago, and of which I have in my possession about *thirty*, taken from different patients.

"As it is impossible to reach it from the anus, so as to extract it with a pair of forceps, the patient should carefully observe the following directions, by which it is hoped he may in no long time pass the concretion, or bring it past the turn of the colon into the rectum, so that it may be got hold of with an instrument, and extracted.

"He ought to take every night, at bed-time, a tea-spoonful, or as much of the lenitive electuary, as shall be found sufficient to procure one loose stool; and in the morning a clyster, composed of an English pint of warm milk, to which two table-spoonfuls of olive oil are to be added; and this should be retained for an hour, if possible, by lying in bed, with the buttocks raised by pillows.

"When he goes to stool, he ought, with his hand, to push the concretion downwards as far as he can, without raising considerable pain, and to sit over the steam of hot water, making efforts longer than is commonly necessary; and even when he is not at stool, he ought frequently through the day to work it downwards with his hand; and by squeezing as if he were at stool, or by putting his finger, or a feather, into his throat, to occasion such an effort as is made when we vomit.

"Once in ten days, or oftener, he should take a purgative, and on the evening of that day a laxative clyster; and when

the clyster begins to operate, let him take an emetic, and go into the warm bath.

" A dozen or two of pills, made of Castile soap, in a table-spoonful or two of oil, taken every day, may probably be of considerable service.

" A flannel-shirt should be worn, and through the day a piece of fur should be laid upon the tumour.

" His diet ought to consist chiefly of bread, milk, soup, or broth, with a little fowl, jellies, or plain roasted or boiled meat.

" Moderate walking, or riding on horseback, will be of service; but fatigue is to be avoided.

" I believe I need not add, that excess in eating or drinking might prove highly dangerous.

" No chirurgical operation is to be performed, unless the concretion should altogether stop the passage through the guts, so as to bring on dangerous symptoms, such as could not be removed by medicines. In that case, indeed, an operation, though very dangerous, might be necessary."

The following year, my Father received the subsequent letters from his patient.

" *Dundee, 20th Feb.* 1769.

" My disorder rather increases. I am in continual pain; my appetite is quite gone; I get no sleep but from opium, which undoubtedly will soon reduce me very low; indeed I am so already.

" The concretion still remains in the same place. In March, I found the tumour a hand-breadth lower than it had been in November.

" I am, &c. " JOHN M."

Upon this letter my father wrote the following memorandum. —" In March, the tumour was a hand-breadth lower than it had been in November, or half-way between the anterior spinous process of the ilium and the os pubis.

" Instead of the former clyster, I recommended an infusion of linseed with oil, and to throw in as much as his guts would

receive. He found that he could receive a chopin of it, and thought it reached as high as the tumour.

" I prescribed the following mixture:

℞ Mannæ, ʒ iij.
Vitel. ovi, ʒ ij.
Olei olivar. ℥ss.
Misce, dein. adde sal. Glauber. ℥j.
Solut. in aq. fontan. ʒ vj.

" He took this purgative in the morning, once a-week; at night the clyster, and then the emetic, and passed the clyster in time of the vomiting."

" *Dundee, 2d April* 1769.

" Upon feeling for the lump yesterday, to my surprise I found it quite away from the lower part of the groin, where it used to give me much pain from every thing that passed it.

" Ever since, I have suffered great pain across the fundament; and I have passed nothing these two days and nights. I cannot throw up one-sixth part so much of the clyster as I used to do, and that gives me much pain. I am continually very thirsty, have a great pain across my stomach, and the parts there are all extended more than usual.

" I took physic this morning, but it has not produced any effect.

" There is a very great rumbling in my stomach; the wind, &c. roll about continually, but do not come lower down. I cannot eat any thing. Pray, let me have your answer in course.

" I am, &c.

" John M. *jun.*"

" *P. S.*—Since I wrote the other side, I have been seized with a violent vomiting."

" This gentleman died, before my answer reached Dundee, on the 24th of April 1769.

" After his death, a very large concretion was found in the lower part of the sigmoid flexure of the colon."

The following continuation of the case was drawn up by the late Dr MITCHELL of Dundee, and sent to my father.

" *Dundee, 8th Dec.* 1772.

" On the 24th April 1769, at ten in the morning, Mr M. complained of a most violent pain about the pit of his stomach. His pulse, though not quicker than it commonly is in people in health, was small, weak, and unequal, and his skin covered with a clammy sweat.

" He had for several years complained of a hard tumour in the left side of his body, under the margin of the ribs.

" Two days ago this tumour had descended to the left groin, where it was still to be felt through the parietes of the abdomen, though not quite so distinctly as formerly. On the 23d, from a purging medicine he had taken, he had a copious stool.

" In the morning of the 24th, he took three grains of opium, which he soon after vomited, along with some green dark-coloured bilious matter.

" He continued to vomit the same sort of stuff, with every thing he took, till his death. At nine in the evening he became very weak, his breathing difficult, pulse hardly to be felt, still sensible, and wishing anxiously for death, which happened about an hour after. The body was opened a few hours after his death.

" Upon laying open the cavity of the abdomen, there ran out about a pound, as far as could be guessed, of thin, white, fœtid matter, in every respect resembling pus. The small intestines occupied the whole anterior part of the abdomen; so that, till they were removed, nothing else could be seen, except a small portion of the colon, towards the left os ilium. The portion of the colon mentioned, contained in its cavity the hardness formerly felt through the teguments of the abdomen.

" The surface of the small intestines, especially towards the epigastrium, was covered with a thick well-concocted pus. The contiguous convolutions of the intestines were glued together. The right side, as also the transverse part of the colon, were of a very red colour, and covered by many turgid bloodvessels.

" The middle of the transverse portion of the colon, and also its sigmoid flexure, were somewhat dilated.

" The concretion was perceived within the left side of the colon, which was redder than usual. After cutting into it, a concretion, of an irregular figure, about four inches in diameter, with many rough knobs and prominences on its surface, was extracted, which, when washed and dried, weighed, the day after, ℥vj and ℈v.

" The whole track of the great intestines above the concretion was filled with thick pieces, of the consistence of stiff clay. The sigmoid flexure of the colon was less conspicuous than usual; for this intestine descended almost directly from the spleen to the os ilium, where it made a short turn to the right, and was afterwards continued downwards into the pelvis, to form the rectum. The colon, on this left side, adhered to the kidneys, and more firmly than usual to the muscles and peritoneum; so that *an incision might have been made into the gut, without penetrating into the abdomen* *. The existence of this concretion, and its situation, was seen as you predicted. *The incision of the colon, which you used to recommend in your Lectures*, could in this case have been easily performed; and, had it been attempted in time, might have saved the patient's life."

Case II.—An elderly woman, who had been for many years afflicted by alvine concretions, consulted my Father, at the suggestion of Dr Hall of Jedburgh.

I have inserted only that part of my Father's letter to Dr Hall, which relates to the mode of extracting the concretion from the intestines.

" If they shall, by increasing, or by change of place, obstruct and stop the passage entirely, it is, I apprehend, possible to save the life of the patient, by taking them out by an operation. For, as the colon is, on its back part, not covered

* If there be an enlargement of the right lobe or right kidney, the operation should not be performed on the right side; and a similar objection may be proposed to it on the left side, when the left lobe of the liver, or left kidney, is enlarged.

by the peritoneum, but connected by cellular substance only to the muscles, if an incision be made on the posterior part of it, between the twelfth rib and upper part of the ilium, or immediately above the ilium, *the colon may be opened, without opening into the cavity of the belly; and the wound, I have little doubt, could be cured without much danger, especially as, in the course of last year, I have seen it in one case wounded by a pistol ball, and in another eroded at this very place; and yet in both the openings were healed soon* *.

* As the success of the cases related in the London Medical and Physical Journal, vol. xlvi. p. 72, &c. in which an artificial anus was formed by an incision into the colon a little above its sigmoid flexure; and as an extensive intusceptio was removed after having opened the containing intestine, (*vide* HUFELAND'S Journal for Feb. 1825), may turn the scale in favour of the mode of operating which was adopted in these cases, I have subjoined the subsequent narrative communicated by Mr ———— to Mr BENJAMIN FORBES, as a counterpoise.

" 29. *Drummond Place*, 18*th April* 1826.

" SIR,—The patient I mentioned from whom the alvine concretion was extracted, was a man about 38 years of age. For more than twelve months, by his own account, he had been distressed with bowel complaints, frequent gripes, and costiveness,—for which he had been ordered a variety of laxatives, clysters, &c. which, in general, produced watery, fetid evacuations, and gave temporary relief. He was considerably emaciated, but could walk six or seven miles. When I examined his belly, he pointed to the right side of it; and about three inches from the navel obliquely outward, there he said he had the most pain. At first I took it for an enlarged lymphatic gland, about the size of a goose's egg; but it had quite a different sort of feel from that of an hardened gland. From all the symptoms, and repeated examinations, of the affected part, I concluded that it was what it turned out to be; and I told him that it was too large and hard ever to be expelled by laxatives—and that the only way that I could rid him of it, was by an operation, fully more doubtful than cutting for the stone; he then told me that he was willing to take his chance at all peradventures. The operation was done in manner following:—An assistant, with one hand on each side of the tumour, pinched up the skin and teguments, so as to keep the lump steady and prominent. After this, an incision was made, the full length of the tumour, through the skin and cellular substance, so as to lay bare the gut; the last incision was made through the intestine cross-ways, then with the two forefingers within the gut, like forceps, the tumour was extracted. In less than twenty-four hours the patient was seized with violent abdominal pains and vomiting, and died.—In this case, if I had opened the tumour by

" If, therefore, these balls are not passed by stool, nor moved from their present place by the medicines, and the pains grow intolerable and wasting to her; or if there shall happen a stoppage of the fæces through the canal, by these balls enlarging, or changing place with respect to each other, I would recommend that an operation shall be performed in the following manner:

" Let an incision be made from the twelfth rib, at the distance of two inches from its point, directly downwards to the top of the os ilium. Then cut slowly, and with great caution, inwards and forwards, till the back of the colon is laid bare for a little way. Then, with one hand, press on the fore part of the tumour, and, with a finger of the other hand, try whether you feel the tumours within the colon. If you think you do, make a very small hole in the colon, and introduce a probe; and, by that means, make it certain that the balls are there by touching them with it. Then, with the greatest caution, enlarge the incision as much as is necessary, for introducing a pair of forceps, such as are used in lithotomy, for laying hold of, and extracting them. After they are extracted, and the fæces that may be collected there are pressed out at the wound, let the sides of the incision be pressed together, and let the external part of the incision be stitched, by sutures passed through the skin, at the distance of a finger-breadth from each other. Cover the stitches and incision with straps of adhesive plaster, and with thick pledgets spread with ceratum simplex, and with a compress and bandage, so as to exclude the air.

caustic, I am persuaded the patient would have had a much better chance of recovery: but the man was extremely anxious to have the operation tried. —I mentioned to you that I had different cases, where a gut was opened in consequence of an abscess, and where the fæces were discharged at the opening for weeks; yet the patients got well. In one case, a woman, six months gone with child, had an opening as above mentioned, got well, and was safely delivered. From these instances, I am led to think, that Nature, in her slow way, with the assistance of caustic, would do better than the knife in alvine concretions, such as the one here mentioned; but I must refer to Dr Monro, who has had much more experience in these matters than I could have had."

" Before, however, recourse is had to the operation, let a trial be made of the following means:

" 1. Let her take, every day, a quarter of an ounce of Castile soap, in pills, and of castor oil.

" 2. Once or twice a-week, let her take a purgative, composed of sal glauber ℥i, sugar half an ounce, and the same of sallad oil and whey lbss. or lbj.

" 3. Three times a-week let her get a clyster of an English quart (chopin) of water, in which an ounce of linseed and half an ounce of Castile soap have been infused for two hours.

" 4. Let her foment the belly, and take the above clyster when she suffers much pain.

" 5. Let her diet consist of loaf-bread, milk, whey, broth, soft eggs, butter, a bit of light dressed meat; and if she takes porridge, let her melt a good deal of butter in it *."

In the following extract from a letter of Dr HALL, the sequel of the case is given.

" For half a year after she had your advice, and whilst she continued to employ the medicines, &c. prescribed, she acquired flesh and strength daily, and the concretions remained stationary; but having, in consequence of finding herself so much *relieved*, neglected since then to employ the same course, I found, upon being called to her a week ago, a great increase of her complaints; her strength much impaired, her body emaciated, and the balls, in point of size, much increased; and these accompanied with febrile heat, &c. irregular belly, and frequently excruciating pain. Sensible, however, as she seems to be of her dangerous situation, she declares, even although a total stop should be put to all alvine excretion, a resolution of *not submitting to any operation*. Your most humble servant,

" R. HALL.

Jedburgh, 8th May 1789."

* I conceive it might be prudent for a patient afflicted by an intestinal concretion, to abstain from the use of the oat, otherwise the concretion might probably become larger, and therefore would not so readily be discharged by the anus. *

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CASE III.—" 1789, Sept. —— M'Kenzie, tailor in Edinburgh, æt. 38 years, has for eight years had a ball in his intestines. About three years ago, when I first saw him with Dr GREGORY, it was felt at the right side of the umbilicus, and appeared to be about the size of a large walnut. It is now considerably enlarged, and has fallen down as low as the os pubis, and is not near so moveable as formerly. Castor oil was prescribed, which has always kept his body open. He is often in great pain, and is willing to submit to any operation; but as there is still reason to hope that the concretion may be discharged by the anus, and as there is no adhesion of the gut to the containing parts, an operation was not thought advisable.

" The patient died a few months thereafter, and a concretion, larger than a golf-ball, was found in the ilium, near its lower end."

CONCLUSION.—The preceding observations appear to me to have established the following propositions:

I. That the greater number of intestinal concretions consist chiefly of fibres of the beard of the oat, which are intimately matted together, and which probably have been attracted by a central nucleus.

II. That intestinal concretions occasion a derangement of the functions of the alimentary canal, and create griping, obstinate and long-continued colicky pains, which are generally limited to that part of the intestinal canal which contains the concretion, and which are occasionally more severe upon the patient taking acids, or food of difficult digestion.

III. That intestinal concretions may be generally felt within the intestines, and when two or more of these are lodged within the intestines, they may be made to strike against each other.

IV. That intestinal concretions frequently change their situa-

tion, and pass down into the rectum, which is thereby much extended, and, when so situated, occasion acute pain and sense of weight in the back part of the pelvis, with a constant desire to go to stool, which the patient cannot gratify; and they may, by the finger, or by an instrument introduced into the rectum, be felt within it.

V. That intestinal concretions, formed within the human alimentary canal, are, in some cases, discharged by vomiting, or along with the fæces.

VI. That an intestinal concretion, after a certain time, cannot be moved from one portion of the alimentary canal to another, owing to its increase in bulk, to the expansion of the coats of that part which contains the concretion into a sac, and to the unnatural constriction immediately below the seat of the alvine concretion.

VII. That intestinal concretions must prove a mechanical obstruction to the passage of the aliment through the intestines; and if proper means be not taken to remove the cause of the obstruction, inflammation of the intestines follows, which proves fatal.

VIII. That, in the earlier stages of the disease, while the concretion may be moved from one part of the intestines to another, all that can be done is, to operate on the bowels, partly through the medium of mechanical action, and partly by lubricating the alimentary canal by the exhibition of proper medicines, in order that the concretion may be discharged along with the fæces, or may descend into the rectum, from which it may be artificially extracted.

IX. That after the disease has been of long standing, and when a sac has been formed, which retains the concretion in a certain place, it cannot be removed, should it be lodged within the colon, but by an incision, as there is little or no chance of

dissolving the stone within the intestine by any medicines given internally.

It is surely much to be desired, that other cases, equally favourable as those above described, might occur to a judicious and experienced practitioner, for bringing this operation, proposed by my father, to the fair test of experiment. I consider this as an object of great importance, not to the profession merely, but to the general interests of humanity; and entertain the hope that my researches, and the collateral information furnished by my friends, may contribute to extend this useful branch of the healing art, and to pave the way for the removal of intestinal concretions, which, when retained within the intestines, waste the vigour of the frame *, and abridge the period of human life.

Before concluding, it may not be improper to mention some of those cases which may most readily be mistaken for intestinal concretions lodged within the intestines.

The organic derangements which may be most readily mistaken for intestinal concretions, are indurated fæces, tumours of the omentum or mesentery, incipient dropsy of the ovaria, and an unusual position of one of the kidneys.

To throw farther light on these organic affections, I have subjoined the following cases:

Case I.—I was requested by the late Dr Kilgour of Musselburgh, to visit a man of 73 years of age, who was then much emaciated, complained of very acute pain in the abdomen, which was much increased on pressure, and who had had no passage for several days. His pulse was quick and hard. The relations of this patient informed us that he had been for many years subject to costiveness and stomach complaints. Several hard substances were distinctly perceived by the touch, a little above the left os ilium. His relatives said that these hard substances

* My grandfather, in his description of the case of a boy afflicted by this disorder, has observed, "that his parents asserted he was scarce of so large a stature, after six years of his disease, as he was at the beginning of it."—Vide his Works, p. 667.

had been distinctly felt by Mr Cunningham, surgeon at Tranent, and also by themselves, for eight or ten years.

Venesection and large doses of purgatives were prescribed, but in vain, and the patient died in six days after I visited him.

His body was opened by my assistant Mr Fyfe, in the presence of Dr Kilgour, and of myself. All the viscera of the abdomen were found in a sound state, excepting the segmoid flexure of the colon, on which there were several black spots, and which, on being opened, was found to contain fæces very much indurated, but no proper intestinal concretion.

For the following singular case I am indebted to the late Mr Bryce.

" *October* 24. 1813.—J. S. ætat. 8., about four months ago was attacked with pleurisy, for which the usual remedies were had recourse to, with success. Immediately after this, there was accidentally discovered in the right iliac region, a circumscribed tumour of very considerable magnitude, which gave slight uneasiness on handling it. The tumour seemed somewhat moveable, and was at times more distinctly felt than at other times. A course of laxatives was administered, without any effect on the tumour; mercury was also used to considerable extent, both by frictions and internally, with as little effect on the tumour. During these courses, however, the pulse was considerably more frequent than in health, and the strength was diminished. There was considerable emaciation, and frequent feverish fits; all which symptoms seem to have strengthened the opinion of the attendants, that the tumour was either in the glands of the mesentery, or within the cavity of the intestines, and gave great anxiety regarding the event. About the beginning of October 1813, when the mercury had been some time given up, and the bowels were regular, and the child was gaining strength, he was suddenly seized with a fit, during which he could not articulate, and after which he had evidently lost the power of voluntary motion of the right arm and leg, to a considerable degree. After this the child became dull, had frequent vomiting, stupor, and the other symptoms of hydrocephalus,

which terminated in death on the 22d October. On opening the abdomen, the intestines appeared in a perfectly natural state. On removing these from the right side, the caput coli was found higher up than usual; and partly behind and between it and the groin was felt the tumour which had occasioned so much anxiety to his attendants during his life. It was behind the peritoneum, which being removed carefully, a kidney of three or four times the natural size was brought into view. It was in a perfectly sound state. The ureter was very large, issuing from the pelvis of the kidney, but soon contracted to its usual size. It ran directly across the psoas muscles, and was inserted into the bladder about the usual place. On examining the left side, there was not a vestige of kidney nor of ureter. The bladder was moderately distended, and reached to the upper end of the kidney *in situ*.

Of Calculi of the Tonsils.

This section is supplemental to the former, and is descriptive of those calculi which occasionally have been contained within the tonsils, and also of the concomitant symptoms.

This disease is by no means frequent; in proof of which, those rich repositories of pathological knowledge, the Letters of Morgagni, the Descriptive Catalogues of the Leyden and Berlin Anatomical Museum, by Drs Sandfort and Walter, the Anatomie Medicale of the learned Dr Portal of Paris, the Nosologia Methodica of Sauvages, the Chirurgia Hodierna of Callisen, the Nosographie Chirurgicale of Richerand, and the Pathologie Chirurgicale of Lassus, do not afford any information respecting this subject.

Even in Schurig's Lithologia, a book professedly written on calculi of different parts of the human body, mention is made but of two examples of this complaint, and these are borrowed from Kentmannus de Calcul., and from Nicol Blegny, Zodiac. Med. Gallic. an IV. and V. Febr. Obs. 4.

Dessault * has made mention of calculi of the tonsils, and says they are produced by a collection of mucus and lymph.

* Vide vol. i. p. 464; translation of his works by Turnbull.

Three cases of this disease occurred to Mr Wilson, surgeon at Beith, and were transmitted to me, along with the calculi, by the late Mr Allan Burns of Glasgow.

Two of the patients, members of the same family, were far advanced in life, and had laboured under the disease for many years, which occasioned coughing and difficulty in swallowing; and at length the calculi were discharged, after having excited a considerable degree of suppuration in the tonsils.

In justice to Mr Wilson, I have subjoined his account of the cases.

" *24th January* 1805.

" Case I.—A man about seventy years of age has been troubled for twenty years (the disease began when he was fifty) with a frequent inflammation and suppuration in the posterior part of the fauces, upon the right side; so frequently, indeed, that scarce three months ever elapsed without a severe attack of it. During the intermission, the patient found an uneasiness in the spot, which he was taught to believe proceeded from an enlargement of the amygdala. I saw him about five weeks ago; his throat was then highly inflamed and swollen, more especially on the right side, from whence the tumour stretched almost entirely across to the opposite side. I used the common remedies without the smallest benefit. At last, after twenty years' suffering, the tumour burst, when, besides a puriform discharge, a concretion came away."

" Case II.—Ann Welsh, aged fifty-eight, sister of the former patient, had frequent attacks of inflammation and suppuration in her tonsils, after exposure to cold.

" From the commencement of her complaint, she thought she felt a lump on the left side of her throat, and this by degrees increased; so that, in about a year afterwards, the skin was seen protruded before it at the upper part of her throat.

" The next attack was more violent than the preceding; the tumour gave way, and matter was discharged; the pus continued to be discharged through eight small apertures, and con-

tinued open for about twelve months. At the end of this period, being about three years from the commencement of the attack, I perceived, by the probe, a concretion in the tonsils. I made an incision into the tumour, but so much blood was lost that the patient fainted; so that I could only break off a portion of the calculus. By the use of emollient gargles for fourteen days, the cyst gave way, and the calculus was discharged into the mouth. The ulcer then healed rapidly.

" In both of the preceding cases, the attacks of inflammation and suppuration were at first extremely frequent, but the sores healed readily. But as the disease advanced, matters were reversed; the intervals of ease were longer, but the cure of the ulcers was more protracted.

" The sores seldom remained open for above four or five months. The patient, whose case has been first described, laboured under the disorder for twenty years, and, during the last attack, the throat was not in the slightest degree inflamed."

The same gentleman communicated to me the history of a third case, which continued for about three years, when a stone, about the size of a bean, was discharged. It was remarkable that this person was a relative of the former patient.

The calculus which had been lodged in the tonsils, which KENTMANNUS has described, was, in some respects, similar to those which were sent to me.

He describes it as " gypseum, simillimum tophis, qui intra digitorum articulos chiragra laborantibus accrescere solent."

There is no mention made of any chemical experiment having been made upon the calculus.

The three calculi sent to me were of the same pyriform shape, unequal on the surface, which was of a dirty olive colour, seemingly owing to the pus, in which the calculi had been so long imbedded, having dried upon the surface of the calculus, and to the touch somewhat harder than chalk. Internally the calculi had a dirty opaque white colour, which, towards the centre, was slightly tinged by yellow, and, towards the circumference, with a dirty-green colour; and the section exhibited a few concentric layers of a more brilliant white colour than the rest of

the calculus, but no central nucleus. By the aid of a magnifying glass, the calculi seemed to be composed of small grains agglutinated to each other.

I have subjoined a more particular account of the calculi, drawn out according to the manner of WERNER, by Professor JAMESON, and the chemical analysis of one of these calculi by Dr THOMAS THOMSON.

Colour of the surface dirty olive-green, internally greenish-grey towards the surface, but yellowish-grey in the centre.

Shape, pyriform.

Surface, granulated, inclining to botryoidal.

Lustre, dull.

Fracture, even.

Concretions, curved lamellar concretions.

Transparency, opaque.

Hardness, yields to the nail.

Tenacity, sectile inclining to brittle.

Specific gravity 1.715.

Constituents.

1. A white matter retaining the size of the calculus, and swimming in water. It possesses the properties of coagulable albumen.

2. Phosphate of lime.

3. Carbonate of lime.

It differs in its composition from any salivary calculus hitherto examined. But pulmonary calculi of a similar kind are common.

CLASS II.

DISEASES CONNECTED WITH A DISPLACEMENT OF A PORTION OF THE ALIMENTARY CANAL.

SECTION I.

OF INTUS-SUSCEPTIO.

A PORTION of intestine sometimes passes within another, carrying along with it its mesentery; the intestine is then in a state of intus-susceptio: and this proves a cause of considerable stricture, the included intestine being in a contracted state.

It has been stated that the internal coat of the intestine is sometimes invaginated, and forms a complete barrier to the passage of the alimentary canal, but this I never have observed.

The intestine passes generally into that immediately beneath it, and sometimes in the reverse manner.

The frequency of the first species may be readily explained from the natural peristaltic motion of the intestines, whereas the latter can happen only when the peristaltic motion of the intestine is inverted.

A part of the intestine has been stated to fall within another, merely on account of its weight; but the case of intus-susceptio from below upwards, sufficiently refutes such a theory.

An intus-susceptio is not peculiar to any one period of life.

It is much more common during infancy than in manhood.

During infancy, the included portion of intestine may, in most instances, be readily disengaged, there being no unnatural thickening, inflammation, or adhesion between the contained and containing bowel, and but a slight diminution in the calibre of the intestinal canal.

In the infant, it is not uncommon to meet with three, four,

or five intus-susceptions at the same time; sometimes there is a much greater number. These intus-susceptions are sometimes all in the natural direction; in other instances, some are in the contrary direction; but, in full grown persons, such an appearance seldom presents itself.

The extent of the intus-susceptio, or of the quantity of intestine received within the other, varies from one or two to eight, ten, nay twenty inches.

Intus-susceptio is rather more common in the smaller than in the larger intestines, but most frequent at the termination of the ilium in the caput cæcum coli, owing probably to the unequal size of these bowels.

The caput coli has sometimes been found within a part of the arch of the colon, or one part of the arch of the colon within another, or the under part of the sigmoid flexure of the colon within the rectum, or the cæcum, and whole of the colon sometimes pass through the rectum, forming an external swelling, or procidentia ani. In a case in the museum, the transverse arch of the colon of a child is contained within the sigmoid flexure of that bowel; and, in the case described by Mr WHATELY, Phil. Trans. vol. lxxvi., the invagination began at the conjunction of the ilium with the colon, and carried with it the cæcum and its appendix. The ilium was lodged within the colon, and the ascending, transverse, and descending colon of the left side, passed into the sigmoid flexure and rectum. The valve of the colon passed as low as the anus; hence when the patient was at stool, he only emptied the ilium.

The muscles of children being more irritable than those of the adult, the intus-susceptio is more frequent in early life, though generally less dangerous, on account of the greater laxity of fibre, and slighter degree of stricture, swelling, and inflammation; whereas, to grown persons, the disease is more certainly and more immediately fatal, the greater rigidity occasioning a more obstinate spasm, which is often followed by inflammation, swelling, and the accretion of parts; indeed, the union between the containing and contained parts, is in some cases so intimate, that the included intestine cannot be withdrawn,

nay, not even distinguished from the containing intestine *; and there is at the same time a great contraction of the affected part.

An unnatural irritation, by exciting a partial contraction, sometimes proves a cause of intus-susceptio.

Worms frequently have been found at the intus-suscepted portion; and it seems not improbable that the drastic purgatives employed for the removal of these may increase the mischief.

Costiveness is also a frequent source or prelude of this disorder, the hardened fæces, or scybala, being the causes of considerable irritation.

Such irritations frequently produce so unnatural a contraction of the parts affected, as to oppose the free passage even of air; for which reason, one part is often contracted, while that immediately adjoining remains in its natural state. The unnatural obstruction impairing the functions of the stomach and intestines, a quantity of air is generated, which is an additional cause of distention.

Symptoms.

From what has been stated respecting the morbid appearances, it follows, that there are two very different kinds of intus-susceptio, viz. that which is unattended by inflammation, and that attended by acute inflammation and its consequences.

The former, a disease of infancy, in most cases does not in any great degree derange the functions of the alimentary canal; whereas the latter, which may be ranked among the diseases of manhood and old age, is one of the most acute and fatal disorders incident to humanity, as the stricture almost immediately causes an inflammation of the displaced intestine; hence the difficulty of distinguishing this disease from inflammation of the intestines, excited by other causes.

The sudden appearance of the symptoms after violent straining at stool, the impossibility of throwing up by the anus as

* Vid. my Grandfather's Obs. on Intus-susceptio. Edin. Med. and Phys. Essays, vol. ii, art. 27.

much liquid as in a state of health, together with the sudden appearance of a hard tumour on the left side of the abdomen, and which is painful on pressure, afford a strong presumption of the existence of an intus-susceptio. The nature of the disease can be discovered for certain, when a tumour is suddenly formed on the left side of the abdomen, and which is occasioned by a part of the arch of the colon passing into the sigmoid flexure of that bowel, or when the invaginated portion comes within the reach of the finger passed into the rectum, or where it appears externally.

The symptoms and progress of the inflammatory species of the disorder were well marked in the case of an infant treated by my father, and that distinguished surgeon the late Mr Andrew Wood.

"I was informed by his nurse, that the child had had a very large stool, which came away suddenly, after a good deal of straining; the child seemed to be in great pain, and cried incessantly for a considerable time. In a few hours the pain somewhat abated, and he seemed to have a strong desire to go to stool; but, notwithstanding repeated efforts, he passed nothing but slime, slightly streaked with blood.

"Various laxatives and clysters also were prescribed, but in vain. This is one of the most unequivocal symptoms of intus-susceptio. Having observed that but little could be thrown up, I was struck with the suspicion (which I mentioned to Mr Wood) that it was probable, during the effort at stool, one part of the intestine had passed downwards within the other, so as to produce the intus-susceptio.

"The strongest purgatives did not move him, and that above not one-fourth part of the quantity which a child is capable of receiving could be thrown up by the anus.

"This last circumstance shewed likewise that the intus-susceptio was near to the anus.

"Repeated attempts were made to replace the intestine by means of clysters, but the resistance could not be overcome, and the child died in sixty-eight hours.

"A very extensive intus-susceptio, accompanied by a great

degree of swelling, and thickening of the intestine, were observed upon dissection.

" The end of the ilium, and beginning of the colon, which is called caput cæcum coli, had been pushed upwards within the colon, by the muscular action of this portion of the intestine, then across the great arch of the colon, and from that downwards to the rectum ; that is, the half of the colon which is on the right side was inverted, and taken with the ilium, which it dragged along with it into the lower half, or left side of the colon.

" The thickness of the coats of the intestine which had been displaced was very remarkable, considering the very rapid progress of the symptoms *." But, in other instances, the disease assumes a chronic form, the patient's stomach is much deranged, he has frequent vomiting, colic, and diarrhœa, and frequently discharges blood, and this is succeeded by frequent and great desire to go to stool, during which only a little mucus and blood are passed, and this is speedily followed by symptoms of inflammation of the bowels.

Intus-susceptio is very much to be dreaded on another account, because, although of itself not always immediately fatal, it is very apt to lay the foundation of a permanent stricture, or of mortification of the included intestine. On dissection, we generally also meet with peritonitis to a great extent, and occasionally partial gangrene, at the seat of the intus-susceptio, and coagulable lymph fixing the invaginated portion of intestine in its unnatural situation, the coats of which are more or less thickened ; hence the impossibility of removing the disorder, even after making an artificial opening into the containing intestine.

Of a Portion of Intestine discharged by Stool.

There have been instances in which a considerable portion of the ilium has been discharged by stool.

There are several such specimens in the muscum of the University of Edinburgh.

* Extract from my Father's Lectures.

Mr Bower gave me a portion of the ilium, measuring about fifteen inches, which had been discharged by stool. The patient enjoyed good health for seven years afterwards.

My father used to explain in his lectures the above very remarkable fact, by supposing a previous intus-susceptio, in which the stricture had strangulated the portion of intestine evacuated, and had occasioned a mortification at the upper part of the intus-suscepted portion, whilst, by exciting adhesive inflammation in the superior and inferior portion, it had produced an adhesion of the superior with the inferior portion, and consequently a continuity of canal.

For an account of another similar case, in which there were several shreds and smaller pieces passed by the patient, I beg leave to refer the reader to vol. ii. art. 27. of the Edinburgh Med. and Phys. Essays, page 361.

Of the Double Intus-Susceptio.

This is a very rare form of the disease, and has not, as far as I know, been yet described.

The late Mr A. Burns sent for my inspection a preparation, illustrative of this disease, with the following description of it:—

"The case occurred in a boy of about twelve years of age.

"The caput coli, and transverse arch of the colon, were intro-suscepted into the sigmoid flexure of the colon and rectum.

"The peculiarity in this case consists in an inversion of the intro-suscepted portion, after it had slipped within the first fold.

"There is thus one intro-susception within another.

"All the inverted portion of intestine was highly inflamed —in some places thickened by the coagulable lymph within its coats, and the part next the anus was gangrenous."

SECTION II.

OF PROCIDENTIA ANI.

The procidentia ani differs but little from an intus-susceptio, and is more frequent during infancy and old age than in the meridian of life. Prolapsus ani is also the sequel of injuries of the spine, and of other causes which induce weakness or palsy of the sphincter ani muscle.

Irritation constantly applied is also a source of prolapsus; and hence it frequently is symptomatic of worms, hemorrhoids, or of stone in the bladder, and is sometimes produced by the frequent use of warm and stimulating clysters; and in women by a prolapsus uteri.

In infants, the disease assumes the form of a small vascular tumour at the anus, but, in the adult, it appears in the form of one or two loose flaps, of a pale colour; but occasionally we meet with a tumour as large, or even larger, than an orange, which is formed by the greater share of the larger intestine.

My grandfather has published the history of a child who died from the disease; and, upon dissection, it was found that the inversion began a little below the upper part of the sigmoid flexure of the colon, and the mesocolon was torn away from the inverted part.

In the adult, the villous coat of the rectum is, in some cases, only displaced, forming folds.

When the disease has been removed it is very apt to return. If the prolapsus be not speedily removed, it is followed by swelling, the unnatural discharge of mucus, inflammation, and sometimes by gangrene, occasioned by the contraction of the sphincter ani, and it is accompanied by the symptoms of strangulated hernia.

It is sometimes impossible to return the prolapse, in consequence of the distention of the cellular membrane by coagula of

blood, and this happens more especially to those who have piles. The disease then assumes a chronic form; it prevents the patient from exertion, proves a source of much irritation, and considerable straining is requisite to discharge the fæces, when they are indurated, by which the prolapse becomes more considerable. The tumour at length loses its velvety surface, and acquires a dense covering like to the skin.

SECTION III.

OF HERNIÆ OR RUPTURES.

The importance of the subject on which we are about to enter, must be apparent to every one who reflects upon the prevalence of the disease, on the various forms, contents, and situations of the tumour, on the ignorance of most patients respecting the particular nature of the disease, on the diseases with which this disease may be confounded, and on the fatal consequences which arise from mistakes on this point.

No age nor condition of life is entirely exempt from herniæ; the old and the young, the laborious and the idle, the corpulent and the lean, the rich and the poor, are subject to it. But though all are liable to this disease, they are not equally so; the differences of age, sex, constitution, mode, and condition of life, not only disposing more or less to hernia in general, but also determining the particular species of the disease.

Amongst the different ranks of society, the lower orders, owing perhaps to their continual labour, are most exposed to hernia, and to them the disease proves more certainly fatal, as labour not only gives rise to their complaint, but tends to aggravate it when formed, and poverty too often prevents their obtaining the means which may arrest its progress.

The disease, when neglected, sometimes proves fatal in a few days, and even when of a milder form always imposes on the patient some degree of restraint; for any muscular exertion may

change its form so far as to reduce the patient to a state of imminent danger.

The frequency of hernia, and the number of useful persons from this cause lost to society, gave rise to a charitable institution in London, of which the object is to relieve the ruptured poor; and from the records of this institution, from observations by ARNAUD and GIMBERNAT, it appears that 1 in 15 is ruptured. JUVILLE states 1 in 30 to be ruptured in Germany; and, according to Dr ROBERTSON, 1 of 15 of the in-pensioners of Greenwich Hospital is ruptured, and but 1 of 40 of the out-pensioners.

Since the publication of my observations on crural hernia, I have endeavoured to ascertain the proportion of persons who are afflicted by this disease; and, in the course of the inquiry, have received much valuable information from various correspondents.

I resorted to the records of our Dispensary, an ample field of information, as is obvious from the following statement. I have added a list of the number of patients who received advice during several years, and also of the number who have got trusses.

Years.	Total Number of Patients.	Single Trusses.	Double Trusses.	Ruptured Children.	Total Number of Ruptured.
1805	1621	11	3	3	17
1806	1551	5	1	1	7
1807	1637	14	4		18
1808	1318	8	3	3	14
1809	1729	14	4	6	24
1810	2936	12	1	2	15

The late Mr INGHAM of Newcastle-upon-Tyne has favoured me with the following report from that city.

Years.	Total Number of Patients admitted at the Newcastle Infirmary.	The Number afflicted with Hernia on one side.	The Number afflicted by Hernia on both sides.	Proportion of Children under the age of 15 years.	Total afflicted by Hernia.
1808	1178	33	7	7	47
1809	1185	30	5	8	43
1810	1349	35	2	5	42

Mr Marrison, trussmaker from Liverpool, assured me, that, in his opinion, about 1 in 20 is ruptured in that city.

The late Mr Gibson of Manchester favoured me with the following report:

The total number of surgeons' out-patients from September 1. 1809 to September 1. 1810, amounts to -	1486
The total number with hernia on one side amongst these, - - - - -	149
Ditto ditto on both sides, - - -	43
At the workhouse, there are of men, women, and children, - - - -	305
The number with hernia on one side, - -	19
Ditto ditto on both sides, - - -	1

Of these three are females, and one child.

Dr Verstrume, Inspector-General of the Geman Legion, was so polite as to send to me the following

"*Statement of the Number of Foreign Recruits rejected and invalided from 26th March* 1796 *to 31st December* 1810, *on account of Ruptures.*

"Number of recruits examined, 40,460; rejected for ruptures, 365.

"Number of men invalided, 3728; of whom 316 were on account of ruptures.

"Total, 681."

In the Memoirs of the French Academy of Surgery, there is the following statement: That, in an hospital devoted to the reception of women, 220 of 7027 were ruptured; that, in the Bicêtre, which contains 3800 men, only 212 were ruptured; that, at the Hotel of Invalids, where 2600 are received, 155 only had hernia; and of above 1037 young men received into the hospital called De la Pitié, only 21 were ruptured.

The discrepancy of the preceding statements may be perhaps explained by the studious care which many take to conceal their

being ruptured, and by some who suffer little from it being ignorant of the nature of their rupture, and also by the diversity as to the mode of life of different nations.

Definition of Hernia.

From the great variety in the situation of hernia, and the contents of the tumour, it is difficult to define this disease in a manner which is unexceptionable.

A hernia may be defined to be a tumour, unconnected with a wound, and produced by a bowel, or part of a bowel, which is not situated in its natural place; and the tumour may be either external or internal *.

The hernial tumour generally is *external to the cavity with which it is connected*, and formed by the protrusion or prolapse of a bowel from the cavity within which it was originally lodged, through a natural opening, preternaturally dilated; hence such swellings appear at the groin, scrotum, labia pudendi, bend of the thigh, and navel.

The protruded bowels are generally included within a sac, which is formed by the elongation of the membrane which lines the cavity from which the protrusion has taken place; hence the impropriety of the term Rupture.

The peritoneum, which lines the abdominal muscles, being a thin and dilatable serous membrane, is readily pushed before the bowels, when these are displaced. This protrusion is gradual or sudden, and the tumour, in the progress of the disease, frequently becomes larger, especially in persons of a relaxed habit, or in those who earn their bread by the sweat of their brow.

The sac is at first moveable, but, in the course of a short time, contracts adhesions with the neighbouring parts, and hence cannot by pressure be returned into the abdomen.

The form and size of the hernial sac depend upon the part

* The definition of hernia, given by BOERHAAVE in his Prælectiones Academicæ, of which HALLER was the editor, is a very good one.

"*Herniæ.*—Ita vocamus partium mollium ex membranis cavis coercentibus dislocationes in aliena loca, ut adpareat esse quasi luxationem partis mollis."—Vid. tom. vi. p. 51.

through which the bowel has been protruded *. The sac is not exposed to the same degree of compression in all parts; hence the neck, when compressed by unyielding tendinous fibres, is much narrower than the body of the tumour; and, on the other hand, if the bowel be lodged within the inguinal canal, the tumour is small, and is in every part of uniform diameter. In short, the form and size of the mouth of the sac correspond with that of the parts through which the protrusion has taken place, and the bulk of the tumour with the degree of resistance which is opposed to its extension.

It also merits notice, that, owing to a change in the position of the hernial sac, the narrowest part of it may not be its mouth; and sometimes the body of the sac is contracted in one or two different places, so that, in the progress of the disease, the sac on many occasions, undergoes a change of form.

The hernial sac, being formed by the peritoneum, is liable to all the organic derangements of a similar description, becoming occasionally thicker or thinner.

The pressure of the tendinous aponeurosis upon the mouth of the hernial sac, has frequently the effect of occasioning a thickening and induration not only of the sac, but also of the cellular substance which covers it, and to these effects the pressure of the truss contributes; and thus, as Arnaud has well observed, the neck of the sac is rendered as it were callous; and, according to Scarpa, this hardening and constriction of the neck of the sac is nearly an inch in breadth in some cases.

When the mouth of the sac has attained such a morbid degree of thickness, another protrusion sometimes takes place at the side of it; thus an appendix is formed at the side of the original sac. There are some herniæ which have no sac, as where the caput cæcum coli or bladder of urine is protruded.

As the caput cæcum coli and colon, on the left side, adhere loosely by cellular substance to the iliac and lumbar muscles; therefore, when these portions of the larger intestine are pro-

* Vid. J. Cloquet on the Varieties in the Form of the Sac; Recherches sur les Causes et l'Anat. des Hern. Abd.

truded, they retain their posterior and lateral attachments; hence the hernial sac incloses the protruded bowel anteriorly and laterally, but the bowel itself is fixed behind to the scrotum.

In abdominal herniæ, the bowels are generally protruded through what may be called natural openings, and there are, also, herniæ of the belly, which appear where there is no natural opening; and, in these cases, there is generally a rupture of the fibres of the muscles which constitute the parietes of the belly.

The different herniæ have been named from their situation, or from the contents of the hernial sac; hence the terms Exomphalos or Umbilical Hernia, Bubonocele or Inguinal Hernia, Oscheocele or Scrotal Hernia, Merocele or Crural Hernia, Hernia of the Perineum, of the Foramen ovale, and the Ischiatic Rupture.

When the hernial sac is filled by a portion of the intestines only, the tumour has been called Enterocele; and when the omentum is also included within the sac, the term Entero-Epiplocele is used; and the terms Gasterocele, Hepatocele, Splenocele, Hysterocele, Cystocele, are employed, when the stomach, liver, spleen, uterus, or bladder of urine, form the contents of the hernial tumour.

The mesentery being longer than the mesocolon, the smaller intestines are more frequently displaced than the larger, to which the vicinity of the ilium to the inguinal and crural apertures also contributes. A part only of their circumference, or a diverticulum from the intestines, sometimes fills the hernial sac. The arch of the colon being the more moveable portion of the larger intestine, is more frequently found within a hernial sac than any other portion of the larger intestine.

The term Congenite has been used when the bowels are contained within the same canal as the testicle, and also as expressive of the period of life at which that kind of hernia generally shews itself.

Besides the External Herniæ there are also Internal Herniæ, of which there are the following varieties: 1*st*, There is an

internal hernia, where there is a small tumour, as when a part of the intestines is engaged within the upper part of the inguinal canal; *2d*, Where there is a tumour, which, on account of the thickness of its coverings, is in most cases scarcely perceptible, as the obturator and ischiatic herniæ; *3d*, Where, at the commencement of the disease, there is in most cases no perceptible tumour, but where, in consequence of the duration of the disease, a tumour appears, as the perineal herniæ; *4th*, There has a species of internal hernia been described, but in my opinion improperly, when stricture, amounting to strangulation, has been made upon a part of the intestines, in consequence of an unnatural aperture in the diaphragm, of malconformation of the omentum, mesentery, mesocolon, or of an unnatural appendix to the intestines.

Of the Causes of Hernia.

There being a constant action and reaction between the contained and containing parts, those causes which diminish the resistance of the containing, or increase the pressure of the contained parts, may give rise to hernia. The former are the causes of chronic, the latter of the acute hernia.

Those causes which diminish the resistance of the parietes predispose to hernia; and those which increase the pressure of the contained part, are the occasional or exciting causes of the disease.

1*st*, Local debility which is connected with the office of the parietes of the abdomen in giving passage to the spermatic cord, round ligament of the uterus, crural and umbilical vessels, predisposes to hernia, which predisposition is proportioned to the size of the apertures; men, therefore, are more disposed to the inguinal, and women to the crural hernia.

2d, The unnatural relaxation of the peritoneum which retains the bowels of the belly in their proper situation, may be conjoined with debility of the parietes of the abdomen, and may give rise to hernia; and hence a bowel which, in the healthy

state, is firmly bound down by the peritoneum, as the caput cæcum coli, sometimes gets into the hernial sac.

The peritoneum passing between the rectum, vagina, bladder of urine, and abdominal muscles (which is well calculated to admit of the free distention of the bladder and uterus), may have a share in facilitating the displacement of the intestines at the inguinal or crural apertures.

Dr CAMPER is of opinion, that the relaxation of the mesentery concurs with that of the abdominal muscles in giving a disposition to hernia.

Debility in the parietes of the abdomen is sometimes induced during the progress of life, by improper diet, a sedentary life, a long train of bad health, the abuse of medicine, or by a long residence in warm climates.

Debility of the parietes of the abdomen is, independently of an unusual structure peculiar to some families, hereditary, descending from father to son, and even to the grandson.

Where there exists such a debility in the parietes of the abdomen, we sometimes meet with several herniæ in the same individual, as in the following case, which fell under the observation of my father. Mr J. B., fifty years of age, has had from his infancy an umbilical hernia; when about four years old, he received a blow on the groin, a bubonocele immediately followed, and about eight years afterwards a hernia took place in the other groin, and without an evident cause.

When there exists a degree of debility in the parietes of the abdomen, we sometimes meet with two or more herniæ in such individuals.

3d, External violence in some cases give rise to local debility of the parietes of the abdomen. I had occasion to examine a sailor who had a swelling of the two uppermost lumbar vertebræ, and upon the right side of the spine there was a tumour about the size of the fist. I supposed, before examining into the history of the patient, that he had a lumbar abscess, but, on pressure, perceived that the tumour communicated the same sensation as a hernia, and I readily reduced the tumour.

The patient had received a violent blow upon the back, while moving a sugar cask; the swelling of the vertebræ immediately followed, and about six months afterwards the tumour at the side of the vertebræ became as large as an orange.

When there exists no degree of debility in the parietes of the abdomen, hernia suddenly appears after some violent exertion, as of lifting or carrying a considerable weight; of violent coughing, as in asthma and hooping cough; of long continued labour: whereas those connected with debility come on slowly, and are of slow and gradual growth.

4*th*, The *enlargement of the apertures in the parietes of the abdomen* predisposes to hernia; hence the extension of the inguinal canal, occasioned by the testes passing through it, renders males more subject to hernia congenita, and bubonocele, than females.

From a similar cause, women who have had many children at short intervals, or who labour under a dropsy of the ovarium, are frequently afflicted by umbilical hernia. The umbilical ring, in such cases, being distended beyond its natural size, is thereby weakened, and is apt to remain so; especially in those of a relaxed habit of body, even after delivery.

This enlargement becomes greater and greater in every future pregnancy.

Upon the same principle, the frequency of hernia in old women who have long laboured under asthma, may be explained.

5*th*, *Malconformation of the parietes* may be enumerated among the causes with predispose to hernia.

The brain, when uncovered, unprotected, and unsupported by the upper part of the skull, has been sometimes displaced, and then forms a large external tumour *.

The thoracic viscera, in consequence of malconformation, have been found upon the outer part of the chest, or within the abdomen.

* Vide my Morbid Anatomy of the Brain.

I met with a singular instance of monstrosity in a lamb, the heart and lungs of which were on the outer side of the ribs.

The navel, and the inguinal canals, are occasionally, at the period of birth, of an unusual size; and hence the bowels are frequently protruded.

There sometimes exists an unnatural enlargement of the inguinal canal at the period of birth, and this I have seen in different members of the same family.

Children often outgrow this; and the same observation applies to horses.

For the same reason, hydrocele of considerable extent, and passing within the inguinal canal, is a frequent precursor of an inguinal hernia.

The parietes of the abdomen are occasionally imperfect at the fore or back part.

The deficiency of the fore-part of the abdomen is most frequent. My colleague, Professor HAMILTON, has several such specimens in his museum, and he has met with others in his extensive practice, in which there was a deficiency of the parietes of the abdomen around the navel, the bowels of the abdomen being in those cases supported only by the peritoneum, formed a prominent tumour. The peritoneum generally bursts in a short time, and the child dies immediately. MORGAGNI has published a case, in which a child lived for thirty days with such a tumour, as large as the fist, in the front of the belly.

The malconformation has sometimes been limited to the apertures through the abdomen, thereby producing varieties in the inguinal and congenital herniæ, which are described under their proper heads, in a subsequent part of this volume.

A malconformation has been sometimes observed in the back as well as the fore part of the body.

My Father was desired, along with Dr FARQUHARSON, to visit a boy six months old, in whom both kidneys passed through large apertures in the muscles of the loins, and were covered by the common integuments only; and the apertures were so large that the kidneys could be easily reduced, but were with difficulty retained within the abdomen.

A malconformation of the pelvis may also give rise to a hernia of the bladder of urine.

I have seen three cases in which the back part of the bladder of urine was inverted and protruded, and formed a red-coloured tumour on the fore-part of the belly: the surface of the tumour was kept continually moist by the urine, which distilled, drop by drop, from two small holes, the extremities of the ureters. One of the patients was a stout man, thirty-six years of age. The penis was almost entirely awanting. In its stead there was a substance about an inch long. The ossa pubis were separated in the man about two inches from each other.

The hernia called Ischiatic, may perhaps be occasioned by a malconformation; for the pyriform muscle, sciatic nerve, and small vessels, completely fill up the sciatic notch in the natural state.

My father had occasion to visit a child with a large tumour under the glutei muscles, which became tense when the child cried, owing to the tumour containing a large portion of intestine.

This case is somewhat similar to that related by PAPEN, in HALLER's Collection of Surgical Treatises, where there was a very large pendulous tumour on the right side of the anus, which, upon dissection, was found to resemble an oblong flask; its length was an ell, and the circumference of the lower part of it half an ell. The patient was obliged to elevate and compress it, with the view of promoting the discharge of the fæces.

CAMPER has described a similar case in his Demonstrat. Anat. Pathol. lib. xi.

The obturator hernia may probably be classed under the head of hernia occasioned by the unnatural size of the obturator aperture.

In the hernia connected with predisposition, the disease is usually of some duration, and the hernial tumour is generally reducible.

It may become irreducible or strangulated; and hence the disease is acute or chronic.

The chronic being the more prevalent form of hernia, I shall begin by describing it.

Of Chronic Hernia.

When the contents of a chronic hernia are reducible, the functions of the bowels are little deranged.

The form and size of the tumour are modified by the opening or openings through which it passes; hence the pyriform and large size which a scrotal hernia often attains, the small and irregular form of a crural hernia, and the small and cylindrical form of an incipient inguinal hernia.

The form of the sac varies in the progress of the disease.

The mouth of the sac, which is round, oval, or triangular, is usually directed towards the centre of the abdomen: it is the most contracted part of it, owing to the pressure of the tendinous aperture through which the tumour has passed, which does not admit of the same degree of extension as the cellular and adipose substances which usually surround the body of the sac.

In some instances, two sacs pass through the same opening, (*vide* Plate XII. fig. 2. of first edition), and in instances of internal inguinal hernia there have been three sacs *.

Time produces a great change upon the hernial sac; there are instances in which the protruded peritoneum has become much thicker than usual, consisting of distinct layers.

When all the layers of a hernial sac have been separated excepting the innermost, it is transparent: it resembles a portion of the protruded intestine, and has been mistaken for it. Such cases are mentioned by Mr C. Bell.

The stimulus applied by the displaced bowels excites, in an unnatural degree, the vessels of the protruded peritoneum, by which it increases in thickness and extent, and thereby accommodates itself to the quantity of its contents, becoming, in large hernia, so capacious, as to be capable of containing the greater share of the intestines.

The thickness of the sac does not always bear a proportion to

* Vide Sir A. Cooper's Plates of Hernia.

the size of the tumour; for, even in small crural hernia, I have seen the hernial sac of a very considerable thickness, and of a cartilaginous consistence.

I have also remarked, that, though that part of the sac which is external to the parietes of the abdomen have attained an unnatural thickness, yet the neck of the sac was not thicker than the healthy peritoneum.

On the other hand, the neck of the hernial sac, in consequence of inflammation, sometimes becomes much thicker than its body, and frequently proves the cause of stricture in hernia of considerable duration, and especially when the patient has worn a truss.

In a few cases, the unnatural thickness is limited to the neck of the sac, and occasions the strangulation of the intestine, but I believe, generally, that, in recent hernia, the strangulation has been occasioned by those parts which are external to the sac.

The condensation of the cellular substance around the sac, adds considerably to its thickness; it is generally thicker at its neck than elsewhere: and sometimes the cellular substance consists of distinct layers, so that it becomes difficult for the surgeon to determine when he has reached the peritoneum.

Tumours growing from the inner side of the sac also add to its thickness.

In two cases of hernia, I have observed small tumours growing from the inside of the sac, by which it attained an unnatural thickness.

But in large hernia, the sac frequently becomes thinner than even the healthy peritoneum, and the colour of the protruded intestine may be remarked within it; and sometimes also so tender as to be ruptured by the effort of coughing *.

The thinness of the sac has been remarked, especially in the umbilical hernia.

The hernial sac has been supposed to be destroyed, in consequence of the rapid increase of the bulk of the hernia; but such

* Vide MERSENNE, Journal de Med. tom. xxii.

an opinion is incorrect; for though the sac seems to be wanting, it is not so: the deception proceeds from the very intimate union between the sac, the adjacent cellular substance, and fat.

The bond of union between the sac and the neighbouring parts is more or less intimate, and depends, probably, upon the degree of inflammation which, when extreme, occasions the firm consolidation of the sac with the neighbouring parts. This adhesion of the sac prevents its return into the abdomen.

In some cases the hernial sac has attained the consistence of cartilage, and even of bone.

Should the chronic hernia be scrotal, the connecting fibres of the tendinous columns of the under abdominal aperture attain an unnatural thickness, and make an impression upon the hernial sac *.

The figure and direction of the apertures through which the sac has passed, undergo a remarkable change in the progress of the disease; their size is increased, and their direction and figure altered.

The tendinous aponeurosis of the external oblique muscle, when a herniæ has been of considerable duration, loses somewhat of its natural elasticity. It is relaxed, and this relaxation is the more considerable the larger the herniæ.

The ramifications of the bloodvessels in the vicinity of the hernial tumour become somewhat enlarged: this is remarkable with regard to the branches of the external pudic artery, which pass over the fore-part of a scrotal hernial sac.

When a scrotal hernia has been of considerable duration, the fibres of the cremaster muscle become much enlarged, and on some occasions attain an unnatural rigidity and hardness, and they are firmly united to the under abdominal aperture.

The coats of the portion of intestine which has been lodged for some time within a hernial sac, sometimes acquire an unnatural thickness, in the same manner as the muscular fibres of the heart or bladder of urine become much thicker and stronger when the blood or urine does not find a ready exit.

* Vide CAMPER's Engravings of Herniæ.

The omentum included within the hernial sac often contracts an adhesion to the body or neck of the sac, and proves not only an obstacle to the reduction of the hernia, but also renders it impossible, by pressure to prevent the other bowels from sliding into the hernial sac, or it adheres to the protruded intestine, or to the testicle in the congenite hernia, and causes, as in the case of ZIMMERMAN, very acute pain when the omentum was replaced.

The protruded portion of omentum in some cases becomes very bulky and lobulated, and at the same time so much indurated, that it has been supposed by some to be scirrhous.

Suppuration is another, though very uncommon, state of the protruded omentum.

Transverse bridles have sometimes, though very rarely, been observed passing across the sac.

The bloodvessels, and also the lymphatic vessels of the protruded portion of intestine, often acquire a very unusual size. My father, while prosecuting his studies at Berlin, having procured the contents of a large chronic hernia, in which the lacteal vessels of the protruded intestine and mesentery were considerably enlarged *, was enabled to fill these vessels with great success with quicksilver; and these preparations attracted the attention of his pupil, Professor SOEMMERING, so much, as to lead him to make particular mention of them in his Treatise on the Diseases of the Lymphatic System.

Of the Symptoms and Consequences of Chronic Hernia.

When there exists a predisposition to hernia, it proves less dangerous, though a more tedious disorder, than where there is no such predisposition; therefore, in my *Observations on Crural Hernia*, I arranged herniæ under two great classes, the CHRONIC and the ACUTE HERNIÆ. These are no doubt the extreme cases, and there are many intermediate shades.

Where, for example, debility of the parietes of the abdomen exists, the bowels are gradually protruded through a dilated

* Vide Engravings of these in FYFE's Anatomical Plates.

aperture in the parietes, in consequence of a very slight occasional cause, as by turning in bed; the situation of the tumour, and sensations it communicates, proclaim the nature of the disease.

Before the bowels descend, the patient has a sense of fulness, tension, or weakness in the groin, when in the erect posture, and especially upon taking exercise, or coughing.

In a short time, after some slight exertion, a small tumour shews itself.

The tumour is not painful, even when pressed, and sometimes creates so little uneasiness, as not to attract the attention of the patient, until it has acquired a considerable bulk.

Chronic Herniæ are reducible or irreducible, and occasionally strangulated.

The size and figure of the tumour are by no means uniform, even in the same species of Hernia, owing to the kind of bowel included within the sac, peculiarity of constitution, and the posture of the patient, for it swells out in the erect, and diminishes in the recumbent posture, disappears on pressure, and enlarges upon the pressure being removed, after long standing, or after a full meal, or when air is generated in consequence of indigestion.

By a minute examination, and by attention to the symptoms, the contents of the tumour may generally be discovered, providing it be not very small, hard and tense, and the patient very fat.

A hernia filled by a portion of *intestine* is generally soft to the touch, elastic, and compressible, and, when compressed, feels somewhat flabby, the displaced bowel being commonly filled by air; and when the patient coughs, it communicates a sensible impulse to the hand, and a gurgling noise may be heard when the intestines slip back into the abdomen, and the hernial sac then feels empty.

But when fæces are within the displaced portion of intestine, the tumour is, when pressed, like to that occasioned by a protrusion of the omentum.

The omentum being very moveable, unattached at its lower

part, and covering in part the intestines, frequently forms a part, or the whole of the contents of a hernial sac. Such a hernia has generally a broad basis, is to the touch soft, unequal, and incompressible, not enlarged by coughing, not painful, and with difficulty returned, as the protruded omentum takes the shape of the aperture through which it has passed. The patient has a sense of dragging-down pain in the tumour.

If the hernial tumour contain a portion of intestine, and of omentum, the symptoms are usually of a mixed nature. When the omentum becomes much enlarged, in consequence of having been protruded for a long time, it presents an obstacle to the reduction of the contents of the hernial sac; which, however, very often proceeds from an adhesion of the displaced parts to the hernial sac.

The omentum of children being very thin and transparent, constitutes, when protruded, a tumour, which bears a strong resemblance to a hydrocele.

Protrusions of the *omentum* are always to be regarded with a suspicious eye, as facilitating a protrusion of the intestines.

In order to return the *omentum*, it is necessary, as Mr Pott has observed, "to follow it with the finger to the last."

The *omentum* sometimes forms a complete, or only a partial, envelope to the protruded intestine, rendering the whole, or only a part, of the tumour, soft, unequal, and incompressible.

Where a part of the tumour is uncovered by the omentum, it is elastic and compressible, and the motion of the air passing from one part of it to the other is perceptible, whilst the rest of the same tumour is doughy, soft, and almost incompressible.

From the slight pressure made on the intestines by the margin of the aperture through which they have been protruded, their functions are in some cases but slightly impaired, except when the hernial swelling attains a large size.

But even when the contents of the hernia have been returned into the cavity of the abdomen, it sometimes happens that the functions of the alimentary canal are much impaired, and the patient suffers from a degree of squeamishness, slight colic, indigestion, and constipation.

Where the hernial tumour is unsupported, more of the intestines, and more of the omentum, slip down: there have been instances, in which the greater part of the moveable bowels has got into the hernial sac, which has been so large as to hang as low down as the patient's knees; the contents of the tumour cannot in these cases be returned into the abdomen. Such large herniæ generally contain more or less of a watery fluid.

Notwithstanding the slight pressure made by the enlarged apertures upon the bloodvessels of the protruded intestine, it proves an obstacle to the free return of the venous blood; hence a serous fluid, amounting in some cases to two or three pounds, is effused into the hernial sac: this fluid adds much to the bulk and weight of the tumour. It may be necessary to draw off the fluid by a puncture.

Herniæ of a large size frequently cannot be reduced: they are not immediately dangerous to those who are attentive to diet, regimen, and to the state of the body, and who wear a suspensory bandage: they, however, prove the source of uneasiness. The penis is sunk in the swelling, the skin is fretted and inflamed by the urine distilling along it; the patient is generally incapable of copulation; much bodily exertion is painful, and even dangerous, for it may change the form of the disease, and may lead to strangulation, by forcing down more of the bowels into the hernial sac; besides, the testicle has sometimes been absorbed in consequence of the pressure of the displaced intestines upon it, and the protruded portion of intestine has occasionally been ruptured by external violence.

Constipation and colic are the usual concomitants of irreducible hernia; the contents of the intestines being propelled onwards, solely by the muscular contraction of the coats of the protruded intestines, as the contraction of the abdominal muscles cannot materially promote their evacuation. The coats of the intestines having, in consequence of the retention of their contents, lost their tone, their functions are impaired; hence the tumour, which had been in the morning comparatively small and soft, becomes, after meals, hard, tense, and much larger;

at length there is a total stoppage of the contents of the herniated intestine.

The accumulation of fæces sometimes leads to a low species of inflammation of the hernial sac, and of its contents; hence the sac contracts an adhesion with the neighbouring parts, and also with the aperture through which the displaced bowel passed.

A relaxed habit of body, and the dilatation of the inguinal canal, do not always prevent strangulation, which may originate from various causes. An extraordinary quantity of air within the alimentary canal, or violent coughing, vomiting, or sneezing suddenly, forcing more intestine into the hernial sac, or the accumulation of fæces, by which the coats of the displaced intestines lose their tone, may induce immediate strangulation, and its fatal consequences.

When a portion of intestines passes into the neck of a hernial sac, which has been thickened, condensed, and contracted, by wearing a truss, strangulation may be produced.

A transverse bridle in the hernial sac, occasioned by preternatural adhesions; a fissure in the omentum, when much indurated, or foreign bodies swallowed, may produce the strangulation.

When a hernia is strangulated, the patient becomes feverish, and suffers from the tension of the tumour: provided the strangulation be not removed, inflammation follows.

The strangulation generally proceeds from the unnatural accumulation of fæces within the displaced intestines.

The patient does not suffer instant acute pain.

The progress of the swelling and of the inflammation in such debilitated constitutions, is not so rapid as in the more robust and plethoric, so that an operation often proves a cure, even when performed several days after strangulation has taken place.

Of the Causes of the Acute Hernia.

Hernia frequently appears suddenly after a violent exertion, where there exists no predisposition to the disorder; it is form-

ed by a sudden protrusion of some bowel, or part of a bowel, in consequence of the great pressure of the diaphragm and abdominal muscles, as during the acts of raising, and carrying heavy weights, or in running or leaping, coughing, in the forcible expulsion of the urine in cases of stricture, in straining at stool, or during parturition *.

During such extraordinary exertions, the abdominal muscles are thrown into violent contraction. The descent of the diaphragm during inspiration, necessarily pushes the bowels against the elastic peritoneum; and the parietes of the abdomen, incapable of resisting the impelling cause, give way at the weakest part, where the various cords and vessels pass through them. The greater frequency of hernia on the right side has been long noticed, and is to be imputed to the more frequent employment of the right side, and not to any difference as to size between the right and left inguinal canals.

Immediately after the violent effort, a small, hard, and painful tumour presents itself, and the patient has the sensation as if something had given way.

Should it be impossible by pressure, and other means, to remove the swelling, the progress of the symptoms is rapid, like those of enteritis. The stricture may obstruct merely the passage through the protruded intestine, or it may be so great as to impede also the flow of blood through the bloodvessels of the prolapsed bowel; the former is called the *incarceration*, the latter the *strangulation* of the bowels. There are no infallible diagnostic symptoms which distinguish the incarcerated from the strangulated state of the bowels, except the greater rapidity and violence of the symptoms.

Of the Appearances on Dissection, when death has been occasioned by a Strangulated Hernia.

The peritoneum and intestines betray marks of acute inflam-

* It has been stated by BLUMENBACH, that herniæ are more frequent among the inhabitants of the Alps than in other countries; but this obser-

mation; the turns of the displaced intestine adhere to each other more or less intimately, or with the hernial sac. The part of the intestines nearest to the stricture is found to be most inflamed. Above the stricture the intestines are much dilated, and occupy the greater share of the cavity of the abdomen, but those beneath it are considerably contracted.

The part more immediately compressed, has the appearance as if a cord had been put around it very tightly, and is generally somewhat of a purple or leaden colour: this stricture may cause considerable permanent contraction of the intestine; the mucous coat, at the part more immediately compressed, is generally ulcerated. The protruded intestine is thereby readily ruptured, and this happens more especially in crural hernia of a small size. The leaden colour is not an infallible index of mortification; for even the intestines, when of such a colour, sometimes retain their usual texture, for the distention of the smaller veins under the peritoneal coat, from the great pressure made by the stricture, is the cause of the dark colour of the intestines. Thus, the protruded intestine assumes a deep purple colour, though by no means gangrenous, and does not tear, though repeatedly handled rudely, and even pinched by the forceps, employed for anatomical purposes *.

In some instances of crural hernia, I have remarked an effusion of coagulable lymph, not only on the surface, but also within the protruded intestine, which almost completely obstructed its cavity.

The tendinous fasciæ covering the hernial tumour seldom partake of the inflammation, a circumstance which is worthy of recollection, as the surgeon, during his operation, discovers, from the redness of the hernial sac, when he has cut down to it.

vation does not hold true with respect to Scotland: for, by the returns from the northern districts, it does not appear that herniæ were more frequent in these than in the more southern recruiting districts.

* A more full description of the effects of inflammation of the intestines is given under the head, of the Organic Derangements proper to each of the Coats of the Intestines.

Of the Symptoms of a Strangulated Hernia.

There is a strong resemblance between the symptoms of this disease and those of inflammation of the intestines excited by other causes: the urgency of the symptoms depends in some measure on the age, sex, and constitution of the patient, the kind of hernia, and the particular bowel which has been strangulated. Anxiety, restlessness, a sense as if a cord were drawn tightly around the belly, acute pain at the site of the tumour, which extends in a short time over the whole abdomen, and is much increased by pressure, together with costiveness, are the earliest symptoms when a part of the intestine has been displaced: rapidly succeeded by hardness and quickness of the pulse, which generally rises to 100 or 130 in the minute; but sometimes it has been slower than usual, even when the patient is in the most imminent danger.

Dr Baillie has observed, "that the pulse is by no means an infallible index of the state of the protruded intestine. The pulse is sometimes, in such a case, not increased in frequency beyond the standard of health; and yet the inflammation of the bowel has been discovered afterwards, by the operation, to be very great. In a case recorded in vol. i. p. 44. of the Medical Gazette, strangulation had taken place without the usual symptoms of inflammation, and, upon dissection, the protruded portion of intestine was of a deep red colour. This is an important practical observation, because it shows that the degree of inflammation is not to be judged of from the pulse, and teaches that the operation should not be delayed, after the proper efforts for reducing the rupture have failed, because the pulse may happen to be little, or not at all, accelerated.

If the stricture be not removed, nausea, retching and vomiting speedily follow; and if a cathartic is given to procure a stool, it aggravates the symptoms, and is speedily rejected.

The abdomen and tumour become tense, hard, and very painful, especially when pressed, or on coughing, sneezing, or vo-

miting. The skin is dry, and the patient thirsty, and much flushed.

If a clyster be thrown up, it only empties the contents of the intestines beneath the stricture.

The pain in the tumour becomes very acute; some patients compare their sufferings to burning at the region of the stomach and navel.

The vomiting becomes still more urgent, and not only the contents of the stomach, but even those of the intestines, are rejected. I have even seen fæces thus discharged.

After some hours hiccough follows, the tension of the belly goes off, the belly subsides, and the pulse, which had been very hard and full, becomes so small and quick as to be counted with difficulty; the breathing laborious; the body is covered by a cold clammy sweat, the extremities become cold, the eyes have a glassy and languid look: the hernial tumour crackles when pressed; and when in this state, its contents, in many instances, spontaneously return into the abdomen, or upon slight pressure, which is followed by a discharge of fæces. These symptoms are the preludes to delirium, convulsions, and death *.

The symptoms occasioned by a protrusion of the omentum are sometimes similar to those occasioned by a strangulated portion of intestine, though generally milder. The constipation in this case may frequently be obviated by purgative clysters.

Before concluding this branch of the subject, it may be proper to suggest to the younger part of the profession, the necessity of examining, with the most sedulous attention, all patients labouring under symptoms of inflammation of the intestines, and particularly females, who are sometimes afflicted by crural hernia, which may escape the notice of a superficial observer, on account of the small size of the tumour.

Of Herniæ, when Gangrene has supervened.

If the patient survive the inflammation excited by the strangulation of the intestines, mortification follows.

* London, 1828.

The hernial sac becomes tense, from the effusion of serum within it.

When the external parts are gangrenous, there is much reason to apprehend gangrene of the protruded intestines, though this rule is liable to some exceptions.

The intestines, within a strangulated crural hernia, have mortified in so short a space of time as twenty hours: when in that state, they are tender and flabby; and, when handled, tear like a piece of wet paper. There are also frequently vesications upon the protruded parts, in the veins of which the blood is coagulated.

When the constriction has been very considerable, as in crural hernia, the intestines sometimes give way above the stricture, and their contents escaping into the cavity of the abdomen, occasion death in a short time. The abdomen of those who have died from gangrene of the contents of the hernial sac, is generally much distended by a turbid fluid, through which shreds of lymph pass in different directions. The intestines above the strictured part are in a high state of inflammation, often partially gangrenous, and much distended. The gangrenous protruded portion of intestines generally adheres to the parietes of the abdomen, to the neighbouring bowels, and to the hernial sac.

In treating of mortification of the intestines, I have particularly described a case, in which the contents of the intestines were for several weeks discharged through an unnatural opening upon the surface of the abdomen, the intestines having contracted an adhesion with their parietes, by which the fæces did not get into the cavity of the abdomen.

Life has sometimes been protracted, even when mortification has taken place in a strangulated intestine, where the fæces pass through an aperture in the protruded intestine, by the adhesion of that part of the intestine above the displaced portion with the parietes of the abdomen.

After a time, in some cases, the unnatural aperture closes, and the fæces are discharged in the natural way.

I have subjoined the history of a very excellent case of the above description, which was sent to me by Mr A. Burns.

" The patient was middle-aged, and about two years and a half ago, during the delivery of her fourth child, a small and painful tumour suddenly formed in her left groin. The midwife in attendance, applied a common cataplasm to the swelling, which in a few days suppurated. I have not learned that the functions of the alimentary canal were at this time materially impaired, but when the abscess burst, feculent matter was discharged along with the purulent matter. The food was not fully digested, some of it escaped by the opening at the groin, in a half-dissolved state. She became much emaciated, and the debility increased, yet the ulcer in the groin slowly closed, and in the course of less than a couple of months was completely healed. Afterwards, she regained her health, and passed her fæces naturally.

" The patient still continued sickly, and after fatigue she was attacked with the usual symptoms of inflammation of the bowels, which in a few days proved fatal.

" On examination, the peritoneum and intestines were found coated over with lymphatic exudation, by which the convolutions of the latter were glued to each other. This crust was about a line in thickness, and straw-coloured. When examined, the peritoneal coat was finely painted with bloodvessels. The surface of the small intestines was more affected than that of the large. Besides the lymphatic exudation, there was a quantity of thin purulent matter mixed with pus, lodged in the pelvis. Above the middle of the ileon, the canal of the gut was much enlarged, and the coats of the intestine were considerably thickened. Below this point, the diameter of the gut was reduced. Between the dilated and contracted parts of the gut, a portion of the ileon had protruded through the left crura foramen, along with a portion of thickened omentum, which lay behind the intestine. The whole diameter of the gut was not displaced. About four-fifths of it, however, were protruded; hence the direct passage from the part of the intestine above the protrusion into the part below it, was not larger than the diameter of a goose-quill. Just in contact with the herniated portion of the gut, the upper end was ruptured. Through this

vent, which was a few lines in length, the feculent matter, which was found in the pelvis, had escaped. At the mouth of the sac, on the fore part, the gut adhered to the peritoneum, and here there was very considerable thickening, and matting of the coats of the intestines. That part of the gut exterior to the abdomen was consolidated with the integuments at the top of the thigh, and over the point where this consolidation was formed, a pretty extensive cicatrix was found. It marked the place where the ulcer had been situated, through which the feculent matter had formerly been discharged."

This case proves the danger of a disordered state of the bowels, even after a patient has escaped the imminent risk of death arising from a mortification of the protruded intestine.

In a case related by SCARPA, the patient died, in consequence of having eaten cray-fish, a year after recovery from a mortification of the intestine. SCARPA, MANCHART, MORAUD, and other authors on hernia, have recorded many instances in which the fæces were discharged, for several days, through a mortified portion of intestine within a hernial sac, and afterwards followed their former route.

According to SCARPA, a breach in the intestines is not repaired by reunion of the orifices of the upper and lower portions of the bowel; but by a funnel-shaped membranous canal, formed out of the remains of the hernial sac, which at an early stage adheres to the peritoneum about the neck of the sac.

When the mortification is limited to a portion of the protruded intestine, a cure is not always accomplished; for the inflammatory action, which is propagated rapidly from one part of the intestines to another, has an effect in deranging, or rather suspending, the action of the intestines; hence these become much distended by fæces, which prove an additional and constant source of irritation, and the gangrene, therefore, spreads rapidly from its original seat.

In the case of an artificial anus, the nearer the aperture is to the rectum, the greater the chance of cure; for if the open-

ing be near to the stomach, the food escapes in a half-digested state.

It sometimes happens that a prolapse of the intestine takes place through the artificial anus. The prolapsed bowel is inverted, and the mucous coat, of a red colour, forms the outer surface of the tumour *.

The tumour sometimes attains a very considerable size, and is invariably larger when the patient is erect, and disappears in the horizontal position. ALBINUS † has published an interesting case, in which there was a double protrusion.

Another effect of mortification of a herniated intestine, is the formation of small fistulæ, through which the fæces are discharged.

Symptoms of Gangrene occasioned by Strangulation of the Intestines.

Sickness and vomiting become more frequent; pain, swelling, and tension of the abdomen, with considerable pyrexia and restlessness, immediately precede gangrene of the strangulated intestine. The patient obtains sudden and great relief, and fancies himself free from danger. The tension of the abdomen is much diminished; the pulse becomes so small as to be counted with difficulty, sinks, and intermits. The countenance assumes a leaden hue, and the features are collapsed; the skin, especially of the extremities, is covered with a cold clammy sweat: and the hernial tumour subsides. Soon afterwards a few black spots appear on the skin, the cuticle separates, and the cellular substance, being filled with air, crepitates to the touch: the skin often gives way, and a quantity of air and fæces are discharged at the opening. There are also a few instances in which the contents of a hernial tumour have

* Vid. SCHACHER Diss. de Morb. a situ Intest. preternat. in HALLER, Disput. Chir. Vol. iii. No. 78.

† Annot. Acad. lib. ii. cap. viii.

been found in a gangrenous state, when the usual precursory symptoms of gangrene did not manifest themselves.

Peculiarities of the Hernial Sac.

These peculiarities are rare. In one instance I saw a small or incipient hernial sac, which was found at the side of a much larger one, in a different state of protrusion; and within the larger (which was filled with bloody serum only), there were two smaller.

When the operation was performed, it was necessary not only to cut through the larger sac, but also to divide the smaller ones, before the intestines were exposed.

Mr Hunter, in his Catalogue, when describing this preparation, observes, " that it strongly illustrates one or other of the following circumstances;—either the mode in which an hernia is formed, or the process by which an old hernia is cured."

M. Chevalier (Med. Chir. Trans. vol. iv.) has made mention of two instances, in which a sac containing intestine was lodged within another sac.

The sac of the crural hernia, when of some duration, is covered by what Sir A. Cooper has called a *Fascia propria*; and in a letter which I received from him, he has observed, " that, in the case which you described from Mr Hunter's Museum, the fascia propria is raised up from the sac." He adds, " I have looked at the preparation again and again, and am sure of the fact."

Of Diverticula, or unnatural Appendages connected with the Intestines.

By the term Diverticulum, is to be understood a process or blind sac, connected to the convexity of a portion of the intestinal canal, which freely communicates with the cavity of the intestine, excepting where inflammation has given rise to the accretion of their opposite sides.

There are two kinds of diverticula, original malformations,

and those formed consequent upon the protrusion of the intestines.

The preternatural appendices occasionally found within the sac of a hernia are generally formed as stated by my grandfather, viz. by the gradual elongation of the side of the intestine, and probably also by the addition of new matter.

When a knuckle has been protruded, the distention and vermicular motion of the intestines favour the return of the bowels into the abdomen. But after the partial adhesion between the hernial sac and its contents, the vermicular action of the intestine cannot have the same effect; the part adhering must be stretched more and more, and is gradually extended into a cul de sac of some length; more especially in those herniæ in which the intestines pass through a narrow canal with unyielding sides, as in crural hernia.

There is also a species of appendix different from any of the preceding; it has a much thinner covering, is of a globular form, and is shorter and wider.

It seems to me to be formed by a protrusion of the mucous membrane, through the other coats of the intestines.

A specimen of this variety was sent to me by Dr CHEYNE of Leith, who found it connected with the middle of the rectum of a patient who died from acute inflammation of the intestines.

The symptoms occasioned by such diverticula included within the hernial sac, are in some instances somewhat different from those occasioned by stricture made upon a protruded turn of intestine. My grandfather has observed, "that, instead of an entire piece of intestine being thrust out, *one side of a gut has been stretched out into an appendix cæca.* When this happens, the ingesta will not be stopped in their passage towards the anus, and the patient will go to stool, even though a strangulation of the hernia should come on: whereas, when the whole diameter of the gut is straitened by a strangulation, the ingesta will be stopped at the hernia, after the guts below it are emptied; the patient passes no more fæces, and the ingesta regurgitate towards the stomach, and are vomited."

But when the diverticulum only is contained within a hernial

sac, it sometimes happens that a very violent inflammation spreads from the diverticulum to the contiguous intestine; and proves fatal.

The unnatural process does not constitute an essential part of the intestinal canal, and has been cut off, when in the sac of a strangulated hernia. Dr WARDROP did so in a case of this description, and after the operation the patient went to stool, and had a complete recovery. Should death ensue in such an instance, it is to be imputed to inflammation excited by the removal of the diverticulum, and not to strangulation of the intestine.

Of the Prognosis.

In every species of hernia, generally speaking, the prognosis is unfavourable.

During infancy, the disease has often been cured by pressure alone, especially in cases of umbilical and congenital hernia in children, as there is then a disposition in the umbilical and inguinal apertures to contract; but in advanced life, a complete cure is rarely accomplished in this way; and even when the disease has, in appearance, been removed, it is apt to recur.

Besides, Sir A. COOPER has observed, that, though the original sac may be completely shut at its mouth, by an adhesion to its opposite sides, another may form at the side of it *.

The disease is in general only to be palliated, it seldom proves fatal, unless from accident or neglect, because the hernia can generally be returned and retained by proper pressure. It is therefore from a chirurgical operation only, that patients, after puberty, can expect a perfect cure.

The danger of the hernia depends upon the cause of the disease, the peculiar constitution, and time of life of the patient; the kind and size of the hernia, the nature of the bowels which fill the tumour, and the length of time which has elapsed since the strangulation has happened.

Hernia, occasioned by some great exertion during the prime

* *Vide* Anatomy of Inguinal Hernia, p. 16.

of life, proves more dangerous than when it occurs during infancy or old age; for, in the former, there exists no predisposition to the disease, and the aperture being small, the displaced bowel must be much compressed and twisted, and sometimes is strangulated at the moment of its displacement; inflammation therefore immediately follows, which runs high, and terminates speedily in mortification; whereas, the relaxation of infancy and old age, which gives a predisposition to hernia, proves, to a certain degree, a safeguard against strangulation and its consequences: besides, the circulation being languid, there is less disposition to inflammation.

The danger of herniæ depends on the size of the aperture through which the bowels are protruded, the cause, the contents of the tumour, and the kind of hernia. The femoral hernia proves to men most dangerous, as the same aperture is not equally capacious as in the female: on a similar account, the inguinal hernia, to which men are most exposed, proves more dangerous to the female. The sex of the patient, therefore, should be taken into consideration.

The size of the hernia, also, has an influence upon the prognosis; herniæ of considerable size being much less formidable than small recent ruptures, there being much less risk of strangulation, on account of the weakness and size of the aperture through which the bowels have passed; the aperture gives way on slight pressure being applied, and the bowels are not so much compressed, and hence less liable to inflammation.

According to Breschet, there is a chance of recovery, even when the intestines have been nearly opened by ulceration; and also even after a few spots have appeared gangrenous.

The case is not hopeless when gangrene has seized all the coats of a small portion of the larger intestines; but, when the same disease is seated in the smaller intestines, the chance of cure is less. In some such cases, a part of the fæces is discharged through the mortified part, the quantity of which, according to Louis,* becomes gradually less, and the aperture, after a time, closes, and the patient recovers.

* Mem. sur la Cure des Hernies Intestin avec Gangrene.—Mem. de l'Acad. de Chir. tom. iii.

As the portion of intestine above the stricture generally adheres to the peritoneum at or near to the under abdominal aperture, when the protruded intestine becomes gangrenous, and gives way, its contents are not effused into the cavity of the abdomen, but are discharged externally *.

Even when, in consequence of gangrene, the protruded portion has given way, a union has been accomplished between the detached orifices of the bowel (as SCARPA has observed), by a funnel-shaped membranous canal, formed by that part of the peritoneum which constitutes the neck of the hernial sac.

Protrusion of the omentum is to be regarded with suspicion; for when the omentum is recently protruded, it cannot be readily returned, as it adapts itself to the shape of the parts through which it has passed: when it has been long displaced, it becomes irreducible, on account of its increased bulk, and readily contracts adhesions to the sac: besides, it enlarges the inguinal canal, and often paves the way for a protrusion of a portion of intestine. Owing to an adhesion of the omentum to the neck of the hernial sac, pressure cannot be applied with advantage. In these cases, the apertures are commonly so much enlarged, as to preclude all danger of strangulation.

If the bowels cannot be immediately returned in acute hernia, there is always great danger, as inflammation and its fatal consequences so quickly and so certainly follow. In chronic hernia, the complaint has been known to terminate fatally, from stricture of the intestine, when very little pain or inflammation existed, and where the medical attendants had, from such circumstances, been lulled into a fatal security.

Before concluding these general observations on hernia, it seems necessary to add, that an inflammation of the bowels within the abdomen may be mistaken for inflammation occasioned by the strangulation of that portion of the intestine within the hernial sac.

* Vide Case by SIR A. COOPER, P. i. p. 35. DESAULT, Paris Journal, vol. ii. and others.

Mr Pott has published two such cases, which throw much light upon this branch of the subject.

He observes, that an old gentleman, who had an irreducible hernia, complained of great pain in his whole belly, but particularly about his navel; he was hot and restless, and had a frequent inclination to vomit; his pulse was full, hard and frequent; and he had been, contrary to his usual custom, three days without a stool.

"I examined his rupture very carefully," says Mr Pott; "the *process was large and full, as usual, but not at all tense or painful upon being handled;* his belly was much swollen and hard, and he could hardly bear the light pressure of a hand about his navel. Upon mature consideration of the whole, I was of opinion, that his rupture *had no share in his present complaints.*"

Notwithstanding the opinion of Mr Pott, the operation was performed, and the patient died on the sixth day. Upon dissection, "the hernial sac was thick and hard, and contained a large portion of omentum, a piece of the ilium, and a portion of the colon, *all perfectly sound, free from inflammation or stricture, and irreturnable only from quantity.* But the intestinum jejunum was greatly distended, highly inflamed, and in some parts sphacelated."

OF ABDOMINAL HERNIÆ.

Having premised such general observations, I shall now endeavour to describe the anatomy of the parts concerned in abdominal herniæ. Thus an accurate knowledge of the situation of the tumour,—of the various causes which oppose a mechanical obstacle to the return of the prolapsed bowels—of the cause of the greater frequency of some herniæ among men than women—of the safest and surest method of removing the disease by pressure, or by chirurgical operation, and also the means of preventing its return, can alone be obtained.

The subsequent description supposes the body to be in the erect posture, and in the healthy state.

In the fore and lateral parts of the parietes of the abdomen there are three distinct strata of muscles; which, being subservient nearly to the same functions, I shall describe in the order in which they are presented upon dissection.

OF THE SUPERFICIAL FASCIA.

Upon removing, with care, the skin of the belly, a thin fascia, or rather membrane, which is cellular externally, and compact internally, presents itself: this has been said by some to take its rise from the inferior part of the tendon of the external oblique muscle, and has been described by CAMPER. This fascia adheres loosely to the tendon of the external oblique muscle.

It rarely exhibits a fibrous appearance in the adult, and the fibres, when distinct, pass in a transverse direction with respect to the abdomen. These fibres do not resemble tendinous fibres, being neither to the eye glistening, nor communicating to the touch the same dense feeling as a tendon.

This membrane is proportionally thicker in the fœtus.

This fascia, which has always appeared to me to consist of condensed cellular substance, covers the spermatic cord in the male, and the round ligament of the uterus, and also some of the inguinal glands of the upper and under cluster; and may, in some subjects, at the upper part of the thigh, be divided into layers, between which some small lymphatic glands are placed.

In a few cases, it may be readily traced for six or eight inches down the thigh.

Beyond the crural arch it is connected to the subcutaneous membrane of the thigh. This fascia adheres internally to the tendon of the external oblique, and descending nearly an inch over the crural arch, is firmly united, on the iliac side, to the falciform process of the fascia lata. In some cases of scrotal hernia, the fascia attains a considerable thickness, and forms the subcutaneous covering of the hernial sac; in others, it adheres so intimately to the coverings of the hernial sac, that it is impossible to separate it from the subjacent fascia.

OF THE COSTO-ABDOMINALIS, OR EXTERNAL OBLIQUE MUSCLE OF THE ABDOMEN.

This muscle originates by eight, sometimes by nine heads, which are nearly triangular, from the eighth or ninth lowest ribs, and not at a great distance from their cartilages.

The upper digitations adhere to the origins of the serratus anticus major, and the lower to those of the latissimus dorsi.

All the heads adhere to the neighbouring intercostal muscles.

The different heads of the oblique muscles are greater in breadth than in thickness.

The fibres of those of the middle pass obliquely downwards, and from behind forwards, and those of the under part are nearly vertical.

The upper part of the muscle passes nearly transversely across the body, and is connected by its tendon to the lower part of the larger pectoral muscle.

By the union of the tendons of the external and internal oblique and transverse muscles of opposite sides, a white line is formed in the middle of the belly, extending from the cartilago-ensiformis to the pubes, and is termed Linea alba.

The larger fibres of the tendinous aponeurosis attached to the lower portion of the external oblique muscle, descend obliquely inwards and downwards, and are disposed in a parallel manner in respect to each other, and these are united together by means of many thin tendinous fibres, which take their rise from Poupart's Ligament; and it merits notice, that these smaller connecting fibres are by no means equally manifest in every instance, being in some persons very small and flattened; but in others distinct, thick, and rounded cords: and in old herniæ, they sometimes become very large, make a distinct impression on the hernial sac, and are continuous with the fascia propria of CAMPER *. Sometimes these connecting fibres are entirely wanting.

The under part of the tendon of the external oblique muscle is stretched between the anterior superior spinous process of the ilium and the symphysis pubis, and extended over the flexor muscles, femoral artery, and vein and accompanying nerves. This part of the tendon is thicker and stronger than any other part of the tendon; it is apparently folded inwards, and somewhat rounded, especially towards the ossa pubis, and has been described by some under the name of Poupart's Ligament.

Mr GIMBERNAT has described the tendon as doubled inwards, forming a

* Vide Plates of Inguinal Herniæ by CAMPER.

canal for the spermatic cord in the male, and for the round ligament of the uterus in the female.

Poupart's ligament is sometimes *double. I have seen two such ligaments on each side.* When such is the case, the one ligament is generally fixed about a line above the tubercle of the pubes, and the other is found in its usual situation. About an inch, or a little more, from the symphysis pubis, the tendon of the external oblique muscle is generally divided into an upper and under column; but, in some instances, the division takes place at a greater distance from the symphysis pubis. Between the tendinous columns a space intervenes, which is somewhat of a triangular figure, called Lower Inguinal or Lower Abdominal Aperture. These tendinous columns are considerably smaller in the female than in the male.

Through the under abdominal aperture in the male the spermatic cord passes; and, in the female, the round ligament of the uterus. There is no direct opening into the abdomen, the passage being shut up by the internal oblique and transverse muscles, and by the fascia transversalis.

The under abdominal aperture is somewhat curved above, angular below, and directed obliquely downwards and inwards. The base of the angle being towards the pubes.

The sides of the under abdominal aperture are thicker than its upper or under part, being formed of the straight fibres of the tendon; whereas the thinner tendinous substance, which connects the thicker fibres of the tendon, forms the upper part of the aperture. In the male, the *under inguinal aperture* is about an inch in length; but, in the female, it is rather longer, and also narrower. The size and figure of the lower abdominal aperture vary somewhat in different individuals; in some the spermatic cord is closely embraced, but in others, the tendinous columns which form it, are separated to an unusual distance.

A thin fascia is attached to the margin of the *under abdominal aperture:* it passes downwards, and thus, by embracing the spermatic cord, proves, in some measure, a barrier against hernia.

This fascia has been represented by CAMPER in one of his excellent engravings, and has generally been called *the fascia propria of* CAMPER.

The external oblique muscle is inserted into the linea alba,—into the two anterior thirds of the crista of the os ilium,—into the anterior superior spinous process of that bone, and, by the superior pillar, into the os pubis of the same and of the opposite side. The inferior pillar of the under abdominal aperture, at its insertion into the tubercle of the pubes, sends off fibres, which are curved upwards. These give additional strength to the conjoined tendons of the internal oblique and transverse muscles, and also assist in the formation of the triangular fascia, which strengthens this part of the abdomen, and presents an obstacle to the formation of ventro-inguinal hernia.

ILIO-ABDOMINALIS MEDIUS, OR OBLIQUUS ABDOMINIS INTERNUS.

This muscle arises from a considerable part of the spine of the ilium, from the fascia lumborum, and from the external third of the crural arch. From these origins the fibres describe a radiated course upwards; and, at the linea semilunaris, the tendon is added: this divides into two layers; one of which joins that of the external oblique, and forms the fore-part of the sheath of the rectus muscle; the other joins that of the transverse muscle, and goes behind the rectus, forming the posterior part of the sheath, till about half way between the navel and os pubis. Where the tendon of the internal oblique passes in front of the rectus, and above the pubes, it is inseparably united to the tendon of the transversalis.

These conjoined tendons immediately above the pubes, however, are situated behind the rectus muscle; are fixed into the pectineal line, and assist in forming the ligament of GIMBERNAT, and are fixed to the fascia transversalis. They form the inner edge of the upper abdominal aperture, support the spermatic cord before it leaves the inguinal canal, and resist direct protrusions of the bowels. This muscle is fixed into the linea alba, the cartilages of the false ribs, and the cartilago-ensiformis.

TRANSVERSALIS ABDOMINIS.

This muscle arises, by tendinous and fleshy slips, from the inner surfaces of the cartilages of the seven lower ribs,—by tendinous slips from the middle division of the fascia lumborum, and posterior part of the crest of the os ilium,—and by fleshy slips from the anterior half of the crest, and from the iliac half of Poupart's Ligament.

The tendon passes behind the rectus muscle, along with the posterior part of the tendon of the internal oblique, to be inserted into the edge of the ensiform cartilage, linea alba, pubes, and pectineal line.

GIMBERNAT has accurately described the course of the spermatic cord.

RECTUS ABDOMINIS.

This muscle arises by a broad tendon from the upper and fore part of the os pubis, ascends, becomes broader and thinner above the navel, and is inserted by three slips into the ensiform cartilage, the costo-ziphoid liga-

ment, and into the cartilages of the fifth, sixth, and seventh ribs. The muscle is contained in a distinct sheath,—the anterior part of which is formed by the tendinous aponeurosis of the external oblique, and interior layer of the internal oblique muscle,—and the posterior by the conjoined tendinous sheaths of the internal oblique and transverse muscles.

In the course of this muscle to the umbilicus, three tendinous lines pass across it; and between the navel and the ossa pubis there is a portion of tendon which extends only half way across the muscle.

The pyramidal muscle arises from the broad and fleshy anterior to the rectus, tapers obliquely upwards and inwards, and is fixed by a tendon into the linea alba, about three inches above the symphysis pubis.

This muscle, behind, is in contact with the fascia transversalis, and is in front covered by the anterior sheath of the rectus muscle.

The muscles of the parietes of the abdomen, besides compressing the hollow bowels included within them, and also the bowels of the pelvis, and expelling their contents, tend to bend the body to a side, and draw the ribs directly downwards; or, if the thorax be fixed, the pelvis is drawn upwards: by their continued action; likewise the heels may be thrown over the head. It may be proper to add, that the internal oblique muscle of the right side co-operates in its action with the external oblique of the left side. The tendinous sheath of the rectus muscle preserves that muscle in its proper place, when the body is bent.

CREMASTER MUSCLE.

Different accounts have been published by different authors of the origin of the Cremaster Muscle.

This muscle varies in its origin and size. In general, it arises from a portion of the internal surface of the ilial third of Poupart's Ligament and contiguous fascia transversalis; often from the inferior edge of the internal oblique; and sometimes from the transversalis muscle. It extends over the spermatic cord, generally on its ilial side, as far as the lower abdominal aperture, where the fibres of the muscle surround it. After the fibres of the cremaster muscle have passed beyond the under abdominal aperture, they are covered by the fascia propria of CAMPER. The fibres of this muscle are inserted into and expanded upon the outer surface of the tunica vaginalis testis; and, in some subjects, a few of the fibres of this muscle may be traced into the dartos muscle. Some of the fibres of this muscle pass around the cord, and ascend, in order to be fixed to the symphysis pubis; but this ascending portion of the muscle is sometimes wanting.

ANATOMICAL DESCRIPTION OF THE INTERNAL PARTS IN THE MALE.

Upon removing the peritonæum, which lines the abdominal, iliacus internus and psoas muscles, the umbilical arteries, changed into ligaments, and the urachus come into view. The spermatic vessels are also exposed, as these sweep along the brim of the pelvis, over the surface of the iliacus internus muscle; and upon reaching the upper abdominal aperture, the vas deferens is added. The spermatic cord, thus formed, passes obliquely downwards and forwards, along the lower margin of the internal oblique and transverse muscles of the abdomen, in its course receiving from the internal oblique the cremaster muscle: then, at the under abdominal aperture, it suddenly forms an angle, which covers the insertion of the outer tendinous column of the external oblique muscles into the pubes, and then passes directly into the scrotum. This peculiar course of the spermatic cord has been very faithfully represented by VESALIUS, in the wooden plates affixed to his book; and also by ALBINUS. It was reserved for Sir ASTLEY COOPER to detect and describe the upper abdominal aperture, which may be perceived by introducing the finger into the under abdominal aperture, and by pushing it upwards in the direction of the anterior spinous process of the ilium. The borders of the upper aperture may then be perceived about an inch nearer to the anterior superior spinous process of the os ilium than the under aperture, and by the fascia transversalis.

The inguinal canal of the adult follows an oblique course, and rather more than an inch intervenes between the *upper* and *under apertures* of that canal. The upper part of this inguinal canal, called *upper abdominal internal aperture*, is formed by the transverse and internal oblique muscles, and the fascia transversalis; and the *external* or *lower abdominal aperture* is formed by the disunion of the tendons of the external oblique muscle.

OF THE FASCIA TRANSVERSALIS.

Upon removing the peritonæum, a thin fascia, called by Sir A. COOPER the *Fascia transversalis*, is seen lining the abdominal muscles. It lines the under part of the transverse muscle of the belly, is connected with the inner or posterior part of the crural arch, and then ascends for four or five inches along the transversalis muscle of the abdomen, on the internal surface of which it is gradually lost.

The upper abdominal aperture is formed by a kind of opening in the fascia

transversalis, resembling the mouth of a funnel, as the cellular edges of the fascia are prolonged along the spermatic cord, in a conical form; under the name *fascia infundibuliformis*. This fascia must be removed before the upper abdominal aperture can be distinctly seen.

Scarpa has particularly described a slight depression in the peritonæum, which marks the passage of the spermatic cord, and which depression, when extended, forms the hernial sac.

Mr Lawrence has given the following very distinct account of Mr J. Cloquet's observations on this department of anatomy:

"Mr Cloquet, who has investigated very minutely this part of the subject, describes certain appearances in the cord, connected with this peritoneal depression, and explained by him as vestiges of fœtal structure. He has found them in male subjects of all ages, and almost as frequently in the old as in the young. The slight depression of the peritonæum sometimes adheres simply to the cord by a dense cellular tissue, in the form of a slender filament, which is soon lost in the cellular substance of the spermatic vessels. Or there may be a long whitish fibro-cellular cord, which can be traced to the tunica vaginalis. Such a cord, instead of being solid, may present oblong serous cavities, two, three, or four in number, separated by contracted intervals, admitting of inflation, and either ending by a blind extremity, or communicating with the cavity of the tunica vaginalis. Sometimes there is an elongated cavity, measuring an inch, or an inch and a half, extended towards its end, and connected to the peritonæum by a narrow neck, which may be either solid, or perforated by a fine opening. The peritonæum exhibits a manifest cicatrix at the point of attachment. The sides of the cavities above described are smooth, and moistened by a serous secretion, which may increase in quantity, and form encysted hydrocele of the cord. Not unfrequently the tunica vaginalis, contracted to a slender tube, ascends in front of the cord, nearly to the abdomen, and joins the peritonæum by means of a small solid stalk. In all the cases just enumerated the cavity of the tunica vaginalis is distinct from that of the peritonæum; but they may be connected, either by a narrow canal, with contractions at intervals, or by a shorter and larger communication."—*Recherches Anat.* p. 39; note ii. and pl. iv.

This fascia serves two important purposes: it both shuts up the direct passage into the cavity of the belly, behind the upper abdominal aperture, and, by dividing into the ilial and pubal portions, forms in a great measure the upper abdominal aperture. This transversalis fascia is so dilatable, that, in hernia of some standing, the upper aperture is nearly opposed to the under aperture.

In the fœtus, the upper and under abdominal apertures are in contact, so that the spermatic cord passes *directly* through the parietes of the abdomen.

The internal or posterior part of the crural arch is always distinct. It is marked by a white line in the tendon, which extends from the anterior spinous process of the os ilium to the linea ilio-pectinea, and feels like a tense

cord when the limb is extended; but, when the thigh and leg are raised to nearly a right angle with the body, the internal edge of the crural arch is thrown into a state of relaxation; which position is favourable, not only to the displacement of the bowels, but also to the replacing of them when protruded. The internal or posterior margin of Poupart's Ligament is intimately interwoven with the tendinous fascia which covers the iliacus internus and psoas magnus muscles. This is connected to the crista of the ilium, the fascia transversalis and fascia lata, to the linea ilio-pectinea and ligament of the pubes. Thus, Poupart's Ligament is firmly bound down, and the bowels can be protruded only through the crural aperture.

OF THE CRURAL APERTURE.

Upon opening the abdomen, and removing the peritonæum, which adheres loosely to the upper abdominal and crural apertures, the crural arch, and parts connected with it, come fully into view.

The space on the ilial side, between the anterior superior spinous process of the os ilium and the anterior iliac artery, is occupied by the iliacus internus muscle, crural nerve, and psoas magnus muscle.

The anterior iliac vein is placed on the pubal side of the artery; and on the pubal side of the vein, the aperture called Crural.

The crural aperture is bounded on the ilial side by the anterior iliac vein, and on the pubal side by the ligament of GIMBERNAT, or crescentic arch.

The fascia iliaca, after having covered the iliac and psoas muscles, passes behind the iliac vessels, and is continuous with the ilio-vesical fascia, and inferiorly and behind, at Poupart's Ligament, with the fascia transversalis, from the spine of the ilium to the femoral artery.

The crural aperture, at its origin, is somewhat of an oval shape; its pubal side is formed by Gimbernat's Ligament, and its iliacal side is bounded by the anterior iliac vein and strong tendinous fibres connecting the fascia iliaca and fascia transversalis; behind by the pubes and pectineal portion of the fascia lata.

Upon comparing the size of this part of the crural aperture, I discovered that it is *considerably larger in the female*, owing to the greater width of the bony part of the female pelvis, and smaller size of the iliacus internus and psoas muscle, and greater narrowness of Gimbernat's Ligament.

Although the ligament of POUPART adds considerably to the strength of the upper part of the crural arch, yet, after the removal of the ligament of POUPART, the crural arch still remains, although diminished in strength.

The ligament of GIMBERNAT is formed superiorily and internally by a

few fibres of the fascia transversalis, and by tendinous fibres from the insertion of the opposite recti abdominis muscles; the central part consists of the combined tendons of the internal oblique and transverse muscles, and externally and inferiorly, it is composed of the pubic portion of the fascia lata.

From the above description, it follows, that the bowels only can be protruded through the crural aperture. The crural canal ends at the opening in the cribriform fascia, and the descent of the bowels is resisted at the upper part of the crural canal, by condensed cellular membrane, which fills the crural aperture, and also by one or two lymphatic glands, which are in the same situation. The hernial sac forces before it this cellular membrane, termed *fascia propria*, and frequently a small gland.

If the crural hernia shall increase in size, it bursts through a portion of the sheath in contact with the femoral vein, or dilates one of the openings in the cribriform fascia; and, if it protrudes still farther, it is reflected upwards over Poupart's Ligament, at an acute angle with the crural canal.

OF THE FASCIA LATA OF THE THIGH.

As the FASCIA LATA of the thigh is intimately interwoven with the fasciæ of the muscles of the abdomen, and as a knowledge of the relation and connection of these fasciæ is necessary to the explanation of the nature of *hernia*, I subjoin a description of the fascia lata.

All the muscles of the thigh are covered by this strong tendinous aponeurosis, which takes its rise from the outer rounded portion of the crural arch, from the spine of the ilium, and from the ramus, body and spine of the pubes, and behind from the sacrum, coccyx, tuberosity, and ramus of the ischium. The fascia lata is fixed to the tendon of the gluteus maximus and fascia of the gluteus medius muscle: it is covered by a thin subcutaneous cellular membrane, fat, and by the superficial lymphatic vessels, nerves, inguinal glands, and by the vena saphena major.

Beneath the crural arch (supposing the body to be erect), an oval-shaped depression may be perceived on the fore and rather inner part of the thigh, and also on the surface of the pectineus muscle, which muscle is bounded, except at its inner edge, by a well-defined tendinous border.

The situation of the above mentioned depression merits notice, as marking the situation of crural hernia. In the fascia lata, there is an aperture through which the vena saphena major passes, to join the femoral vein, the borders of which aperture are covered by fat, cellular substance, and lymphatic glands. The fascia lata has been described as being composed of two distinct portions: one of which covers the upper and outer part of the thigh, and is connected

with the larger share of the crural arch, between the anterior spinous process of the os ilium and tubercle of the pubes, and may be called *ilial* portion; the other, which arises from the pubes, may be called *pubal* portion. The ilial portion passes over the sheath of the femoral bloodvessels, and divides into two layers. The pubal portion covers the pectineus and gracilis and adductus muscles, passes behind the sheath of the femoral bloodvessels and crural arch, and is firmly interwoven with the fascia iliaca. Where the iliac part of the fascia lata ceases to be united to the crural arch, it forms a fold of the shape of a sickle, the concavity of which looks downwards and inwards: this fold was first described by Mr A. Burns, and called by him *The Falciform Process of the Fascia lata;* and it covers that portion of the femoral artery and vein which is found immediately under the crural arch, and the under part of the iliacus internus and psoas muscles. The other, or pubal part, which is thinner than the ilial portion of the fascia, arises from the pubes, covers part of the pectineus and triceps muscles, and is united with the ilial part, beneath the vena saphena major, where that vein joins the femoral vein.

The depression formed by the falciform process, is filled by the termination of the saphena major vein,—by one or two of the deep inguinal glands,—also by a portion of the superficial fascia of the thigh, and by the cribriform fascia.

The cribriform fascia resembles condensed cellular substance; it extends from the crural aperture to the lower part of the crural sheath, and is united at its sides to the iliac and pubal portions of the fascia lata.

The anterior crural artery and vein are closely invested by the same kind of cellular membrane as the other large bloodvessels.

The iliac portion of the fascia lata, which is dense and thick near to the ligament of Poupart is divided into two layers, the external of which is continuous with the superficial fascia of the abdomen, and the internal with the fascia tranversalis.

From the preceding description, it is obvious that, in crural hernia, the bowels are protruded only through the upper crural aperture, which aperture is the beginning of a species of canal commencing there, and terminating at an opening in the cribriform fascia, surrounded by a layer of condensed cellular substance which fills the opening, and one or two lymphatic glands, opposite the descent of the bowels.

The hernial sac pushes this cellular membrane, termed *Fascia propria*, before it, and frequently a small lymphatic gland, and enters the crural canal, which is closed by the cribriform fascia.

INFERENCES DEDUCIBLE FROM THE FOREGOING REMARKS.

From the preceding description of the muscles of the abdomen, it follows, 1*st*, That, as the hollow bowels of the abdomen are in immediate contact with the peritoneum lining the abdominal muscles, there must be a constant action and reaction between the containing and contained parts; and hence, that any cause which increases the pressure on the contained bowels, or diminishes the resistance of the containing parts, may give rise to hernia.

2*d*, That, as the contents of the abdomen are placed between two compressing forces,—the abdominal muscles and diaphragm, which act alternately or conjunctly upon them, any violent action of the former or of the latter muscles, or the inordinate combined action of both, may occasion a displacement of the bowels of the belly; hence hernia is frequently occasioned by violent coughing, straining at stool, blowing on wind instruments, &c. and especially by lifting heavy weights, as then, the body being bent, and the parietes of the abdomen at the same time relaxed, the muscles exert themselves with a great force.

3*d*, That, if the peritoneum lining the abdominal muscles be not ruptured, it forms the hernial sac, as it must be pushed before the bowels which have been displaced.

4*th*, That, as the parietes of the abdomen do not give the same degree of support to their contents where the spermatic cord, round ligament of the uterus, and the crural bloodvessels, pass outwards, the bowels are protruded at such places, and the frequency of the protrusion bears a ratio to the size and direction of the aperture in the parietes of the abdomen.

From the greater capacity of the inguinal canal of the male,

men are more frequently afflicted by inguinal herniæ; and this disease is more dangerous to women, there being, on account of the smaller diameter of the inguinal canal, a greater risk of strangulation.

The relaxation of the margins of the apertures in the parietes of the abdomen and of the peritoneum, must also give a predisposition to hernia; hence a very slight cause induces the disorder in the weak and debilitated.

5*th*, That the spermatic cord and round ligament of the uterus, cannot be compressed during the action of the abdominal muscles, owing chiefly to the peculiar manner in which the under tendinous column of the external oblique muscle is folded beneath the spermatic cord, and fixed to the linea ilio-pectinea.

6*th*, That the oblique course of the spermatic cord and round ligament of the adult, proves a great barrier to the protrusion of the contents of the abdomen and pelvis, as it serves in some measure the office of a valve; but as the *upper aperture* is immediately opposite to the *under aperture* in an infant, infants are much more exposed to the hernia at the groin than adults.

7*th*, That, as the space of more than an inch intervenes between the *upper* and *under abdominal apertures*, the intestines may not always pass through the *under inguinal aperture*, but may be arrested within the canal. In these circumstances, owing to the unyielding structure of the inguinal canal, the hernial tumour is small, and the tumour is not external to the parietes of the abdomen.

8*th*, That the phrase Stricture, at the *Under Abdominal Aperture*, which has been employed even by the most celebrated surgeons, may convey an incorrect idea of the cause of the strangulation in cases of herniæ; for it implies, that the spasmodic contraction of the tendinous bands of the external oblique muscles occasions the strangulation.

Mr Pott remarks, " that the mere stricture made by the tendon in the generality of lacerated ruptures, is not only a sufficient, but the primary, and indeed sole, cause of the symptoms, and of all the mischief;" an opinion which may lead to the supposition, that tendons are capable of contraction on the application of a stimulus.

But as the tendinous column is immoveable, and therefore passive, if the size of the *under abdominal aperture* had been diminished by the spasmodic contraction of the external oblique muscle, this must have been felt by the patient, or by any one who examined it.

The pressure is occasioned by more of the intestine or omentum being forced into the *Under Abdominal Aperture*, than can lie there, without being much compressed, and the mischief does not result from the *Aperture* being less, but from its contents being greater; for when the bowels have been suddenly protruded, and where there is no predisposition to hernia, the tendinous columns of the *Under Abdominal Aperture* cannot receive the bowel or bowels which are out of the abdomen, without making great and dangerous pressure upon these. And in a rupture of some duration, even where the inguinal canal has been extended, and where an extraordinary portion of the intestines has, from any cause, been forced down, the strangulation is not occasioned by the spasmodic contraction of the tendinous columns of the external oblique muscle.

The remedies that are usually employed with the greatest success for the cure of herniæ, afford an additional argument in favour of the above opinion.

Supposing the strangulation to depend upon a contraction of the tendinous fibres of the *Under Inguinal Aperture*, or of the *Crural Aperture*, the application of cold water, vinegar, snow, or ice, instead of removing the disorder (which they certainly sometimes do) should, by bringing on a greater degree of contraction in the *Tendinous Apertures*, render the disease still more obstinate; whilst, on the other hand, warm fomentations, which induce relaxation, should always prove an antidote to the disorder, whereas they do much more harm than good, for, by

rarifying the air within the protruded intestine, they add to the bulk of the tumour, and aggravate the disease.

Where the bowels are strangulated at the *Navel*, or at the *Under Abdominal Aperture*, it seems to me to be owing to the bowels within the hernial sac being stretched, twisted, and inflamed, and forced into a part where there is no sufficient cavity for their reception, and to their bulk being increased by an effusion of lymph upon their surface, between their coats, or within their cavity.

9*th*, That the strangulation at the *Upper Abdominal Aperture* may be occasioned either by the fascia of the transverse muscle, or by a spasmodic contraction of the internal oblique muscles. If it is occasioned by the latter, it may be removed by those remedies which occasion great relaxation, as venesection, fomentations, or the warm bath; whereas, if a tendon be the seat of the strangulation, such applications produce no good effect, tendons being incapable of relaxation or contraction.

10*th*, That the situation of the *Under Abdominal Aperture* is not exactly uniform, owing to the existence of some slight difference as to the place of the separation of the tendinous columns which border that aperture. Hence the tumour in an inguinal hernia has not always precisely the same situation; and if the smaller tendinous fibres which unite the larger tendinous columns be awanting, though the hernial tumour be truly a protrusion through the inguinal canal, it may have the same situation as a crural hernia.

11*th*, That, when the bowels are protruded through the inguinal canal, and pass in front of the spermatic cord, these are directed obliquely downwards and inwards, in which situation they are covered by the cremaster muscle, and the membrane derived from the tendon of the external oblique muscle, which has been called the *Superficial Fascia*.

12*th*, That, as the inguinal apertures are extended in consequence of the bowels passing repeatedly through these, the *Upper Inguinal Aperture* may be so much enlarged, as to be brought immediately opposite to the *Under Abdominal Aperture*; and, in such a case, no part of the hernial tumour has an oblique direction, for it passes directly through the parietes of the abdomen.

13*th*, That, as there is fat around the *Under Abdominal*, and also at the *Crural Aperture*, if there be an unusual quantity of it in such a situation, it may bear a strong resemblance to a hernia; and should colic, constipation and vomiting follow, the case may erroneously be supposed to be a strangulated hernia.

14*th*, That, on account of the connection of the crural arch with the neighbouring fasciæ, when we wish to relax as far as possible the superficial fascia, and the inguinal canal, to take off the pressure and stricture upon the displaced intestine, it is necessary to raise the head and pelvis of the patient (who is supposed to be in bed) with pillows, to bend the thighs very considerably, and to throw the knee of the affected side over to the opposite side, leaving only sufficient space for the surgeon to introduce his hand. On attempting to reduce such herniæ, the pressure should be made in the same direction as the hernial tumour; that is, in a recent inguinal hernia, the pressure should be made in the direction of the anterior spinous process of the os ilium; and in a hernia of some duration, directly upwards, as the *Upper* and *Under Parts* of the *Inguinal Canal* are, in such a case, nearly opposite to each other.

15*th*, That unless the truss shall make pressure, not only upon the *Under*, but also upon the *Upper Abdominal Aperture*, the inguinal hernia will not be removed; and that a truss which presses only upon the *Under Aperture*, instead of affording relief, exposes the patient to strangulation at the *Upper Abdominal Aperture*, or between the *Upper* and *Under Abdominal Apertures* *.

* In justice to my Father, I cannot forbear describing a Truss for an Inguinal Hernia, which he directed to be made many years ago, and which several of his patients have worn with much benefit. The

16*th*, That, on account of the connection of the ilial and transverse fasciæ with the crural arch, the bowels can be protruded only through the foramen crurale; and that, from the greater size of the female *crural aperture*, the greater width of the female pelvis, a smaller size of GIMBERNAT's ligament, and of the iliacus internus and psoas muscles, women are more exposed to crural herniæ than males.

17*th*, From the small size of the *crural aperture*, and unyielding nature of the parts around it, strangulation is more common in this kind of hernia than in the inguinal, especially in the male.

18*th*, That the bowels in crural herniæ are frequently protruded in a direction perpendicular to the abdomen, and on the fore part of the pectineus muscle; and, on account of the small size of the *crural aperture*, and unyielding nature of the parts in the vicinity of it, the neck of the tumour is but of a small size, nearly of an uniform diameter, and from half an inch to three quarters of an inch long. On account of the quantity of cellular substance at the bend of the thigh, which yields readily, and on account, also, of the falciform process of the fascia lata, the tumour, in a case of crural hernia, does not descend, but is often reflected, or, as I in my Observations on Crural Herniæ observed, tilted upwards upon the crural arch, so that the fundus of it is in the most prominent part, and the body and neck of the sac form a considerable angle with each other; and the tumour sometimes expands literally to a considerable extent.

19*th*, Owing to the superficial fascia, the quantity of fat, cellular substance, and lymphatic glands, which cover a crural hernia, it is very difficult to detect that disorder, which may

The cushion of the common truss is so small as to cover one of the Apertures only, and, from its thinness, when the circular is tightened with the view of increasing the pressure on the aperture, the pad is raised forwards from the aperture, because the ossa ilia and ossa pubis are more elevated than it, in consequence of which the truss does not produce the desired effect.

He therefore directed, that the pad of the truss should be made much thicker and larger, and placed with such a degree of obliquity, with respect to the circular, as to press upon both apertures at the same time.

very readily be mistaken for a swelling of the lymphatic glands, as a crural hernia may exist at the same time as a swelling of these glands: hence the surgeon must judge of the nature of the disease, by the history of the symptoms, as much as by the knowledge he gains by examining the tumour with his fingers.

20*th*, As the inguinal lymphatic glands lie over the *crural aperture*, œdema of the limb of the affected side may be produced, by wearing a truss for the cure of the crural hernia.

21*st*, That the coverings of a crural hernia vary according to the situation of the tumour.

22*d*, From the connection of the fascia lata with the tendon of the external oblique muscle, it is obvious, that, if the thigh be extended, the crural arch must be put upon the stretch; and, on the other hand, when the thigh is rotated inwards, and raised nearly to a right angle with the body, the crural arch is relaxed; hence the pain which the extending the thigh creates in some cases of crural hernia.

23*d*, That, in many cases of crural hernia, the stricture is so complete, that the surgeon finds great difficulty in introducing even the nail of his finger as a director. On account of the situation of the epigastric artery, and occasionally of the obturator artery, in respect to the hernial tumour, the division of the tendinous fibres is made with the greatest safety on the pubal side of the tumour.

24*th*, That as, in our erect posture, the bowels gravitate directly against the *crural aperture*, there is less chance of removing a crural than an inguinal hernia, by the use of a well-made truss.

25*th*, That the umbilical ring may be slit up in any part, without the risk of wounding any bloodvessel of importance.

26*th*, That, in ventral herniæ, there must be a separation or rupture of some of the muscular fibres of the parietes of the abdomen.

Such is the account of the parts concerned in Hernia, and such the inferences from it, which I have for many years past delivered in my course of Lectures. Notwithstanding all

that has been lately written upon the anatomy of the parts concerned in the inguinal and crural herniæ, there is a branch of the subject which has not yet been explained to the medical world,—I mean the gradual formation of the Inguinal Canal.

Having found that the late Mr ALLAN BURNS of Glasgow had devoted a great deal of attention to this branch of the subject, I requested of him to favour me with his observations; with which request he readily complied, and, by his permission, I have inserted these in his own words.

" In the fœtus, or new-born male, we find that the tendon of the external oblique muscle, at its inferior and anterior part, separates into two pillars, which leave between them an irregular opening, through which the cord passes. One of these pillars runs below the cord, the other above it. Both pillars tend obliquely downward and forward, inclining toward the crest of the pubes, where one is completely lost, the other in part implanted. That fold which passes below the cord is completely implanted into the tough ligament which covers the tubercle of the pubes. The other pillar, when it reaches the pubes, separates into two bands; the posterior, or deeper-seated, is inserted along with the lower pillar into the tubercle of the pubes, and even extends to the opposite side. The other, and by far the most important fillet, winds obliquely inward, then bending backward between the penis and the cord, it at last incorporates itself with the fascia covering the heads of the triceps longus, the gracilis, and flexor muscles of the leg, and in some cases it can be traced much farther, and reaches even to the tendon of the gluteus maximus, to which it is attached. This slip, from the upper pillar of the canal, is always inseparably joined to the fasciæ covering the cremaster; indeed, it may perhaps most properly be described as a part of CAMPER's fascia, attached to the ring. I thought that this structure had not been noticed by any author. I find, however, that it has not escaped that indefatigable anatomist CAMPER, who delineates it very accurately in his plate. It is easiest detected by slitting up CAMPER's fascia, by which I mean the sheath of the cremaster, till we come near to the ring. When we have done this, if we then insinuate the point of the finger into the lower

orifice of the canal in the adult, or ring in the child, we find that we are by this fillet prevented from carrying the finger toward the pubes.

" This part of the canal merits peculiar attention; for whoever is ignorant of the position and connection of this production from the upper pillar of the ring, can possess only a very confused notion of its action in disease.

" When we have examined in the very young subject, the structure of the external orifice through which the cord passes, we have seen all that is most worthy of notice; for, in the very early part of life, the inguinal canal is not formed: In proof of which, take a new-born male, in whom the tunica vaginalis communicates with the cavity of the abdomen, and make a puncture into the former, through which one of the blades of a pair of scissors is to be introduced, and passed into the belly; then all that portion of the tunica vaginalis, which is above the puncture, is to be snipped through. By doing this, we lay the abdomen and tunica vaginalis into one; and we at first glance perceive whether the cord, at this early period of life, passes in an oblique direction between the muscles and transversalis fascia.

" I have never observed the cord in any obvious degree *oblique* in its course; in an infant at birth, it runs *in a straight line* from the psoas muscle to the bottom of the scrotum.

" It passes through a *mere aperture.*

" When, however, we take a subject even a month old, and treat it in the same way, we find then a *very apparent obliquity* in the course of the cord. As, however, it is very rare to meet with an infant of that age, in whom the tunica vaginalis remains pervious, we may, where its canal is obliterated, by slitting up CAMPER's Fascia, and entering the blade of a sharp-pointed pair of scissors into the lower outlet of the canal, pass it up till it appears in contact with that part of the peritoneum which invests the cord at that spot where it passes from the abdomen. If we divide completely what is between the blades, we expose fairly the *degree of obliquity of the cord.*

" If we examine, in a similar way, subjects of different ages, we find that the older they become, till they arrive near the

age of puberty, *so much the longer does the inguinal canal become.*

" It may here be worth while to inquire, how the canal comes to be formed, and what changes take place on the neighbouring parts. As I have already mentioned, the upper and lower openings of the fœtal ring are *opposite to each other*, and so very little distant the one from the other, that there is hardly a palpable space between them. The ring is placed just in contact with the tubercle of the pubes. From this fact, it must at first sight appear, that the lower outlet is, in the fœtus, in the same spot which it is afterwards to occupy in the adult. In proportion, therefore, as the fœtal ring is changed into the adult canal, it is the *internal orifice* which changes its position; it is the upper opening which mounts towards the spine of the ilium. We may from this very readily understand, that it is *from the gradual extension of the transversalis fascia*, in that direction, that the cord comes to be inclosed in a canal. A very simple contrivance gives a very clear idea of the manner in which the inguinal canal is formed. Let any one take two slips of paper of the same length, and cut two small holes in the centre of each; let him then lay these holes opposite to each other, and pass through them a quill or pencil-case. When he has done this, he has a very good plan of the state of parts about the groin in the fœtus. If he now hold the papers opposite him, and then pull to a side the one nearest to himself, he will find, that, by doing this, he comes to lay the quill between the pieces of paper in the same way that the spermatic cord, by the extension upward and outward of the internal orifice of the ring, comes to be lodged in a long canal. And he will also see, that the length of the canal must vary according *to the greater or less extension of its posterior side.*

" In the very early period of life, the cord passes through a *mere aperture;* and besides, there is an open communication between the tunica vaginalis and the belly. From these circumstances, therefore, a portion of gut is forced down along the cord, forming congenital hernia; or, if the tunica vaginalis be obliterated, a new peritoneal sac passes through the ring by the

side of the cord. As, however, the parts are more dilatable in the young than in the old person, so is hernia, *cæteris paribus*, more readily reducible in the former, and, consequently, less dangerous. The gut, in the first instance, in the young subject, passes through a *simple ring*; but if the hernia be allowed to remain, then, in many cases, the upper orifice, ascending toward the spine of the ilium, as it ought to do, comes in the end to lodge both the hernial sac and the spermatic cord in a complete canal; and this will probably be found to be the reason why surgeons believe that hernia does often take place along the canal. They see a herniary tumour in advanced age, lying in the oblique course of the canal; but they forget to inquire when the protrusion took place, and what was the original appearance of the tumour.

"Were they to trace their cases to their origin, they would most probably ascertain, that, in the first instance, the hernia had appeared in infancy, that it had been *less oblique at the beginning, but imperceptibly become more and more so.* I speak from what I have seen in several instances. Among a considerable number of patients in whom the hernia was lodged in the canal, and of some of which I have casts, I have uniformly, by applying to the friends, ascertained that the rupture had taken place in infancy, and had slowly assumed the oblique direction. Some of the nurses have even said, that when, immediately after birth, they attempted to return the gut, they found that it had passed through a hole, about large enough to admit the tip of their little finger; but when the child was older, they found it run more to a side.

"In the advanced stage of hernia, the parts are brought into precisely the same state they were in when the disease began. In the congenital hernia, or in the common inguinal hernia taking place in a very young child, the sac passes through *a mere aperture;* then, in time, we have seen that, owing to changes which this opening undergoes, the gut comes to be lodged in a *fully formed canal.* This continues till the tumour becomes large, when the posterior side of the canal is, owing to the pressure, slowly absorbed; and again the up-

per and lower orifices are brought opposite to each other. Again, the hernia resembles, in its appearance and course, the incipient tumour.

" If the view which I have given of the mode of formation of the inguinal canal be correct, it will lead to this conclusion, that we ought, in every case of hernia in a young child, most sedulously to prevent the descent of the gut; and, if possible, to return also the sac, where it is not congenital rupture; for if we do this, we bid fair to cure the disease, by allowing of the *extension of the posterior side of the canal along the cord.* This observation leads me to a review of the influence which the different parts of the inguinal canal have in preventing the accession of hernia.

" In the very young child, there is no security against hernia, except what arises from the cord filling the aperture through which it passes. This is generally sufficient; for the infant is exposed to few of the exciting causes of the disease.

" When, however, the child advances in years, in the course of its amusements, and afterwards of its business, it is more and more exposed to the causes of hernia.

" Nature has, however, wisely provided, that, in proportion to the danger, the security should be increased. The posterior side of the canal overlaps every day more and more the anterior side: consequently, when the canal is completed, any pressure against the posterior side, tending to produce hernia, has *the effect of laying that side more firmly in contact with the cord;* of forcing the latter steadily against the anterior side, where the fibres of the transversalis and internal oblique muscles react upon it. Thus a most perfect valve is formed, and where the posterior side of the canal is fully extended, it is impossible that inguinal hernia can take place.

" I have already attempted to show, that, where the gut has passed down in infancy, it may in the end come to be lodged in a canal; but this is very different from a hernia passing along the canal for the first time in an adult. By the overlapping of one side of the canal over the other, hernia is prevented from

primarily taking place in the adult, by the internal orifice of the inguinal canal.

" Although, for the reasons above stated, hernia cannot often, if ever, take place by the upper orifice of the inguinal canal; still, were there not some contrivance devised, it might happen, by bursting the posterior side of the canal opposite the lower orifice.

" The posterior side of the inguinal canal is formed, as was first demonstrated by Sir A. Cooper, by the transversalis fascia, which is thin and dilatable, and therefore, independent of assistance, affords but a trifling barrier to protrusion. Nature has not, however, neglected this point; for, opposite to the inferior opening, she has strengthened the posterior side, by a *set of inflected fibres*, which arise, as described by Camper, from the folded-in lower pillar of the oblique muscle, and run upward, expanding over that portion of the transversalis fascia, opposite to the lower outlet. This affords one security; but Nature seems peculiarly solicitous about defending this opening, and has therefore bound the two pillars firmly together, by cross slips, and made to arise from the upper one, a fasciculus of fasciæ, which, by winding round the top of the thigh, must, in those motions which would endanger the parts, be made closely to embrace the cord, adapting thus, in a most accurate manner, the size of the lower outlet to the size of the cord.

" We thus see, that, *by the posterior wall of the canal, inguinal hernia is, in the adult, prevented from taking place through the upper orifice;* and that, by the peculiarity of the mechanism of the lower opening, *ventro-inguinal hernia* cannot occur, except where, by violence, the posterior side of the canal is burst, or the cross slips torn, by which the fillet, from the upper pillar, would come to lose its effect.

" When hernia has taken place, the very objects which formerly had a tendency to prevent its accession, are now so far changed in their action, that they present obstacles to the replacement of the gut. If the hernia has occurred in a young subject, where the canal is not formed, or in an adult, in whom

the posterior side is wanting, which is not a very rare malformation, then our only difficulty must depend on the action of the lower outlet. In this case, the cross fibres which bind the two pillars together, act on the sac; and the fillet, from the upper pillar, embraces it closely, but not equally, in every direction of the limb. When the toes are rolled inward, and the thigh, on the affected side, pulled from the other, and turned backward, this fillet is sunk into the sac, and retains it immoveably in its situation.

"This species of stricture may most readily be overcome, by moving the member in an opposite way; and, I believe, in knowing how to humour the parts in the taxis, the great superiority of one surgeon over another consists. When, however, the rupture has taken place in infancy, and continued till the complete extension of the canal is accomplished, then, besides this source of difficulty, there is also a source of embarrassment, arising from the reaction of the fibres of the transversalis and internal oblique muscles upon the sac, which occasions a species of stricture, in which bloodletting, warmth, and the relaxing the muscles, by bending the body sideways, facilitate the reduction. The above remark applies to that species of incarceration dependent on a narrowing of the internal orifice of the canal."

A part of the muscles of the abdomen is sometimes awanting at the navel, of which I have seen several instances in children. It also sometimes happens, that there is a defect of the smaller tendinous columns which form the inguinal canal, so that when the bowels are protruded at the under abdominal aperture, the hernia is situated at the common place of a crural hernia.

Of the situation of the neighbouring Bloodvessels in respect to Inguinal and Crural Hernia.

The epigastric artery generally arises from the anterior iliac artery, and passes behind the spermatic cord, on the side of the upper abdominal aperture, next the pubes, in its course to the posterior part of the rectus muscle; the epigastric artery must

therefore be first behind, and then on the pubal side of the most common kind of inguinal hernia.

But the epigastric artery is also sometimes situate on the opposite or ilial side of the tumour, as has been observed by DESAULT, CHOPART, SABATIER, CAMPER, and ROUGEMONT.

The epigastric artery does not always take its rise from the same part of the anterior iliac artery within the pelvis. I have seen the epigastric artery and internal circumflex of the pelvis come off from the anterior iliac, by a common trunk within the pelvis, and very near to the crural arch.

The epigastric artery sometimes arises from the pudic artery; I have also seen it arising from the arteria profunda femoris. In some cases, a branch of the epigastric artery passes through the inguinal canal, and anastomoses with a small branch sent off from the femoral artery.

When the epigastric artery takes its usual origin from the anterior iliac artery, its smaller branches, in some cases, pass along that part of the crural arch called Gimbernat's Ligament, in their course to the symphysis pubis.

I have a specimen in which the epigastric artery takes its rise from the obturator, and passes upwards and inwards to the rectus muscle.

Besides the epigastric artery, there is another artery which is in danger of being wounded in performing the operation for crural hernia. I allude to the OBTURATOR ARTERY, which commonly arises from the posterior iliac artery; but sometimes takes its origin in common with the epigastric artery from the anterior iliac.

The trunk common to the obturator and epigastric arteries is sometimes a quarter of an inch in length; in other instances, it measures from an inch to an inch and a half (see Plate II.); and I have met with it of all intermediate lengths.

If the common trunk be only a fourth of an inch long, the obturator artery runs on that side of the sac which is next to the anterior spinous process of the ilium, and cannot be displaced, being firmly bound down by cellular substance, and, therefore, cannot be injured in that kind of crural hernia in

which the displaced bowels are lodged within the sheath of the lymphatic vessels, by dividing that part of the crural arch next the pubes, in the manner recommended by Mr GIMBERNAT.

On the other hand, it frequently happens, when the obturator arises in common with the epigastric artery, that a third branch, nearly of equal size with the obturator, takes its rise from the common trunk. This may be called the artery of the internal part of the crural arch; for it runs on the inner side of the crural arch, passes across Gimbernat's ligament, and when it reaches the symphysis pubis, then divides into a number of small branches, which are distributed upon the inner side of the symphysis pubis.

It also merits mention, that a small artery, or two or three small branches, are sometimes sent off from the obturator, in its course from the common trunk to the foramen obturatorium, which are distributed upon that part of the crural arch called Gimbernat's Ligament, and which may be divided in performing the operation for crural hernia, as recommended by Mr GIMBERNAT.

When the trunk common to the obturator and epigastric arteries is of an inch or an inch and a half in length, the obturator artery is then situate between the symphysis pubis and the hernial sac, and sometimes follows the same course as that part of the crural arch called Gimbernat's Ligament; of which I have seen several examples.

Mr JAMES WARDROP is, I believe, the first who has described such a distribution of arteries in the case of crural hernia. In that instance, the obturator artery arose from the same trunk as the epigastric artery, and then passed on the pubal side of the neck of the hernial sac, and described a semicircle around the neck of the sac.

Baron HALLER, LIEUTAUD, RICHTER, and MURRAY of Upsal, have described such an unusual origin of the obturator artery, but do not make mention of the proportion of cases in which it occurs.

I have paid a good deal of attention to this department of anatomy: In my Observations on Crural Hernia (published in

1803), I have stated that I had not observed such a deviation from the usual distribution of the arteries in above one of 25 or 30 cases; and, according to subsequent observation, such a distribution of arteries occurs in one of 20 cases.* I have also observed, that the short division is as common as the longer; and as the obturator artery is only in danger of being divided by GIMBERNAT's operation in the latter case (indeed Mr COOPER asserts, that he had never met with the obturator artery passing around the neck of the hernial sac); hence such an unusual distribution of the obturator artery does not form so material an objection to the operation for crural hernia, performed according to the method of GIMBERNAT, as has been supposed.

There is still another variety as to the distribution of the epigastric and obturator arteries. These arteries, in some cases, come off from the anterior iliac artery by separate trunks; and the obturator artery passes around that part of the crural arch called GIMBERNAT's Ligament, and is attached to it by cellular substance. When this happens, the obturator artery, by the descent of a portion of the intestine through the crural ring, is pressed upon the very part of the crural arch divided by GIMBERNAT, in his operation for crural hernia.

I have seen the obturator artery sent off from the external iliac artery, about an inch and a half above; and in others, about an inch below, the epigastric artery; in still other examples, even on the outer side of the pelvis, from the superficial femoral artery, in which case the artery ascends along the pectineus muscle, and enters the pelvis at the crural aperture. The artery in this case is placed behind the crural hernia.

* VELPEAU, one of the most distinguished anatomists of France, has observed, "Il y a long-tems déjà que les anatomistes ont fait remarquer cette origine commune des artères épigastrique et obturatrice; mais, ce n'est que depuis MONRO qu'on a essayé d'établir dans quelle proportion ces cas se rencontraient. Ce chirurgien célèbre pense que cette anomalie se voit une fois sur vingt; BURNS dit l'avoir remarquée plus de trente fois; HESSELBACH la regarde comme assez rare; SCARPA, LAWRENCE admettent qu'elle peut avoir lieu une fois sur dix ou quinze; M. J. CLOQUET, une fois sur cinq, et F. MECKEL avance qu'elle est presque aussi fréquente que l'état normal. Nos propres observations nous porteraient à partager l'avis de MONRO."—*Vide* Traité d'Anat. Chirurg. Paris, 1826.

I have made particular mention of all the varieties as to the origin and course of the epigastric and obturator arteries, and of their branches, which have fallen under my observation, as these arteries are of considerable size, and when divided, in the time of performing the operation for crural hernia, have poured out so much blood as has proved fatal; for, on account of their deep situation and retraction, it is extremely difficult to secure these by ligature.

Even wounds of the smaller branches of the epigastric artery sometimes prove fatal.

Dr CARMICHAEL SMYTH * has related the histories of two such cases, and makes mention of other similar cases which were communicated to him, in which the patients lost their lives, by a wound made in the epigastric artery, in performing the operation of tapping for dropsy in the belly.

There is another artery, which, from a variety as to its mode of distribution, may be divided in performing the operation for the crural and inguinal herniæ.

I allude to the ARTERIA CIRCUMFLEXA OSSIS ILII, which takes its rise within the pelvis, from the anterior iliac artery, and opposite to the epigastric artery. I have seen a branch of this artery nearly as large as the epigastric, pass under the crural arch, about two inches from the symphysis pubis, and it then divided into branches, which were distributed upon the symphysis pubis, and the fat and skin over the crural arch; whilst other small branches were distributed upon the ilial portion of the fascia lata of the thigh.

There is still another artery which is liable to be wounded in performing the operation for crural hernia, according to the method proposed by Mr GIMBERNAT.

No author with whose works I am acquainted, has taken notice of this fact, and, therefore, I thought it worth while to give a representation of it. *Vide* Plate II. fig. 2.

The artery to which I allude, is usually a small branch of the epigastric, which sweeps along the inner surface of the crural arch, and along GIMBERNAT's ligament, and is ultimately joined with the obturator artery. This artery is sometimes of

* *Vide* London Med. Communic. vol. 2d, published 1790.

the size represented in Plate II. fig. 2., and, in such a case, if divided, would pour out a good deal of blood. If wounds of the epigastric artery have proved fatal, the same may result from the division of this artery.

The peculiar course of the veins also merits attention. A plexus of veins is sometimes placed on GIMBERNAT's ligament; a good deal of blood may be lost by wounding these, especially as they run on the inner side of the crural arch, and therefore the bleeding could not be stopped by pressure.

The obturator vein generally accompanies the obturator artery, and therefore may be divided at the same time as the artery, in performing the operation for crural hernia, as recommended by GIMBERNAT.

The late Mr A. BURNS of Glasgow shewed me a case of crural hernia, in which A LARGE VEIN passed along the inner part of the crural arch, and received the epigastric vein. In this case, if the division of the crural arch had been made directly upwards, supposing the patient to be in an erect position (as has been recommended), that large vein must have been divided, and, on account of the size of the vein, a great quantity of blood must have been lost.

OF INGUINAL HERNIA.

In this kind of hernia, the bowels are lodged in some part of the inguinal canal. Man, from his erect posture, is more exposed to inguinal and crural hernia, and quadrupeds to ventral hernia.

The frequency of this kind of hernia is proportioned to the size of the canal; males, therefore, are more frequently afflicted by this hernia than females, as the subjoined statement proves.

From July 6. 1805, *to July* 6. 1811. 1637 *Cases.*

			Males.	Females.
332 double	In both groins,		319	2
	thighs,		0	11
1257 single,	Inguinal	Right side,	671	26
		Left side,	354	13
	Femoral,	Right side,	5	54
		Left side,	2	37
	In the navel,		13	76
	Ventral herniæ,		3	3

Several patients having umbilical hernia, had also one or two inguinal or femoral hernia, one person had a ventral, and two inguinal hernia *.

The following document, extracted from the 25th volume of the Philosophical Magazine, corroborates the former. 3013 patients were examined

		Males.	Females.
741 Double Ruptures.	In both thighs (femoral) .	3	44
	In both groins (inguinal) .	609	85
2272 Single Ruptures.	In one thigh (femoral) .	57	163
	In one groin (inguinal) .	1520	399
	In the navel (umbilical) .	36	97
	Total,	2225	788–3013.

" Of the single ruptures, more than one-third happened on the left side, and nearly two-thirds on the right side. A very small proportion of triple ruptures, and other extraordinary cases, likewise occurred in the above number; but they were extremely rare, and mostly existed among the female sex."

The greater size of the inguinal canal predisposes to the inguinal hernia; hence, when that canal is extended beyond its natural diameter, some part of the bowels very often passes into the inguinal canal.

Thus the varix of the veins of the spermatic cord, or a hydrocele of long standing, the upper part of which has insinuated itself within the under abdominal aperture, have been the preludes of inguinal hernia. Upon drawing off the water, some part of the bowels passes into the enlarged inguinal canal, the obstacle to their protrusion having been removed.

There is much variety as to the size and as to the form of an inguinal hernia, of which there are *four different modifications.*

The *first* is the most frequent, viz. where the displaced bowels have passed through the whole track of the inguinal canal. The bowels insinuate themselves into the small depression formed by the peritonæum, where the spermatic cord passes un-

* I am indebted to that distinguished physician Dr G. GREGORY of London, for this statement.

der the edge of the transverse muscle. The protruded bowel passes between the two portions of the transverse fascia, and under the margin of the transverse and internal oblique muscles, in front of the spermatic cord. The tumour is placed obliquely, or it proceeds obliquely downwards and inwards between the upper and under abdominal apertures, and at length passes through the under abdominal aperture, frequently extending downwards, creating in the scrotum a tumour of considerable magnitude, called a Scrotal Hernia. But when the disease has been of some duration, the upper aperture is considerably extended, so as to be nearly opposite to the under abdominal aperture, by which the canal loses its original oblique situation, and becomes nearly direct.

A second hernia is sometimes formed at the pubic side of the first.

In the *second* modification of inguinal hernia, the tumour is *not external* to the parietes of the abdomen, and the tumour is confined either to the upper abdominal aperture, or to that part of the inguinal canal which intervenes between the upper and under abdominal apertures.

The *third* modification of inguinal hernia is widely different from either of the preceding. The tumour appears in the seat of the under abdominal aperture, but is not placed obliquely; for the displaced bowels have not followed the track of the inguinal canal, but have passed directly through the under abdominal aperture only: hence this has very properly been named the *Ventro-Inguinal Hernia.*

The *fourth* modification of inguinal hernia is the effect of *malconformation of the inguinal canal.* The small tendinous fibres which connect the upper and under tendinous columns of the tendon of the external oblique muscle being wanting, the inguinal canal is imperfectly formed, and consequently, when the bowels protrude through such an inguinal canal, the hernial tumour has neither the common form, nor does it occupy the exact situation of an inguinal hernia.

Of the most Common kind of Inguinal Hernia.

This hernia may be reducible, irreducible, or strangulated.

When the protruded bowels are not properly supported, they soon pass into the scrotum, the loose texture of which does not oppose the expansion of the tumour. It sometimes therefore acquires an enormous bulk, descending as low as the knee, and contains the greater share of the more moveable bowels of the abdomen. The protruded parts cannot be returned, on account of their increased bulk, or from their adhesion to the hernial sac, or from membranous bands passing across the sac.

These herniæ, besides their mere bulk and weight, prove the source of much inconvenience and uneasiness; the penis is sunk within the tumour, and the urethra being displaced, the urine is discharged with difficulty, and is apt, by distilling along the skin, to fret and inflame it to a great degree.

The displaced bowels have sometimes been ruptured in consequence of external violence *. A sinus forms in the scrotum of some persons afflicted by hernia, which it is impossible to heal without confining the patient to bed.

In proportion as the hernial tumour becomes larger, the functions of the displaced bowels are more impaired, not only from their being unsupported, and not exposed to the pressure of the abdominal muscles, but also from their being twisted, and compacted together by unnatural adhesions.

There has been, in some constitutions, so great a relaxation, that even those bowels which are fixed down firmly at a distance from the groin by the peritoneum, as the spleen and liver have passed into the hernial sac.

The uterus has sometimes been protruded at the groin: cases of that description are mentioned by Hildanus, Ruysch, and Lallement.

Strangulation rarely occurs when the hernial tumour is of a very large size.

* Vide Cooper, p. 17., 1st edit.

Dissection of the Hernial Tumour.

The coverings of the tumour are, skin, cellular membrane, by some called a fascia, which is of various thickness, fascia propria of CAMPER; and immediately investing the sac, the fascia infundibuliformis and the cremaster muscle.

CAMPER has very faithfully represented the direction of the fibres of the aponeurosis of the external oblique muscle, when there exists an inguinal hernia. When the tumour has attained a large size, the upper pillar is pushed upwards and forwards, and it forms a sort of band upon the neck of the hernial sac In scrotal hernia of considerable duration, the fibres of the cremaster muscle attain a large size and rigidity, are spread over the neck and body of the sac, and may be distinguished from the other coverings during the operation for a strangulated hernia.

There are some branches also of the external pudic artery lying over the hernial sac.

Upon extending the incision to the under abdominal aperture, the tendinous fibres which connect the larger tendinous columns of the external oblique muscle, generally are found to be of an unnatural thickness, and consisting of distinct layers, which adds much to the thickness of the sac.

The under abdominal aperture is not only larger, but also of an unusual form.

The small branches of the external pudic artery are found between the skin and hernial sac; and these, as CAMPER has justly represented in his figures, attain, in hernia of some duration, an extraordinary size.

The epigastric artery is at first situated behind the hernial sac, in the form of a curve, and then between it and ossa pubis, and is pushed nearer to the pubes, when the hernial tumour attains a large size.

The spermatic cord is commonly behind the hernial tumour, but sometimes, according to LE DRAN, in front of it.

The hernial tumour, even when the disease has been of many years' duration, never extends below the place where the sper-

matic vessels enter the testicle; but sometimes the hernial sac splits the cord. In a case which occurred to my father more than forty years ago, the hernial sac disunited the different parts of the spermatic cord: The vas deferens was found upon the fore part of the tumour, the spermatic artery and vein behind it. In a case described by CAMPER, the spermatic artery and vein were found before, and the vas deferens behind, the tumour. The degree of separation of the parts of the cord is proportioned to the bulk of the hernial tumour.

The stricture, according to Sir ASTLEY COOPER, in recent and small herniæ, is most frequent in the upper aperture, and occasioned by the internal oblique and transverse muscles; but in herniæ of large size, and of some duration, at the under aperture. The strangulation may be seated between the upper and under apertures, or at both apertures, and sometimes, though rarely, it is occasioned by a thickening at the mouth of the hernial sac*.

The varied seat of the stricture points out the necessity of the most minute examination into every circumstance of the case.

As the under abdominal aperture is composed of tendinous fibres, little benefit can be expected from those remedies which induce relaxation, tendinous fibres being incapable of relaxation; but an internal stricture produced by the transverse or internal oblique muscles, may be removed by such means.

In consequence of the duration of an inguinal hernia, the bowels descend into the scrotum, and as a scrotal hernia be-

* My grandfather observes (*Vide* quarto edition of his works, p. 562), "After the bowels are reduced in appearance, the surgeon ought to search with his finger, lest there be any contracted ringlet, cross bars, or production of the peritoneum above the ring of the muscle, which might continue the strangulation.

"Such strangulating rings are most frequently to be met with in people who have long worn trusses, which have pressed the sides of the sac together."

BERTRANDI asserts, "that the transverse and internal muscles sometimes produce strangulation, and constitute a tumour of an inch or two in length."

comes larger, and the under abdominal aperture is extended, the inguinal canal becomes shorter, and loses its oblique direction. The tumour, to a certain degree, changes its place, in consequence of the extension of the upper abdominal aperture. The upper part of the tumour, which had an oblique direction in respect to the body of it, becomes perpendicular in respect to the body, the upper and under abdominal apertures being nearly opposite to each other; hence the necessity of accommodating the form of the pad of the truss to the stage of the disease.

It is unnecessary to describe the common inguinal hernia of the female, as the round ligament of the uterus bears to the hernial tumour the same relative situation as the spermatic cord of the male.

Scarpa, and Mr Jules Cloquet, have described at considerable length the thickened state of the mouth of the hernial sac. Cloquet states, that there may be more than one opening into the principal protrusion, and also that the original sac sometimes shrinks, and is connected with a subsequent and larger one.

Internal Inguinal Hernia.

In the second modification of inguinal hernia, the bowels occupy only the space between the upper and under abdominal apertures, or are engaged in the upper abdominal aperture only.

The tumour is of small size, and rounded, and elevates the upper portion of the inguinal canal.

I have seen an external converted into the internal inguinal hernia, by wearing an ill-made truss, which, by pressing only upon the under abdominal aperture, had induced the accretion of the opposite sides of the sac; but that part of the inguinal canal, between the under and upper abdominal apertures was not obliterated, and being filled by the protruded bowels, the patient, instead of being relieved, incurred even greater risk of strangulation, than when the bowels had passed also through the under abdominal aperture.

In this case the tumour is small, lies upon the spermatic cord, and is covered by the cremaster muscle: the tendinous aponeu-

rosis of the external oblique muscles, and the transverse and internal oblique muscles, pass over the neck of the tumour, and prove the cause of the strangulation, while the epigastric artery is situated, in respect to the hernia, as in the more common inguinal hernia.

During my last eight courses of surgical lectures, I have exhibited a rare kind of inguinal hernia. I was desired by the late Dr J. ANDERSON to visit a patient who had this kind of hernia, which was strangulated. An operation afforded no relief. Upon dissection, a tumour, about the size of an orange, which was filled by a portion of the colon and omentum, was found within the upper abdominal aperture. The bowel had passed through the inguinal canal, and appeared beyond the under abdominal aperture. All the symptoms of strangulated hernia continued, though the external tumour could be reduced, and the finger passed into the under abdominal aperture.

Upon dissection, the bowels included within the internal tumour could not be withdrawn before opening the hernial sac.

The contents of the tumour were of a deep purple colour, much thickened, and in a softened state.

An account of a case very similar to the preceding, has been very lately published in the Medical Gazette, vol. i. page 485, by that celebrated anatomist, physiologist, and surgeon, Mr CHARLES BELL.

It is stated, " On looking at the inside, however, it was seen that the portion of gut had carried the neck of the sac before it into the abdominal cavity; and the duplicature of the peritoneum, which has been described, being unfolded, had formed a new sac for including the knuckle of intestine, on the inside of the abdominal muscles. Thus the fold of the intestine was pushed through the external abdominal rings, through the spermatic canal, and through that part which is described to be an internal ring (but of which ring no trace could be seen), and was reduced with the abdominal muscles; but not within the abdominal cavity. The neck of the sac had been torn off from the internal ring, in the effort of reduction, but continued to grasp the included portion of gut."

"There was another remarkable circumstance observed, which related to the sac lodged in the scrotum. At the lowest part, there was a hole of communication between that sac and the cavity which is between the coats of the testicle. This orifice was so large that the finger could be passed through it, and its margins are so dense as to resist dilatation. It appeared to be the sac of a congenital hernia pushed down before a common one."

Ventro-Inguinal Hernia.

Chapter 15th of Sir A. Cooper's very valuable treatise on Hernia, contains the first and most accurate description of this kind of hernia. When I was a pupil of the late celebrated Mr Cline, I saw various examples of this variety of inguinal hernia, which never attains a large size.

According to Cloquet, this kind of hernia occurs in the proportion of one to five*, is smaller than the more common inguinal hernia, and the bowels do not follow the course of the inguinal canal, but are protruded through the under abdominal aperture only; hence this species has been called the ventro-inguinal hernia.

Sir A. Cooper has imputed this kind of hernia to the non-existence, weakness, or rupture of the tendon of the transversalis muscle.

Mr Cloquet states that the sac of this hernia pushes before it the fascia transversalis, or passes through an opening of that fascia.

According to Mr Stanley, the sac is covered by a protrusion of the fascia transversalis.

The epigastric artery is placed along with the spermatic cord, which is covered with the fascia given off by the tendon of the external oblique, but not by the cremaster muscle, on the ilial side of the mouth of the tumour, unless where the tumour has been occasioned by external violence.

* *Vide* Rich. Anat. p. 84.

The sac is not covered by the cremaster muscle.

In this case no part of the tumour is oblique; it passes directly upwards, behind the under abdominal aperture, and the internal oblique and transverse muscles of the abdomen pass across the neck of it.

Inguinal Herniæ, which in situation resemble Crural Herniæ, owing to Malconformation of the Inguinal Canal.

The fourth modification of inguinal hernia is very rare, and occasioned by the malconformation of the inguinal canal, which is owing to the smaller tendinous fibres, which connect the larger columns of the external oblique muscle, being wanting.

In these circumstances the inguinal canal is imperfect; hence the bowels, when protruded, do not follow the course of the inguinal canal, but push immediately downwards and outwards, forming a tumour in the situation of a crural hernia.

This modification of hernia has been described by the late Professor HAMILTON of Glasgow, and also by PETIT. It remained for the late Mr ALLAN BURNS of Glasgow to detect the cause of such a deviation, which he has described to me in the following letter, dated March 7, 1806:

"The tumour was found in the bend of the left thigh. The inguinal canal was fully as large as it is usually met with in the male, and besides, so very short, that it presented, when fully unfolded, almost the appearance of a mere aperture. The round ligament of the womb was enveloped in a distinct tunica vaginalis, and bearing the same relation to the intestine that the spermatic cord does in the other sex. On the right side, the herniary sac was about two inches in length, and in shape resembled a Florence flask; the bulbous extremity extending from the lower orifice of the canal, was contained in the upper part of the thigh, *lying more in the course of a crural than of an inguinal hernia.*

"This deviation from the usual direction of the tumour was produced by a premature separation from each of the external

pillars of the inguinal canal. Where the inguinal canal is imperfectly formed, it is generally owing to the incomplete extension of the posterior or internal side of the ring.

" Where this happens, the internal orifice of the canal is brought nearer to the pubes than it ought to be, but when the imperfection is produced by a premature separation at the external pillars, then, by dissection, we find the internal orifice in its proper place, but the external outlet is removed from the pubes.

" In the first instance, when the herniary tumour protrudes, it lies just over the tubercles of the pubes, and follows the course of the spermatic cord into the scrotum, while in the latter it lies nearer to the spine of the ilium, and is seated just over the crural foramen, and by extension, descends along the thigh, *counterfeiting the appearance of femoral hernia.*

" By attention, however, it is readily distinguished from the latter, by being felt lying over the crural arch, and on the outer side of the tubercle of the pubes.

" When the bowels follow the course of the inguinal canal, the epigastric artery is situated nearer to the symphysis pubis than the hernia; whereas, when the bowels do not follow such a course, but pass only through the under abdominal aperture, then the epigastric artery is situated nearer to the anterior spinous process of the ilium than the hernia."

In the same patient, we sometimes meet with two, three, or even a greater number of inguinal herniæ, and all of the same kind *; or a patient has a common inguinal hernia on one side, and a ventro-inguinal hernia on the other; or the same patient is afflicted by crural herniæ, and also by pudendal hernia.

In those cases where it is extremely difficult to determine, when there are symptoms of strangulation, to which of the herniæ they are imputed †.

I have also seen the opposite sides of the neck of a scrotal

* Sir ASTLEY COOPER met with a case in which there were six ventro-inguinal herniæ. Page 52., 1st edit.

† Vide Sir ASTLEY COOPER's 1st Part, page 27.

hernia obliterated by an adhesion of its sides, in consequence of the use of a truss, and its body was filled by a watery fluid.

Symptoms of Inguinal Hernia.

This disease, by attention to its origin and progress, may be distinguished from diseases of the testicle or cord.

A tumour, possessing all the characters of hernia above enumerated, appears in the under abdominal aperture. It is situated above the ligament of Poupart, and frequently descends in front of the spermatic cord into the scrotum, and is then called a Scrotal Hernia, and the testicle may be felt behind and below the tumour.

If the bowels have not penetrated beyond the under abdominal aperture, the tumour is small, circumscribed, is covered by the aponeurosis of the external oblique muscle, and appears, according to Sir ASTLEY COOPER, "merely as a fulness above the ring and Poupart's ligament," its margin being undefined.

If the tumour is nearer the pubes than common, and appears to have made its exit from the abdomen, immediately behind the under abdominal aperture, and if the spermatic cord can be perceived on the ilial side of the tumour, the case is a ventro-inguinal hernia.

When a hernia is occasioned by external violence, it may be a ventro-inguinal hernia, though the spermatic cord and epigastric artery be situated on the pubal side of the tumour. The above circumstance is demonstrative of the greater safety of making the division of the stricture over the middle of the neck of the sac, as, in so doing, there is no risk of wounding the epigastric artery.

Swellings in the groin, or in the scrotum, proceeding from various causes, may sometimes bear a strong resemblance to inguinal or scrotal hernia.

1st, Fat in the groin sometimes assumes the shape of an inguinal or crural hernia, and being covered by a thin layer of

condensed cellular substance, communicates to the touch nearly the same sensations as an omental hernia. If a patient, with masses of fat so situated, had been seized with colic and vomiting, and had been at the same time much constipated, recourse might have been had to an operation, for pressure does not alter the shape or bulk of such tumours.

The history of the progress of the swelling unfolds the nature of it.

2d, The testis, when arrested in the under abdominal aperture, forms a tumour not unlike to an inguinal hernia, more especially as the testis is not fixed in its place.

A swelling in the groin, originating from such a cause, may be discovered by the want of the testis in the scrotum, and by the very peculiar sensation which pressure on the testis creates.

The case becomes much more puzzling when a turn of the intestine slips down behind the testis, sticking at the groin.

3d, A polypus contained in a cyst growing from the spermatic cord, bears a strong resemblance to an inguinal hernia.

4th, Crural or pudendal hernia has sometimes been mistaken for the inguinal. The diagnosis is founded upon the situation of the neck of the tumour; if the neck be placed above the margin of the crural arch, the tumour is an inguinal hernia, if under it, a crural hernia.

The pudendal hernia, situated in the middle of the labium, may be distinguished from the inguinal hernia by being placed on the inner side of the ramus of the ischium, and may be traced as far as the vagina extends: besides, there is no swelling in the course of the round ligament of the uterus from the groin.

5th, An inguinal hernia bears a considerable resemblance to a hydrocele, especially when the hydrocele extends within the inguinal canal, or when the serous fluid within the hernial sac is in large proportion to the other contents of the tumour, a fluctuation may be perceived in that part of the hernial sac. The fluctuation and pellucidity of the tumour have been supposed to be characteristic of hydrocele; but neither of these symptoms are perceptible in a hydrocele of some duration, from the thickness

and tension of the vaginal coat, or from an admixture of coagulated blood with the effused fluid.

The hydrocele of the vaginal coat is an uniform swelling, which begins in the lower part of the scrotum, and gradually extends upwards to the under abdominal aperture: the spermatic cord above the tumour may be perceived of its natural size above, but with difficulty behind the tumour. There is no derangement of the functions of the alimentary canal; and the bulk of tumour, which has an uniform feeling when pressed, does not vary in different portions of the body.

7th, An inguinal hernia may be mistaken for an enlargement of the veins of the spermatic cord.

This kind of tumour, like a hernia, increases in bulk on coughing, becomes much less when the patient lies on his back, and sometimes can be pressed into the abdomen: the swelling begins in the lowest part of the scrotum, and ascends gradually.

The above diseases may be distinguished in the following manner. In both cases, the tumour disappears whilst the patient is in bed. If pressure be made whilst the patient is in that situation, upon a hernia, the tumour does not reappear when the patient gets up; whereas, if the enlarged spermatic veins cause the swelling, in consequence of the pressure impeding the return of the venous blood, and not interrupting the flow of blood by the spermatic arteries, the tumour attains a considerable bulk.

8th, A scrotal hernia which sometimes originates from external violence, may be mistaken for the effusion of blood within the vaginal coat, or within the body of the testis. But in the latter case, the tumour does not become larger upon the patient coughing, is accompanied by sense of weight, and communicates a very peculiar sensation when pressed: the spermatic cord at the under abdominal aperture is not involved in the swelling, and the skin over the tumour has a red colour.

Upon the whole, the inguinal hernia may be distinguished from other swellings at the groin, by attending to the origin and progress of the disease; by observing that the swelling is

first perceived at the groin, and that it is observed to pass into the inguinal canal. These marks, combined with the other symptoms already enumerated, characterise the common inguinal hernia.

OF CRURAL HERNIÆ.

Mr GIMBERNAT of Spain, by his minute anatomical researches into the anatomy of the crural arch, has thrown much light on this intricate variety of hernia.

It has been universally admitted, that women are more frequently afflicted by this kind of hernia than men, and that the disease is very rare before puberty.

CAMPER and MORGAGNI have informed us that they never have met with this kind of hernia in the male.

The causes of these remarkable circumstances have not been explained, which led me to institute a comparison between the male and female pelvis, and also to examine, with the most scrupulous attention, the various changes which the pelvis undergoes, as to its size and shape, at different periods of life.

In the female, the bowels in the neighbourhood of the crural aperture are not so fully supported as in the male. That part of the crural arch of the male which is inserted into the linea ilio-pectinea, is somewhat of the form of a crescent, and therefore the space between it and the anterior iliac vein is very trifling; whereas the same part of the internal edge of the crural arch is much narrower in the female, consequently the crural aperture is more capacious, to which the smaller size of the iliacus internus and psoas muscles also contributes.

The effect of the support of the internal part of the crural arch is rendered still more obvious by an observation of ARNAUD, who states, that, of twenty women afflicted by crural hernia, nineteen were married; the relaxation, therefore, induced by pregnancy, gives a predisposition to crural hernia.

The effect of the bones of the pelvis in giving support to its contents, is also to be taken into account.

Before puberty, there is little difference in the capacity of the pelvis of the male and female; hence crural hernia is a very rare disease in early life. I have never seen an example of it; and Sir Astley Cooper, in his very extensive practice, reports that he had met with but one case of the disease. But, after puberty, the female pelvis expands laterally.

Before proceeding into detail respecting the varieties of crural hernia, it may not be improper to premise a few general observations.

A crural hernia is generally of a small size, rarely larger than a walnut; in a few instances, the swelling can scarcely be said to form an external tumour.

A crural hernia has not only the irregular surface of an inguinal lymphatic gland, but also communicates the same sensation when pressed; indeed the hernial tumour is, in many cases, in part covered by the inguinal glands.

The figure of the hernial tumour, when detached from the other parts, is very different from that of an inguinal hernia: it has a long narrow neck, of an uniform diameter, and then suddenly expands into a body, the breadth of which is generally greater than its length.

The spermatic cord and round ligament are rather more than half an inch distant from the mouth of the sac of the hernia, and on the upper and ilial side of it.

Of the Varieties of Crural Hernia.

There are several varieties of this disease.

1*st*, The most common kind of crural hernia is that in which the bowels are protruded through the crural aperture into the lymphatic sheath, which is thereby much distended and protruded.

In this instance, the hernial tumour is situated on the pubal side of the femoral vein, and is covered by the fascia propria of Sir Astley Cooper, which is rather thicker than the healthy

peritoneum, under which a small quantity of fat is found between it and the hernial sac.

The neck of the hernial tumour is covered by the upper insertion of the falciform process of the fascia lata: the epigastric artery is situated on the ilial side of the tumour, and about an inch from it.

In the *second* variety of crural hernia, the protrusion of the bowels takes place through an aperture in the membrane which passes across the crural aperture; a lymphatic gland which had filled up that aperture having been displaced, and pushed to the ilial side of the crural hernia.

The stricture, in this instance, is sometimes occasioned by the sides of the aperture through which the protruded intestine had passed. This variety is peculiar in wanting the fascia propria.

The *third* variety of crural hernia is that in which the protruded bowels pass into the sheath surrounding the femoral lymphatics, and then escape by one of the apertures, through which the lymphatic vessels enter the sheath, as has been accurately described by Sir A. Cooper. The tumour has not a well defined edge, being covered by the fascia lata of the thigh.

In this hernia, the strangulation may be occasioned by the border of the sheath.

The *fourth* is that variety of crural hernia where the tumour passes through the ilial side of the lymphatic sheath, into the sheath of the femoral vein.

The hernial tumour is originally situated on the pubal side of the femoral vein, having the semilunar fold of the fascia lata stretched across its neck: the epigastric artery is situated on the ilial side of the swelling, and its termination is placed in front of the femoral vein, distending the sheath of that vessel.

In the *fifth* variety of this disease, there are two tumours; the one escapes into the sheath of the vein, the other into that of the lymphatic vessels.

The late Mr A. Burns discovered this variety of hernia.

In this instance, the obturator artery passed between the herniæ, and encircled the tumour next the os ilium.

Mr Burns observed, "That, in a person afflicted by this variety, in whom the obturator artery comes off by the short origin from the epigastric artery, the former vessel will to a certainty encircle the pubal side of the neck of the ilial sac. If, however, the obturator artery and the epigastric continue connected for a considerable distance from their origin, and if one herniary tumour pass into the sheath of the vein, and another escapes into the common sheath of the lymphatics, then both sacs will be transversed on their upper margins by the obturator artery, and the tumour in the lymphatic sheath will likewise have the same vessel on its pubal side. I have never seen this variety in the course of the obturator artery, but I dissected the body of an aged woman last summer, in which I found one sac in the sheath of the lymphatics, and another in the sheath of the vein. In this subject, the obturator and epigastric arteries came off by a short trunk from the external iliac, and the obturator in its way to the thyroid foramen, encircled the neck of the sac contained in the venous sheath. *This new variety of arrangement of the obturator artery shows, that the general opinion respecting the safety of cutting toward the pubes, in those cases where the conjoined trunk of the epigastric and obturator is short, is not well-founded.* In this female we have seen, that, although the common trunk of these vessels be very short, yet, from the ilial tumour descending into the sheath of the vein, the neck of that sac is encircled by the obturator artery."

The *sixth* is a frequent variety of crural hernia. The displaced bowels, in the first place, descend in a direction perpendicular to the abdomen, and lie over the pectineus muscle; the tumour is therefore very moveable. In consequence of the connection of the falciform process of the fascia with Poupart's ligament, and the duration of the disease, the tumour is frequently reflected over the crural arch, and is covered by the superficial fascia, skin, and cellular substance only.

From the great looseness of the cellular substance at the sides

of the tumour, it extends laterally, the transverse being the longer diameter. This kind of hernia sometimes attains a considerable bulk; my Father met with a case in which the hernial tumour was in size equal to both his fists.

In this variety of hernia, the sac is remarkably thin, so that the vermiform contractions of the protruded intestine are visible; the neck of the tumour forms nearly a right angle with its body.

In the *seventh* variety of crural hernia, the protruded bowels primarily enter the sheath of the lymphatic vessels, and then pass through holes for the transmission of lymphatics in the cribriform fascia, and in the falciform process. The tumour is in a great measure immoveable, and bears a very strong resemblance to an enlarged inguinal gland. The history of the tumour, its situation, and its appearance in the erect, and disappearance in the recumbent posture, distinguish this disease.

The *eighth* variety of crural hernia cannot be distinguished by an external examination. In this, the obturator artery arises from the same trunk as the epigastric artery. The common trunk being an inch long, the obturator artery, in its course to the obturator aperture, encircles the neck of the hernial tumour on its *pubal side*. I have met with three cases of this description.

On account of the small size of the crural ring, and unyielding nature of the surrounding parts, considerable pressure is made on the protruded bowel, and it is more difficult to return the displaced parts than in inguinal herniæ. The stricture very often causes acute inflammation; and hence the contents of the sac are frequently covered by coagulable lymph, which connects them together, or to some part of the sac.

The effusion of coagulable lymph is not limited solely to the inner serous surface. I have seen so great a degree of inflammation excited, that the outer surface of the hernial sac was covered by a crust of coagulable lymph, nearly one-fourth of an inch thick. In some cases, the cavity of the protruded intestine has been in part filled by coagulable lymph.

The hernial sac, in this species of hernia, is subject to chronic

inflammation, by which it becomes thickened, and sometimes cartilaginous.

Strangulation more readily takes place in this than in any other hernia, and is often so perfect, that it acts like a tight ligature, producing the rapid mortification of the protruded bowel. Hence, in a former work *, I observed that, in general, the difficulty and hazard of performing the operation for crural hernia, deter the surgeon from having recourse to this operation in due season. If the operation be postponed until a considerable degree of inflammation has affected the herniary sac, it will often be impracticable to reduce the bowels.

Sir ASTLEY COOPER's opinion on this point is still more decided. After mentioning instances of the fatal effects of postponing the operation, he has added, " So strongly am I impressed with this belief, that if I were myself the subject of crural hernia, I should only try the effect of tobacco clysters, and if they did not succeed, would have the operation performed in twelve hours from the accession of the symptoms."

Diagnosis of Crural Hernia.

The general symptoms of all kinds of hernia are nearly the same.

On account of the very small size and flatness of the tumour in crural hernia, and laxity of the skin and fat, it is often very difficult, by pressure with the fingers, to discover the disease, or to ascertain the nature of the contents of the tumour. Another cause of difficulty is the vicinity of the tumour to the neighbouring lymphatic glands.

A swelling of the inguinal lymphatic glands bears a very strong resemblance to a crural hernia which contains omentum. Besides, some of the smaller inguinal glands frequently cover the hernial tumour. In both the above cases, the hernial tumour has not its usual characters, elasticity and smoothness of surface.

* Observations on Crural Hernia, Edinburgh, 1803.

The hernial tumour commonly appears suddenly after some violent exertion, as after raising a heavy weight, or from a fit of coughing, or vomiting, and increases or diminishes in bulk by pressure, or when the patient goes to bed.

In many cases of crural hernia, the tumour is so small, that an opinion is formed respecting the nature of the disease, rather from the concomitant symptoms than from the appearance of the tumour.

Symptoms of strangulation coming on, remove all doubt respecting the nature of the case.

Notwithstanding these and other marks of distinction, crural hernia has been mistaken for scrofulous enlargement of the inguinal glands, or a venereal bubo, for a hernia.

At the Dispensary, I met with a case which at first sight was puzzling. A girl, about fourteen years of age, had a swelling in her groin, which was extremely painful upon being touched, and which she said had appeared very suddenly. Upon examination, I perceived that the swelling was not situated exactly over the crural ring. This swelling did not occasion sickness or costiveness. This determined the nature of the disease, which was treated as scrofulous. Mr Else met with a crural hernia placed behind a swelled suppurating lymphatic gland of the groin. In such a complicated case, the surgeon may wound the intestine in opening the abscess. The diagnosis becomes still more difficult, if suppuration shall have taken place in the enlarged lymphatic gland, and also when the hernial tumour is composed of several small sacs, (Vide fig. 3d. of Plate 13. of former edition); or when an empty hernial sac or hydatid covers the more recent hernial tumour, or when the displaced intestine is included in a double sac, (Vide Plate 12. fig. 2d. of former edition.)

A quantity of fat, or a collection of hydatids on the inner side of the groin, bears some resemblance to a herniary tumour, as the watery fluid within the elastic coats of the hydatid, communicates to the touch nearly the same sensation as a protruded portion of intestine.

In the Museum of the University of Edinburgh, there is a

sac, the size of a hen's egg, and containing a quantity of hydatids, which was removed from the upper and outer parts of the thigh.

Lumbar abscess may be very readily mistaken for a crural hernia; as it becomes larger when the person coughs, and also more tense in the erect than in the horizontal posture.

The characteristic symptoms of lumbar abscess are inflammation in the side or loins, followed by symptoms which indicate the formation of purulent matter, viz. pain, increased on motion, with slow and gradual increase of the tumour, the limits of which are not well defined; fluctuation of matter felt, on alternate pressure being made on the loins, or lower part of the abdomen, and upper and inner part of the thigh when the swelling is examined alternately in the erect and horizontal posture.

A crural hernia of a large size, or when reflected upon the crural arch, is often placed obliquely, as such a hernia covers the under abdominal aperture, and its neck being compressed, and somewhat resembling the spermatic cord, it may be mistaken for an inguinal hernia.

A crural hernia is sometimes reflected upwards and outwards, sometimes upwards and inwards.

In order to ascertain the nature of the hernia, it sometimes becomes necessary to press downwards the reflected part of the swelling; and by grasping Poupart's ligament over the crural aperture, the herniary tumour may be traced to the crural aperture. But this cannot always be done when the disease has been of some duration; as, during the progress of the disease, the tumour may be retained in its unnatural situation by adhesions.

A circumscribed varix or swelling of that part of the femoral vein which is next to the crural arch expands when the patient coughs, becomes much less in the recumbent, and expands in the erect posture, and hence has been mistaken for a crural hernia, to which it may bear a strong resemblance.

A swelling occasioned by such a cause, may be discovered, by making pressure upon the vein above the crural arch,

so as to prevent the return of blood: thus the varix, by distention, is rendered more prominent.

On account of the small size of the crural aperture, and unyielding nature of its parts, considerable pressure is made upon the neck of a crural hernia, which is sometimes succeeded by thickening and induration; and, for a similar reason, the mucous and muscular coats of the displaced intestine have been, in some cases, ulcerated on the side next to the edge of Gimbernat's ligament.

There is also less chance of returning the contents of a crural than of an inguinal hernia, and strangulation more speedily takes place in the former than in the latter; this points out the danger of postponing beyond a few hours the operation after the symptoms of strangulation appear, and when venesection, the warm bath, and a tobacco clyster, have proved of no avail.

Where the internal edge of the ligament of GIMBERNAT proves the cause of the stricture in the crural hernia, I have always recommended the incision of that ligament, with a view to remove the stricture; though fully aware that the obturator artery sometimes is placed nearly around the neck of the sac. It is well known that the division of a very small part of the crural arch generally suffices for the removal of the stricture But, if the incision be unnecessarily extended upwards, and towards the anterior and superior spinous process of the os ilium, the epigastric artery will probably be divided *: if the incision be made upwards, provided the patient be a male, the spermatic cord may be injured †; and if it be so, death may probably ensue, as happened in a case treated by ARNAUD, from hemorrhage from the spermatic artery into the abdomen.

I have already stated, that the instances in which the obturator artery runs on the pubal side of the hernia, are about one in twenty ‡. This circumstance, therefore, does not afford a well grounded argument against the division of the crural arch for the relief of a strangulated crural hernia. I used in my lectures also to observe, that, even when the obturator ar-

* Vide Plate I. † Vide Plate I. ‡ Vide Plate II.

tery sweeps along Gimbernat's ligament, and is situated on the pubal side of the hernial tumour, it may be avoided; and I was not a little gratified by observing that that celebrated surgeon Mr LAURENCE entertains a similar opinion. He observes, "If we consider, that, by the precaution of introducing the knife to the very smallest distance within the stricture, that is compatible with effecting the cut, by the careful successive division of the tendinous fasciculi, and by carrying this division only just so far as to gain the necessary room for reduction, the artery may frequently escape; the probability of any unpleasant occurrence is so much diminished, that it hardly constitutes an objection, and certainly would not justify us in leaving this method for any but one that should be perfectly free from all danger. All the evidence that I have been able to collect on this subject, concurs in demonstrating the safety of the above mentioned mode of operating *."

* Vide LAURENCE on Hernia, 4th Edit. p. 435.

PLATE I.

EXPLANATION OF PLATES,

ILLUSTRATIVE OF CRURAL HERNIA.

PLATE I.

This plate, which was copied from an admirable engraving of Scarpa, exhibits, of its natural size, a crural hernia in the male, and its relation to the neighbouring bloodvessels and spermatic cord, and hence explains the manner of operating for an inguinal or crural hernia. As a considerable portion of the inguinal canal has been exposed to view, and also the epigastric artery, that artery, when inguinal hernia is within or without the under abdominal aperture, and when the protruded bowels follow the whole course of the inguinal canal, is situated on the pubal side of the hernial sac.

This engraving also points out the spermatic cord and epigastric artery crossing each other, somewhat like the strokes of the letter X. Hence, supposing the patient to be in an erect position, if the parts be divided straight upwards over the neck of the sac of a crural hernia, there must be the most imminent danger, when operating upon a male, of dividing the spermatic cord, or epigastric artery, and, in the female, the round ligament of the womb.

No. 1, 1, 1, points out the thin membrane which lies under the skin of the abdomen, and which has been turned down, in order to shew the tendinous expansion that is connected with the external oblique muscle of the abdomen.

No. 2 and 2, point out the tendinous expansion of the external oblique muscle; and No. 3, the separation of those tendinous columns which form the under abdominal aperture. The under part of the tendon of the external oblique muscle, stretched between the anterior superior spinous process of the os ilium, No. 5, and the symphysis pubis, No. 4, is thicker and stronger than any other part of it, and somewhat rounded, especially to-

wards the ossa pubis: it has been described under the name of Poupart's Ligament; and, more lately, it has been called by anatomists, Crural Arch. It is marked No. 7, 7, as it extends over the flexor muscles, great bloodvessels, and nerves of the thigh.

No. 5. Is placed upon the anterior and superior spinous process of the os ilium; and No. 4. upon the symphysis pubis.

No. 6. Points out the pubes. The crural bloodvessels, lymphatic vessels of the inferior extremities, and the protruded bowels, No. 8, 8, in cases of crural hernia, pass behind the crural arch.

No. 9. Marks the hernial sac formed by the protruded peritoneum, which was covered by cellular substance. The tumour formed by a crural hernia, when detached from the other parts, is very different from that of an inguinal hernia. It has a long narrow neck of an uniform diameter, and then suddenly expands into a body, the breadth of which is generally greater than its length.

No. 10. Points out the spermatic cord covered by the cremaster muscle. The cord passes obliquely through the inguinal canal of the adult, by which the prolapse of the contents of the abdomen is to a certain degree prevented; and, owing to this cause, a recent inguinal hernia is situated obliquely.

No. 11, Points out the femoral artery, accompanied by the corresponding vein, marked by No. 12, which lies on its inner or pubal side.

No. 13, 13, Are placed on the anterior crural nerves.

PLATE II.

This Plate is intended to exhibit the relative situation of the epigastric and obturator arteries, in respect to a crural hernia. It was taken from the body of a person afflicted by that disease.

Fig. 1.

Shews a short trunk common to the epigastric and obturator arteries, which is situated on the ilial side of a crural hernia.

A, The abdominal muscles turned forwards.

B, The under part of the rectus abdominus.

PLATE II.

C, C, A part of the iliacus internus muscle.

D, A part of the psoas muscle.

E, The anterior iliac artery. In this case the obturator and epigastric arteries arose from the common F.

G, The obturator artery passing behind, and then on the ilial side of the neck of the hernial sac, to pass to the foramen obturatorium I.

K, The epigastric artery passing on the ilial side of the herniary sac, and crossing the round ligament of the womb.

M, The circumflex artery passing outwards towards the os ilium.

Fig. 2.

Shews a long trunk common to the epigastric and obturator arteries, the latter, marked letter A, sweeps along the ligament of Gimbernat, in its course to the foramen obturatorium.

Fig. 3.

The object of this Engraving is to represent a branch of the epigastric artery, which is of a very unusual size, which passes along Gimbernat's Ligament, in its course to join the obturator artery.

A, The anterior iliac artery.

B, The epigastric artery.

C, The obturator artery, which takes its origin from the posterior iliac artery.

This branch forms a communication between the epigastric and obturator arteries, and passes along the ligament of Gimbernat: it might be wounded in performing the operation for crural hernia, according to the method recommended by Gimbernat, and its division might prove fatal.

I am indebted to the liberality of Mr Liston for this novel case. The engraving, which is of the size of nature, was copied from a preparation in his Museum.

D, A branch of the epigastric artery, which, to make it more conspicuous, has been shaded. This artery is usually very small, but in this instance is about the size of the trunk of the epigastric or obturator arteries.

E, Represents the bladder of urine.

EXOMPHALOS, OR UMBILICAL HERNIA.

By this term is to be understood a protrusion at the navel, or at the side of it, of some of the abdominal bowels.

This disorder may occur at any period of life. Frequently it has been observed in the fœtus in utero, or it shews itself at or soon after birth, and also in after life, especially amongst women who are pregnant.

There are certain peculiarities proper to the disease in these three different states of life, which merit notice.

The first, or *congenital* hernia, is connected with the mode of formation of the parietes of the abdomen, which have been so minutely and accurately described by Scarpa as to render repetition superfluous.

I shall content myself by stating, that the parietes of the abdomen of the fœtus are lined, as in the adult, by the peritoneum; and if the navel string be drawn outwards, a slight depression in that membrane may be observed opposite to it; and it is evident, by placing the finger on this depression, that it is the least resisting portion of the parietes of the abdomen.

According to the very accurate Soemmering, the bowels are protruded at the upper part of the umbilical ring *, close to the umbilical vein.

The tumour, which seems as if formed by the expansion of that part of the navel string next to the child's body, is not of a regular figure, and is very various as to size, as the umbilicus does not yield in an uniform manner.

The navel rupture of the fœtus is sometimes a tumour of considerable bulk, and contains a considerable portion of the intestines; and, in these circumstances, the abdomen, according to Professor Burns, is too small to receive the intestine quickly. The child generally dies in a short time. In one case, ac-

* Uber Ursache und Vehutung der Nabel.

cording to the late Mr Hey, the tumour burst during labour.

But more frequently such a hernia is a tumour of a small size and conical figure.

The surface of the tumour, next to the body of the child, is shining, but opaque; but beyond that place it has a considerable degree of transparency, being covered only by the membranes of the navel string. The contents of the tumour are included in the triangular space between the separated umbilical vessels. The umbilical vein lies above, and the corresponding arteries at the side of the tumour.

Upon dissecting the tumour, the cellular substance of the navel string comes first into view, under which there is a quantity of viscid albuminous substance, covering the sac of the hernia formed by the displaced peritoneum.

The tumour is often filled by a portion of the smaller intestines; at other times by a part of the smaller and larger, sometimes by a portion of the liver, and sometimes by the spleen.

Soemmering has described and represented cases, in which there was a deficiency of the whole of the anterior part of the abdominal parietes.

This hernia, which is often complicated with malformation of other parts of the body, has been imputed to the imperfect formation of the parietes of the abdomen, or to pressure made by the large liver of the fœtus; and sometimes, according to Scarpa, to the compression made upon the body of the child during tedious labour.

OF UMBILICAL HERNIA WHICH OCCURS IN CHILDREN.

It has been matter of much dispute amongst authors, whether the protrusion more frequently takes place in the middle, or at the side, of the navel. As far as I have observed, in infants, the protrusion generally takes place through the very center of the navel.

The hernial tumour is by no means invariably of the same form, being sometimes conical, round, or cylindrical. There is no appearance of the cicatrix of the navel, except at one side, or near to the apex of the tumour. Upon removing the skin, the superficial fascia, which covers the protruded peritoneum forming the hernial sac, comes into view, and the tendinous aponeurosis of the abdominal muscles surrounds its neck.

Owing to the thinness and shortness of the omentum of children, it is seldom found within the hernial tumour, which is usually filled by a knuckle of the smaller intestine.

This, like other hernia, is to be imputed to those causes which diminish the resistance of the parietes of the abdomen, or increase the pressure upon the contained bowels. One of the more frequent causes of this kind of hernia is a very large navel string.

The umbilicus is a cicatrix, formed by the skin, the shrunk umbilical vessels, and the contracted tendinous ring in the linea alba.

A short time elapses before these parts are sufficiently consolidated: hence the disease often appears when children are a few days old, and more especially during the weaning, from fits of colic, from frequent crying, or from bandages injudiciously applied around the body; and sometimes also from the want of the necessary support after the navel-string has come off. Heat also predisposes to this kind of hernia. I have been informed by my friend, Dr Forbes, who resided many years in the West Indies, that nearly two-thirds of the Negro children are afflicted by umbilical hernia.

There may be other predisposing causes of this hernia, such as a considerable relaxation of the skin around the navel,—the non-adhesion of the extremities of the vessels of the navel string,—pressure made upon the child's body during tedious labour,—or a dropsy of the belly,—by which I have seen the navel protruded, so as to form a prominent and transparent tumour.

OF THE UMBILICAL HERNIA OF THE ADULT.

MEN are much less predisposed to this kind of hernia than women.

Any cause which leads to the enlargement of the umbilical ring may occasion an umbilical hernia, which sometimes shews itself after delivery, and sometimes after tapping, for dropsy of the belly; or it proceeds from excessive corpulency, owing to the previous dilatation of the umbilical ring.

The navel of many women protrudes even at an early petiod of utero-gestation.

Pregnant women are peculiarly liable to suffer from this hernia.

The enlarged womb pushes upwards and forwards the intestines against the parietes, and at the same time extends the umbilical ring.

"If the woman," says Professor BURNS, "have been formerly subject to that disease (umbilical hernia), pregnancy tends to increase it; whilst, on the other hand, the intestines being soon raised up by the ascending uterus, inguinal and femoral herniæ are not apt to occur, or are even removed, if they formerly existed."

This hernia often attains a very considerable size in women who are accustomed to bodily labour. I have seen it very large in women who carry fish to our market from a distance; and, where the tumour has attained a large size, it becomes pendulous, the navel forming the upper part of the tumour. This tumour, when of large size, proves a very great annoyance to the patient, especially when it hangs so far down as partially to cover the pudenda; and also when it becomes ulcerated.

Some have affirmed that the contents of the hernial tumour pass through the peritoneum, or that the umbilical hernia is *a true rupture*; an opinion which is grounded upon error.

In this species of hernia, the sac is very thin, and often contracts a very intimate union with the adjacent cellular substance, fat and skin, so that it is difficult to distinguish the one

from the other; hence the necessity of laying open the hernial sac with great caution.

Portions of the sac have sometimes been removed by absorption, so that the contents of the tumour adhere to the skin; and the part of the displaced bowels, which have passed through the sac, has been strangulated at the aperture.

As the omentum covers a part of the intestines, and is unattached at its lower part, it generally forms a considerable share of the contents of an umbilical hernia of the adult: as it is generally kept in immediate contact with the same part of the sac, it frequently adheres to it, whereby the return of the contents of the hernial tumour is prevented; and there are even instances in which the omentum has produced the strangulation of the displaced portion of intestine.

Dr Abercrombie met with an instance in which the omentum strangulated the intestine: "On laying open the hernia, nothing presented but a mass of omentum, in some places inflamed, in others partially suppurated. On cutting into it, it was found to form a sac, in which was contained a small turn of the ilium strangulated and gangrenous. The stricture was produced by the neck of this sac of omentum, which formed a ring nearly as thick and as firm as the umbilical ring, which had been divided in the operation. The intestine adhered to the omentum in several places." In some instances, a turn of the ilium alone has been found in the hernial sac, or the transverse arch of the colon.

The bowels in this kind of hernia very frequently contract adhesions to each other, and to the hernial sac, so that it becomes impossible to reduce the tumour. In some corpulent women the hernial sac is enveloped by the subcutaneous fat, so that the tumour is concealed, though external to the abdominal muscles.

Tumours and abscesses, external and internal to the parietes of the abdomen, in the region of the navel, may be mistaken for umbilical hernia.

Sometimes a tumour grows from the navel, which somewhat resembles an umbilical hernia. I met with a case of this description, in which a tumour, the colour of a strawberry, was

situated in the navel, and which was removed by the application of the sulphat of copper.

A large collection of hydatids within the liver, or hydatids growing from the surface of that organ, sometimes give rise to a tumour at the side of the navel, which, by the inattentive, may be mistaken for an umbilical hernia.

OF HERNIA OF THE LINEA ALBA.

I have seen a few instances of hernia in the Linea alba. The tumour had an oval flattened appearance, and a short neck. I have never seen such a hernia strangulated. Though the communication between the abdomen and the hernial sac be generally narrow, the form of the neck of the sac is oval and narrow.

According to SCARPA, the hernia of the *Linea alba* very frequently forms so near to the aponeurotic margin of the umbilical ring, that it has been supposed by surgeons in general to be a true umbilical hernia. In other cases, this hernia appears above or below the umbilicus. The first, however, or that above the umbilicus, is more frequent than the second, on account, as I suppose, of the *Linea alba* from the *ensiform* cartilage to the umbilicus being naturally broader and less resistant than the other portion of the same aponeurosis, extending from the umbilicus to the pubes, because the recti muscles, as they descend, converge towards each other. The superior portion of the *Linea alba*, is undoubtedly that *which yields more than the inferior portion* to the impulse of the uterus and of the abdominal viscera pushed towards the diaphragm; and in women who have had many children, if we examine carefully the superior portion of this aponeurosis, and place it opposite to the light, it is found to be irregular, thin in some places, and transparent; in others wasted, and disposed to separate longitudinally or transversely. And, in herniæ of this species, a fissure in the *Linea alba* is constantly met with, sometimes longitudinal, sometimes transverse, through which the hernial sac has protruded, containing the intestine and omentum, or more commonly omentum only. Some persons are so predisposed to this disease, from the tendency which the *Linea alba* has to separate, that several herniæ have been

observed to appear in them in the portion of this aponeurosis from the ensiform cartilage to the umbilicus *.

OF THE CONGENITAL HERNIA OF THE MALE.

The name implies, that the disease appears at or soon after birth, but this name is exceptionable, as it gives an incorrect idea of its nature, which is much more frequent a short time after, than at the time of birth, and sometimes shews itself during manhood. This kind of hernia, therefore, should be called the vaginal, instead of the congenital hernia, and it is necessary to add, of the male, to distinguish it from vaginal hernia of the female; as the protruded bowels are contained within the vaginal coat of the testicle, are in immediate contact with the testicle, owing to the passage through which the testes had passed remaining open, and as the vaginal coat of the testicle forms the hernial sac.

In this hernia, the displaced bowels are situated within the canal, through which the testes pass from the abdomen into the scrotum, which, though commonly obliterated, sometimes remains open during the whole of life.

Hesselbach found the vaginal process of the peritoneum open on both sides, notwithstanding which there was no protrusion of the bowels.

The nature of this kind of hernia was long unknown. We are chiefly indebted to Baron Haller, Wrisberg, Mr Pott, and to Dr and Mr J. Hunter, for our knowledge on this head.

There is much irregularity as to the period at which the canal, through which the testes pass, is obliterated.

Dr Camper has published the following observations on the subject; he examined for that purpose the bodies of seventeen new-born male children. In eleven, the canal was open on both sides; in three, a portion on the right side was open; and in two, a portion on the left side was open; and in one only, the canal was obliterated on both sides.

* Scarpa, translated by Wishart.

There is frequently a stricture in the middle of the canal through which the testes pass; thus the protruded intestines are much compressed at that place, and sometimes strangulated.

Pelletan has made a similar observation in his case: there was a narrow aperture between the hernial sac and the tunica vaginalis.

In a case of this description which I dissected, there was a stricture in the middle of the canal: and the part of the omentum had got beyond the constricted part of the canal, which had attained an unnatural bulk.

The canal for the testes has been sometimes observed to be contracted at its upper, and also in its under parts, and sometimes, according to Dr Wrisberg, in two different places at the same time.

Sometimes the testicles are detained in the groin, and have been mistaken for an inguinal hernia, and upon that supposition trusses have been worn.

The size and figure of this hernia is various, and depends upon the situation of the stricture in the canal. Should the stricture be seated near to the under part of the scrotum, the hernial tumour assumes an oblong figure, and is equally large in its upper as in its under part: the tumour passes out perpendicularly from the abdomen; because in a child at birth, the spermatic cord does *not pass obliquely through the parietes of the abdomen*, as in the adult, but passes directly through these; and hence the peculiar shape of the herniary tumour.

Lobstein has described a case of congenital hernia, in which the tumour descended as low as the knee.

The sac of the congenital hernia sometimes acquires a preternatural thickness; but at other times it is of an unusual thinness. Mr Arnaud relates a case, where the sac was so thin that he divided it, in making the incision through the skin, and with difficulty could find it out afterwards.

The sac, which is of an oblong figure, is covered by the cremaster muscle, and the thin fascia of the abdominal muscles.

On account of the greater shortness of the omentum of children, that organ is seldom contained within the hernial sac.

As life advances, in consequence of the omentum being elongated, it gets into the hernial sac, which originally contained only a portion of the small intestine.

The late Mr A. Burns communicated to me a case, which forms an exception to the above observation. He met with an instance in a new born child, of the omentum, which had previously adhered to the testicle, being dragged from the abdomen along with that organ.

It sometimes happens, as in a case related by Mery, in the Memoirs of the Academy of Sciences at Paris, 1701, that the omentum which had been displaced has involved the testicle, which led the surgeon to suppose that the patient was afflicted by a sarcocele. There is often likewise an adhesion between the protruded omentum and testicle.

Wrisberg has described several cases, in which the patients affected by this variety of hernia, which was reducible, suffered the most excruciating pain, during the reduction of the hernia: the pain was found to have originated from a preternatural adhesion between the testicle and the omentum.

Dr Wrisberg and Mr Pott also make mention of the intimate connection between the protruded bowels and the testicle, and also of the difficulty of disuniting them.

If the testicle, before it has reached the scrotum, contracts an adhesion with the other viscera of the abdomen, it may retard or may prevent the descent of the intestines.

When the testicle has descended no lower than the Under Abdominal Aperture, it sometimes happens that the intestine slips past it into the scrotum; and, in a case described by Reichel, the testis sticking at the under abdominal aperture strangulated a portion of the ileum of a boy, whose scrotum was empty.

Mr Pott met with two such cases; and the patients could not wear a bandage, on account of its pressure on the testicle.

In this species of hernia, the displaced bowels pass into the vaginal coat of the testicle, which is involved by the protruded parts.

It may not be improper to add a circumstance respecting

congenital hernia, which was communicated to me. About four years ago, a surgeon was desired to reduce a congenital hernia in a boy of six years old: he did so, but, along with the bowels, he pushed back the testicle into the abdomen; and it has never since passed into the scrotum.

It sometimes happens, that the congenital hernia is complicated with a hydrocele. In that particular case, the water collected within the vaginal coat, by change of posture, or, by pressure, readily returns into the cavity of the abdomen; and it often happens in young persons that the fluid is absorbed.

OF THE VARIETIES OF CONGENITAL HERNIA.

Mr HEY *, and Mr FOSTER †, have described an unusual variety of congenital hernia, in which the protruded bowels, with their containing sac, were included within the tunica vaginalis testis.

This kind of hernia was probably occasioned by the canal, through which the testes pass, being shut in its upper part, whilst its lower part remained open.

OF CONGENITAL HERNIA OF THE FEMALE.

In the observations on Crural Hernia, which I formerly published, I observed, that infants of the female sex may be afflicted with hernia congenita, as there is a canal formed by the peritoneum, which passes through the UNDER ABDOMINAL APERTURE, over the round ligament of the uterus. This canal is about half an inch in length, and terminates in a blind sac at the groin.

NUCK ‡ is the first author who has described this canal; he called it a Diverticulum. Some authors had entertained doubts upon this point of anatomy, until CAMPER § and WRISBERG ‖ examined the subject with attention. The latter has observed, that in 19 of 200 females, he found an opening generally on

* Vid. his Practical Observations.

† Vid. Sir ASTLEY COOPER, Part I. p. 59.

‡ Vid. Adenographia Curiosa, Cap. 10.

§ Haarlem Trans. ‖ WRISBERG, de Test. descen.

both sides, but sometimes on one side only, which passed over the round ligament of the womb.

According to CAMPER, the above-mentioned canal was open in three of fourteen female infants after birth; and he adds, that he had discovered traces of it in women after delivery.

WRISBERG observed the canal of different sizes, and open in nineteen out of two hundred children.

LE CAT observed it of the size of a goose quill in a woman of forty-six years of age.

The late Mr A. BURNS, in two cases of ascites, found this canal so much enlarged, as to admit of the introduction of the thumb.

I subjoin a letter which I received from that able surgeon, descriptive of the congenital hernia of the female.

"I have now examined seven cases of this kind, and in six have found the anterior side of the inguinal canal deficient. The instance in which I found this species of herniary sac not conjoined with imperfect formation of the inguinal canal, was in a girl aged thirteen years. Although I have once met with a congenital hernia without deficiency of the anterior side of the canal, yet I have never had occasion to notice any case in which this deficiency existed, and was not complicated with congenital hernia.

"In one of the subjects with congenital hernia, the sac did not escape from the canal; in five, it had, from the peculiar state of the canal, descended along the thigh, assuming to a great degree the resemblance of crural hernia, and in one it was bound down by the superficial aponeurosis of the external oblique. In this person, the oblique aponeurosis had come in reality to supply the place of the anterior side of the canal; it was so strong, that it resisted the passage of the tumour down along the thigh; it led it down to the upper part of the labium pudendi.

"This was not the only peculiarity of this case; for the tumour, in its course to the labium, insinuated itself between the fillets of the upper pillar of the canal, and at that point was

strictured by this fillet. There was also a very obvious narrowing at the part where the sac escaped from the deficient canal. The stricture was formed by the interlacing fibres of the external oblique; a fact which proves that the deficiency of the canal does not depend on the want of these fibres.

"In congenital inguinal hernia the risk is, that we mistake the disease for crural hernia. It has been seen, that the tumour in the former, owing to the imperfect state of the anterior wall of the canal, comes, in the majority of cases, by separating the fibres of the oblique aponeurosis, to place itself, in so far as regards the course of the swelling, in the situation of a crural hernia."

There are many examples within my knowledge, where this mistake was never discovered till after the operation had been performed. Generally it is unpardonable in a surgeon to confound the one disease with the other. He can never, indeed, be excusable, unless where the parts around the sac are so swelled and diseased, that there is no possibility of distinguishing Poupart's Ligament.

In congenital inguinal hernia in the female, I have found that the tumour, when it descended along the thigh, lay above the adipo-glandular fascia, so that it was more defined and superficial than in crural hernia.

Where the deficiency of the canal was great, and the hernia large and reducible, I have found that the finger could be made to follow the bowels, and so could be turned into the crural foramen.

Dr Thomson has noticed the same fact, which, I would observe, has never, to my knowledge, been pointed out by any author *.

Experience has not yet determined whether these diverticula which are observed in the female, are closed, like the canal through which the testis passes.

* It may be proper to add, that the case described by Mr A. Burns under the head of Inguinal resembling Crural Hernia owing to malconformation of the Inguinal Canal, was also a Congenite Hernia, but very different from the above.

OF VENTRAL HERNIA.

A hernial tumour appearing at any part of the belly, excepting at the natural apertures in the parietes of the abdomen, has been called a Ventral Hernia. It is by no means so frequent as the inguinal, crural, or umbilical hernia.

This species is most common between the recti muscles of the abdomen, and has been described by HIPPOCRATES under the name of Divulsio, Ruptura Ventris.

Some observations have already been made upon the herniæ of the linea alba, a species of ventral hernia.

SABATIER has described a species of ventral hernia, which he met with very near to the under abdominal aperture, occasioned "par un ecartement des fibres de ce muscle près l'anneau."

Though they derange the functions of the alimentary canal to a considerable degree, occasioning nausea, vomiting, and often hiccough, such herniæ generally occasion but little pain, are readily reduced, and are rarely strangulated, the base of the tumour being large.

The tumour sometimes attains a very considerable size, containing a large portion of the ileum, or jejunum, with omentum and mesentery, and sometimes the stomach.

I have met with several ventral herniæ in the course of the linea alba, or linea semilunaris: in some cases these herniæ have appeared in succession, and the majority of these were above the navel; sometimes they are connected with debility, and occur at the same time as other herniæ, as has been observed by GUNZ.

The late Mr A. BURNS informed me of a case, in which a patient had all the symptoms of hernia, excepting a tumour. On dissection, a small portion of intestine was found by the attending surgeon to have passed between the fibres of the transversalis muscle, forming a small hernia between that and the internal oblique muscle.

Most authors have imputed the ventral hernia to the relaxation of the muscular fibres of the parietes of the abdomen.

But as this kind of hernia is often induced in young people by severe muscular exertion, as in lifting weights, leaping horses, dancing, and from violent vomiting, and as the patient at the moment experiences a sense of laceration, it appears probable that it has been occasioned by a rupture of some of the muscular and tendinous fibres, more especially when it is the immediate consequence of muscular exertion; for there is no reason to conclude that the unnatural size of the small openings, which give passage to the small bloodvessels and nerves of the parietes of the abdomen, ever gives passage to the contained bowels; more especially as there are no such apertures for the bloodvessels at the linea alba, at which the bowels are most frequently protruded.

Such is the opinion which I formerly published respecting the most frequent cause of this kind of hernia, and I was much gratified by observing that Mr A. Cooper and Mr Lawrence* entertained a similar opinion, and that the latter gentleman had detected the rupture of the recti muscles.

Ventral herniæ are very seldom strangulated. Some exceptions, indeed, to this observation occur in the writings of Petit, Littre and Sir A. Cooper. The latter very eminent surgeon has made mention of strangulation of a hernia, which was placed in the linea semilunaris.

Mr Hammond has published a case (Medical Gazette, vol. i. p. 370.) in which, on account of the enormous thickness of the parietes of the abdomen, the nature of the disease was not discovered during the life of the patient.

In some old people we meet with large tumours in the belly, owing to the weakness or partial absorption of the parietes: but such tumours scarcely merit the appellation of herniæ, for the bowels are not protruded from their proper cavity.

Such tumours have sometimes protruded externally, and have attained a very large size, and have been called by Petit

* Vide Second Edition of his Treatise on Ruptures, p. 442.

eventrations. RUYSCH has described an instance in which the gravid womb was contained in the tumour *.

This hernia, according to HEISTER †, BARBETTE ‡, and PLATNER §, has been mistaken for an abscess; and indeed abscesses have sometimes given rise, according to PETIT, to a ventral hernia ‖.

OF INTERNAL HERNIÆ.

In a former page (72) I enumerated several species of internal herniæ.

The first has been already described, viz. where the displaced bowels are contained within the inguinal canal.

The second class of internal herniæ comprehends those which are by no means obvious during life, on account of the thickness of the investing parts; and the third those in which there is no external tumour.

OF ISCHIATIC HERNIA.

In the ischiatic herniæ, which are very rare, and probably, in many instances, connected with a malconformation of parts, the bowels are protruded through the sacro-sciatic aperture of the pelvis. The tumour is generally of a small size, and its existence is not suspected during the patient's life, as in the cases related by BERTRANDI ¶, CAMPER **, and Sir A. COOPER ††, it being covered by the gluteus maximus muscle. On account of the thickness of this muscle, it is difficult to discover the nature of the disease during life, if the tumour be small.

* LORRY, LA PEYROUSE, and others, have described such large tumours. 1, Journal de Med. tom. 61.—2, Mem. de l'Acad.

† Instit. Chir. p. 749. ‡ Chirurg. cap. 7.

§ Instit. Chir. p. 449.

‖ A ventral hernia has sometimes been occasioned by a wound or blow upon the abdomen.

¶ Vide Mem. d'Acad. de Chir. tom. ii. p. 2.

** Anat. Pathol. lib. ii. p. 17. The tumour was on the left side of the pelvis of a female, and the opening into the hernial sac, which was of a pyriform shape, was narrow.

†† Vide Part II.

My Father met with a case nearly similar to that described by PAPEN *, which forms an exception to the above remark: the tumour was of large size. VERDIER has described an instance of this hernia, in which the base of the tumour was of large size, and it contained not only the omentum, the jejunum, and ileum, but also the cæcum and lower portion of the colon, and even a part of the rectum.

OF THE HERNIA OBTURATORIA.

By the hernia obturatoria is to be understood a protrusion of the bowels through the obturator aperture, at the upper and inner part of the thigh, very near to the scrotum of the male, or labium of the female.

This is also a rare kind of hernia, and frequently discovered only after the patient's death, on account of the small size of the swelling, its deep situation, and its producing no very obvious external tumour.

The tumour, which is more common in women than in men, is prevented from extending by the first and second heads of the triceps and pectinalis muscles, under which it lies.

Mr CLOQUET has lately described a case of this hernia. A tumour, containing a mortified portion of intestine, about the size of a small hen's egg, proved fatal. After death, the tumour was found to be covered by the adductor longus and pectineus muscles.

OF THE PERINEAL HERNIA †.

The perineal hernia falls under the third class of internal herniæ; for, at the commencement of the disease, there is no external tumour ‡, and sometimes, as in the case which happened to Dr MACLAURIN §, symptoms of strangulation occur, and the patient dies, though there exists no external tumour.

* Vide HALLER, Disput. Chir. vol. iii.

† Vide Dissertation on this kind of Hernia, in the Supplement to SCARPA on Hernia.—1. Demonstrat. Anat. Pathol. lib. ii. p. 17.

‡ Vide Sir ASTLEY COOPER'S Plates.

§ Vide DENMAN'S Midwifery.—Vid. also SMELLIE'S Cases and Observations in Midwifery, in which two cases of this kind of hernia are described in detail.

But, in consequence of the duration of the disease, a tumour frequently appears in the perineum, on one side of the raphe, the bowels having passed (if the patient be a male) between the rectum and bladder, between the levator ani and sphincter muscle, or between the fibres of the levator ani. In the female, the protrusion takes place between the bladder of urine and the vagina.

Scarpa has published an interesting case of this kind of hernia, which was occasioned by an effort made with the legs apart, when the body was bent forwards: it was about the size of a small nut. The tumour suddenly appeared at the right side of the anus, and gradually became larger, though the patient wore a truss. The tumour, which was situated at the right side of the rectum and bladder, protruded on the same side of the anus, the tuber ischii and coccyx. The hernial sac was covered by a portion of the levator ani.

The tumour, when internal, may be discovered from the rectum; when external, it becomes more evident while the patient is standing, becomes less upon pressure, and in the recumbent position. Sometimes this kind of hernia is accompanied by bearing down pains, and has been mistaken for a prolapsus uteri.

The intestines generally form the contents of the hernia, and sometimes the bladder of urine; and hence there is some variety as to the symptoms.

The bladder of urine is always more or less affected by this kind of hernia; as it is pressed upon, and irritated by, the protruded intestines *.

* Mr Brodie has described a case (London Medical and Physical Journal), in which two yards of the smaller intestine, in a high state of inflammation, with a considerable portion of the mesentery, protruded through the anus. The displaced parts could not be reduced. Under these circumstances, Mr Brodie made a longitudinal incision of the linea alba, about two inches in length, below the umbilicus. The incision was continued through the peritoneum into the cavity of the abdomen; and the fingers being introduced at this opening, by gently pulling the small intestine, that portion of it which had protruded through the slit of the rectum was readily drawn back into the abdomen. It having been ascertained, by examining the rectum

Strangulation sometimes takes place during labour, as Dr SMELLIE has observed *. Sir A. COOPER has described the appearances upon dissection of this kind of hernia. The hernial sac was observed between the rectum and under surface of the bladder and prostate gland. The lower part of the tumour did not reach the skin.

OF THE VAGINAL HERNIA.

This hernia is most common amongst women who have had several children, and generally is perceived projecting into the upper and back part of the vagina, and sometimes, according to SANDIFORT †, at the orifice of that canal.

This hernia, which becomes larger and tense in the erect, and disappears in the recumbent posture, bears a strong analogy to the perineal hernia; for in both, the protrusion takes its origin in the same situation.

The intestines generally form the contents of the tumour, and sometimes, though rarely, the bladder of urine; and as, in the former case, though the bladder be not protruded, it is affected from its vicinity to the hernia.

The bladder of urine sometimes forms a prominent tumour at the lateral or posterior part of the vagina in virgins, and still more frequently in married women, when that canal has been reduced to a state of relaxation by repeated pregnancies at short intervals.

As the os uteri is pushed forwards, and the vagina is in part

with the finger, that the reduction was completed, the edges of the wound in the linea alba were brought together by sutures. After the operation the pulse was scarcely perceptible, the extremities were cold, and the patient was sick, throwing up again immediately whatever she swallowed. In about two hours the pulse was somewhat stronger, and the extremities were warmer; but the restoration of the vital powers was imperfect, and, after some hours, they again began to fail, and the poor woman died.

* Vide his Cases and Observations in Midwifery.

† Vide Obs. Anat. Pathol. lib. i. cap. 4. Vid. also CHRISTIAN'S Observations on the Retardation of delivery by fulness of the bladder (Edin. Med. and Surg. Jour. vol. ix.); also Sir A. COOPER on Hernia.

filled by the tumour, such a hernia bears a strong resemblance to the retroverted uterus.

If the intestines be protruded between the uterus and rectum, the tumour appears at the back part of the vagina, low down; but if the protrusion be between the womb and bladder, the tumour lies at the fore part of the vagina, and towards the os uteri, and creates difficulty in passing the urine, which is increased by the erect, and diminished by a recumbent posture.

In this case, upon introducing the finger into the vagina, a large fluctuating tumour is found within it, which disappears upon pressure. After the urine has been discharged, the superior part of the vagina is felt flaccid.

In some cases, the projecting bladder of urine within the mouth of the vagina is said to have proved an obstacle to delivery.

The membrane of the vagina forms the external surface of the swelling.

PUDENDAL INTESTINAL HERNIA.

This kind of hernia also resembles the vaginal, for the displaced parts pass along the surface of the vagina, and protrude, as in the case of the hernia above described, between the fibres of the levator ani muscle: the tumour is situated in the middle of the labium, and may be felt extending along the side of the vagina, by an examination per vaginam.

A pudendal hernia sometimes contains a part of the bladder. The late Mr A. Burns has informed me, that, since Sir A. Cooper's books on herniæ were published, he has met with two examples of that species of hernia in the living subject. In both cases, the bowels were reducible, and the diseases coincided, in every point, with Sir A. Cooper's description, except in regard to the position of the tumour. In the cases examined by Sir A. Cooper, the tumours were lodged between the folds of the labium, "above a line drawn from the orifice of the vagina outwards;" whereas, when Mr Burns's patients were standing, the tumours appeared like pretty firm balls in the labium, behind or below a line drawn from the orifice of the vagina outwards.

OF SYMPTOMS SIMILAR TO THOSE OF HERNIA,

Occasioned by an unnatural elongation of the Omentum passing around a part of the Intestinal Canal.

The last class of internal hernia originates from internal malconformation, by which stricture, sometimes amounting to strangulation, is made upon a part of the intestinal canal, in consequence of an unnatural opening in the diaphragm, of malconformation of the omentum, mesentery, mesocolon, or of an unnatural appendix to the intestines.

It seems probable that the adhesion of a portion of omentum to the enlarged uterus or ovarium, proves a cause, on some occasions, of derangement of the functions of the alimentary canal.

In consequence of the unnatural length of the omentum, it sometimes encircles the intestines; and the degree of stricture thereby produced proves, in some cases, a complete barrier to the course of the fæces, and produces a great distention, inflammation, and strangulation of the intestines.

I have seen five cases of this description. In three of these the intestinal canal was constricted only at one place by the omentum, but, in the two others, the intestinal canal was constricted at three different places.

A sixth similar case was communicated to me by the late Dr James Anderson.

I shall give a brief history of the appearances upon dissection in two of the cases.

The first was that of a young woman. The omentum extended to the pubes, and adhered by preternatural short processes to the ovaria and posterior part of the broad ligament of the uterus.

A part of the omentum, which was of a much darker colour than usual, being covered as by a lattice-work of vessels, passed downwards between the convolutions of the ileum, and was fixed to the spine.

The whole track of the intestines, and more especially the ileum, bore the marks of inflammation.

In this person there was a great tendency to the formation of these unnatural processes, for, besides the unusual process of omentum passing around the intestine, there was also a vessel from the mesentery of the size of a small goose-quill, passing around, and constricting the intestine: it was distended by dark-coloured blood, to which an oval-shaped body, of a deep-purple colour, about the size of a dried bean, was attached.

I have made the more particular mention of this latter circumstance, as it seemed to me to afford an illustration of the manner in which these unnatural elongations of the omentum (which do not in structure resemble the healthy omentum), are formed; and shewed that, in this case, the intestines had not been protruded through an aperture in the omentum.

In the second instance, the patient had been for many years occasionally constipated, and suffered much from pain in his bowels and vomiting, followed by quick pulse. He was bled, and was considerably relieved. He speedily relapsed, and the constipation could not be obviated by the most drastic purgatives. The constipation at length amounted to such a pitch, as to induce inflammation of the intestines, which proved fatal to him.

Upon examining the body, the omentum, to which a very small quantity of fat was appended, was found covering the whole surface of the great and small intestines, and was firmly fixed down to the bladder of urine, by means of a number of short and firm processes, also to the left side of the colon, and to the sigmoid flexure of that bowel.

After tearing asunder the preternatural adhesions which the omentum had contracted, it could not be turned up in the usual manner, on account of three different bands, which passed between the different turns of the ileum; these encircled the intestines, and made considerable pressure on them. The intestines, above the constricted portion, were much dilated, whereas the portion beneath seemed somewhat less than usual.

The greater part of the omentum and intestinal canal were of a leaden colour, and here and there of a chocolate colour;

but the coats of the intestine had not lost their usual firmness; and did not tear, even upon being rudely handled.

The vessels of the villous coat of the ileum of the three portions, surrounded by the preternatural processes of the omentum, were much distended by blood, and were covered by thin layers of coagulable lymph.

My Father met with an instance, more than forty years ago, in a case of congenite hernia on the right side, in which an unnatural process from the omentum was the cause of strangulation. The hernial tumour was as large as a goose's egg: it was tense, and felt as if it contained a portion of intestine, and also of omentum.

The testicle formed the lower and back part of the tumour. All the usual methods were employed, with the view of removing the disorder, but in vain; an operation was performed by that excellent surgeon Mr Benjamin Bell.

The intestines within the sac, which were found of a dark colour, were readily replaced.

A part of the omentum, which had attained an unnatural bulk, and was found adhering to the spermatic cord above the testicle, and to the hernial sac at the under abdominal aperture, was cut off, as it could not be reduced.

The patient died thirty-eight hours after the operation.

On dissection, all the intestines were found of a dark colour, and much distended with air. A part of the ileum which had been within the sac was contracted and thickened. The omentum adhered to the peritoneum, above the under abdominal aperture, and a process of omentum passed around some turns of the ileum, and grew to the mesentery, forming a complete circle around the displaced intestines.

In cases such as the above, the cause of the strangulation being internal, cannot be removed.

It merits mention, that the ring formed by the omentum, which embraces the intestine, is, strictly speaking, rather a membrane attached to the omentum than a portion of it; it is more firm, has no fat appended to it, and bears a greater resemblance to the peritoneum than to the omentum.

My learned colleague Dr Ballingall shewed me a striking case of the description above alluded to, and was so polite as to send me the history of his patient, who had laboured for some time under strangulated hernia. "The hernial tumour, which was situated on the right side, was of large size, inflamed, and somewhat œdematous. I immediately proceeded to the operation, and on laying open the hernial sac, it proved to be of the congenite kind, consisting partly of omentum and partly of intestine. Of the former, I am told by some of my friends who were present at the operation, that a considerable portion was cut off in a gangrenous state, although this I do not myself recollect. Of the intestine a large portion was found protruded, and more came down after the stricture was relieved, but the whole was with some little difficulty returned; and, although considerably discoloured, its appearance did not lead me to anticipate any thing like sloughing or ulceration.

"Matters went on favourably for about a week, when, in dressing him one morning, a burst of feculent matter unexpectedly took place from the upper extremity of the incision, nearly opposite to the external orifice of the inguinal canal. From this point more or less feculent matter continued to discharge daily for some weeks, when an abscess formed a little above this aperture, and, on plunging a lancet into it, a quantity of purulent matter, mixed with fæces, was discharged. From this time the fæces found their way more readily through the new orifice, and the original wound closed. The patient had a continued discharge from this artificial anus, sometimes of a mucous appearance, at other times more of a bilious character, and frequently feculent, but always limited in quantity, the great bulk of the fæces passing downwards, in the natural way, by the rectum. He enjoyed, in other respects, tolerable health, his appetite good, and functions natural; but he had always a sallow unhealthy complexion. He went at last to his home, in the outskirts of the town, when, after a time, the artificial anus entirely closed. He did not, however, regain his strength, but died emaciated and dropsical, about sixteen months from the date of the operation."

" On dissection, several pounds of serum were found effused into the cavity of the abdomen ; the liver and mesenteric glands were found extensively diseased, and full of hard cheesy-looking tubercles. A very large indurated gland, full of the same cheesy-looking matter, was situated without Poupart's Ligament, and many of the same kind within it. The ileum was found adherent to the parietes of the abdomen, opposite to the cicatrix of the artificial anus, and below the point, which was about six inches from its termination in the colon, the caliber of the intestine appeared rather contracted. At the same point also, that is to say, opposite to the artificial anus, *a prolongation of the omentum, in the form of a narrow-pointed slip, was found attached, and an adventitious band*, about two inches long, with a tubercular mass in the centre of it, was found passing from a flexure, in the lower part of the ileum, to the caput cœcum coli, and, upon a minute examination, it was found that a fine probe could be passed through the artificial anus.

" I was anxious to have made a more minute examination of the parts, but was prevented."

QUEEN STREET,
18*th March* 1826.

The following remarkable case of internal strangulation was communicated to me by Mr LISTON.

" James Black, æt. 64, had a good recovery after the operation of lithotomy. Nearly six weeks after its performance, he was seized with obstruction of the bowels, vomiting, hiccup, &c. &c. Various medicines by the mouth were tried, as well as large injections by means of Mr READ's syringe, but without effect.

" On dissection, an old, and remarkably dense adhesion, about the thickness of a person's fore-finger, was found passing from the upper part of the mesentery to the rectum, separating the bowels into two portions. The stomach, and upper part of the small intestines, were distended and inflamed. The rest of the canal was empty, and sound. I may add, that this patient had suffered from several severe attacks of ileus."

According to CALLISEN, the intestines have sometimes been strangulated through an aperture in the omentum.

Of Hernia through the Mesentery.

In this kind of hernia, the displaced intestines pass through an unnatural aperture in the mesentery, and are strangulated *.

Sir A. COOPER has published an engraving, in which the intestines are represented as having passed between the layers of the peritoneum, forming the mesentery.

Both patients died in consequence of inflammation in the bowels.

Another variety of internal hernia, which I have seen, is produced by the protrusions of the villous and cellular coats of the intestines, through the muscular coats, in the same manner as pouches are formed within the bladder of urine.

It sometimes happens, that a process from the intestines passes around the intestines, and proves a cause of strangulation.

In the remarkable case from which Plate III. was taken, a process grew from the ileum, which passed around, and so greatly compressed a portion of the small intestines as to prove the cause of death.

I have also seen all the symptoms of strangulation occasioned by the unnatural adhesion of the convolutions of the ileum; which adhesion made considerable pressure upon, and confined a part of, the intestinal canal.

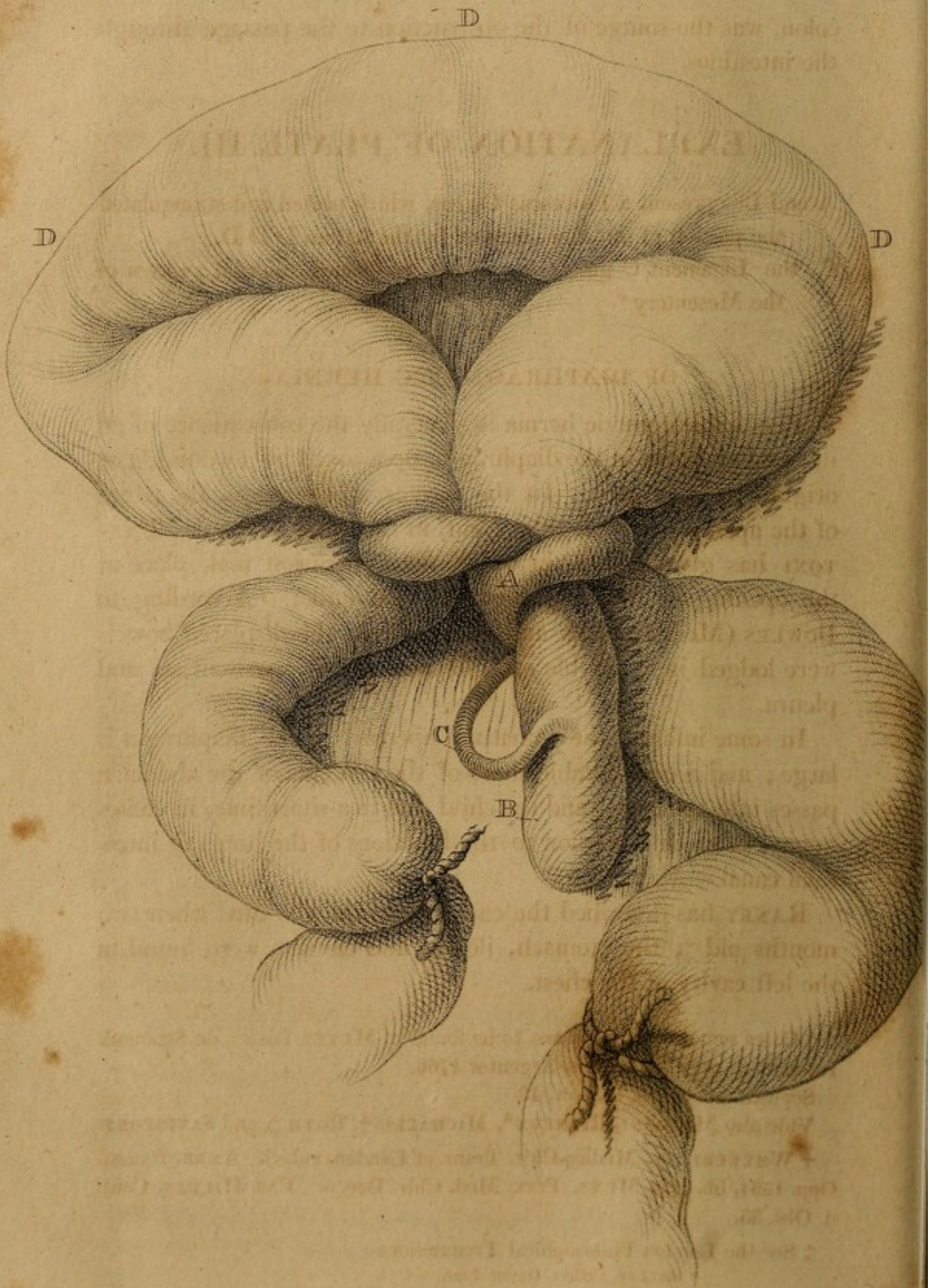
My Father met with a case, in which a patient died, with all the symptoms of a strangulated hernia, where the caput coli was inverted.

Upon dissection, the intestines were found adhering to each other by means of coagulable lymph: the caput coli was very much distended by fæces, and also inverted and fixed in that situation by unnatural adhesions.

To me it seems probable, that the distended and inverted

* Vide Plate I. fig. 1. in my Observations on Crural Hernia, which was taken from a case of that kind of Hernia, which occurred to Dr RUTHERFORD.

Plate III.



I. Stewart sculpt.

colon, was the source of the obstruction to the passage through the intestines.

EXPLANATION OF PLATE III.

A and Br epresent a Processus Cœcus, which passed and strangulated the portion of intestine, marked by the letters D D D.

C, the Ligament C unites the above mentioned unusual process of the Mesentery *.

OF DIAPHRAGMATIC HERNIA.

The diaphragmatic hernia is generally the consequence of an unusual aperture in the diaphragm, occasioned by a wound †, or original malformation. In the former, when recent, the edges of the aperture are irregular; but, in the latter, smooth. FANTONI has given a case, in which the protrusion took place at the opening in the diaphragm for the gullet. According to BOWLES (Med. Records and Researches), the displaced bowels were lodged in a double sac, formed by the peritoneum and pleura.

In some infants, the unnatural aperture in the diaphragm is large; and a considerable share of the contents of the abdomen passes into the chest, and the child dies in a short time, in consequence of an interruption to the functions of the lungs or intestinal canal.

RANBY has described the case of a child who died when two months old ‡; the stomach, ileum, and cæcum, were found in the left cavity of the chest.

* Cases somewhat similar are to be found in MEYER Disser. de Strangul. Intestin. in cavo Abdominis. Argentor 1766.
Sepulch Anat. Lib. iii. sect. 13.
Vide also MORGANI, RICHERZ *, MICHAELIS †, ROTH ‡, and SANDIFORT.

† WHEELRIGHT, Medico-Chir. Trans. of London, vol. vi. AMBR. PARÆI. Opp. 1594, lib. ix. MUYS, Prax. Med. Chir. Dec. 5. FAB. HILDAN, Cent. ii. Obs. 33.

‡ See the London Philosophical Transactions.

* HALLER, Collect. Disput. Pract. vol. vi.
† LODER, Journ. f. d. Chir. B. iii.
‡ Pathol. Intestini Coli. Erlang, 1803.

This kind of hernia has been said to be more frequent on the right than the left side. There is a preparation in the Museum, in which this kind of hernia was found in the body of a child, and connected with original malformation. A part of the posterior portion of the diaphragm was deficient, and the stomach, and the small and greater portion of the larger intestines, were lodged within the left side of the chest. The displaced bowels were not contained in a sac.

If there be a hernial sac containing the displaced bowels, we must suppose that the fibres of the diaphragm have yielded, in consequence of the pressure of the abdominal bowels against it, and which push before them the peritoneum.

Dr MACAULAY* found the liver in the right side of the chest.

The bowels pass in general through the muscular part of the diaphragm.

When this hernia is congenital, the child exists but for a short time †. There are a few exceptions to this remark.

Some persons have lived for several years, with an unusual aperture in the diaphragm, which is probably to be imputed to the aperture being of small size; but upon a violent effort being made, a part of the intestine is forced through the unnatural opening in the diaphragm, and is strangulated, as in the subjoined case §.

* Med. Obs. and Surg. of London, vol. i.

† FOTHERGILL, Phil. Trans. vol. xliv.

§ "The patient, a young woman, twenty-two years of age, had been occasionally subject, during the greater part of her life, to pain in the left side, under the false ribs. This was generally succeeded by pains throughout the whole belly, resembling colic pains, and was attended with some degree of costiveness.

"These complaints commonly wore off in a few days, and she was not subject to them at the period of menstruation. Having danced violently on Saturday evening, she was seized on the Sunday morning, in the manner below described. In the afternoon, she was seized with a violent vomiting, and with excruciating pain in the side and belly, which lasted during the whole night. A clyster was given about ten o'clock, which procured a considerable discharge of fæces, but without any relief.

"She was never observed to have any shortness or difficulty in breathing, and lay alike well on both sides.

"The patient soon after died.

When the transverse arch of the colon passes through the left sac of the diaphragm, it often displaces the heart, as in the following case.

A man of middle age was suddenly seized with acute darting pain in his belly, accompanied with nausea and vomiting. The abdomen was not tense, but painful on pressure in the region of the navel. Pulse 112. Had had no passage for eight days, though various purgatives had been given. By the use of the lancet, and more powerful purgatives, a free passage was procured, and he was relieved.

Four months afterwards, he was seized with symptoms denoting an affection of the brain, together with difficult breath-

" The body was opened the following morning, and although only twenty two hours after death, it was unusually putrid.

" The bowels were much distended with air, and the drink she had swallowed was effused into the cavity of the abdomen.

" This I found to arise from an opening through the coats of the stomach, nearly in the middle of its great curvature.

" On examining the intestines, I found a large portion of the colon had passed through an opening in the middle of the left side of the diaphragm, into the cavity of the thorax ; and lay behind the heart and lungs.

" This tumour exceeded the size of a person's fist, and appeared to be strangulated ; for all the bloodvessels were turgid, as if they had been injected, and the gut was with difficulty drawn back into the cavity of the abdomen.

" On examining the opening through the diaphragm, I found it surrounded by a callous ring, and to have every appearance of having been of long standing, or more probably an original defect.

" A thin pellucid membrane was connected with part of the edge of the ring, and a sort of process from this membrane extended along the tumour, into the cavity of the thorax. On examining, it appeared that the bowels had not been forced through the diaphragm, at the side of the esophagus, the vena cava inferior, or aorta, but through a preternatural aperture in the diaphragm, into the left side of the thorax."

From the symptoms which preceded the death of this woman, and the history of the appearances discovered upon dissection, it seems probable that the violent exercise she had taken had forced more of the colon through the preternatural aperture in the diaphragm, which brought on strangulation.

The aperture was of an oval shape, and, though now considerably shrunk, from having been dried, still measures two inches and a-half in length, and an inch and a-half in breadth.

ing and expectoration. He was bled, blistered, and purged freely; but died in eight days.

Upon dissection, nothing unusual was discovered in the brain. The lungs, on the left side, were found in a state of collapse, and adhered to the transverse arch of the colon, which, together with the omentum, had passed into the left pleura, and forced the pericardium and heart over to the right side of the chest. The arch of the colon was much distended, and of a livid colour.

Even when there is an aperture in the diaphragm, life may be continued for a number of years. I have given the histories of two persons, who in all probability were born with such a malformation, as the aperture in the diaphragm did not seem recent. One of the patients experienced no inconvenience, until a short time before death, but the other suffered much from obstinate constipation and impeded respiration, for many months before he died.

Of Obstruction consequent to displacement of Bowels within the Abdomen.

Two remarkable cases of this description occurred to my father; in the former, a patient died of three days' illness, with all the symptoms of ileus. Upon opening the body, about a foot, or more, of the intestinum ileum, was found of a black colour, and lying at the right side. It was found that the appendix vermiformis had passed over the bowels, near to the root of the mesocolon, and was entangled in the mesentery, on the under side; in the latter, the patient died with similar symptoms, in three days. Upon dissection, the intestines were found adhering slightly to the peritoneum, and could not be drawn out without tearing them. The caput cœcum coli, instead of lying upon the os ileum, was turned upwards, and applied to the liver and gall-bladder, to which it adhered. The intestinum ileum, instead of opening upon the left side, passed behind, and opened upon the right; the consequence was, a great accumulation of fæces, and an extraordinary distention of the caput cœcum coli; and such a degree of pressure was made upon the colon, as im-

peded the progress of the fæces, and led to gangrene of that bowel *.

I have also seen strangulation occasioned by a portion of intestine passed under the appendix vermiformis, the extremity of which had been fixed down by unnatural adhesions. The patient, before death, had the usual symptoms of strangulated hernia. A case of that description occurred to my learned colleague Dr GRAHAM.

OF HERNIA OF THE CAPUT CŒCUM COLI.

Owing to an unusual looseness of that portion of the peritoneum which fixes down the cœcum, together with unusual laxity of the parietes of the abdomen of the right side, the cœcum has been detected by Mr J. HUNTER and SCARPA within a scrotal hernia. SCARPA has accurately described various degrees of herniæ containing the cœcum. In the first, the fold of peritoneum which fixes down the cœcum to the loins, had passed down within an inch of the under abdominal aperture; in another, the whole cœcum was within the hernial sac, together with the appendix vermiformis, and origin of the colon; and, in a third scrotal hernia, the cœcum, the origin of the colon, and termination of the ileum, were contained in the hernial sac. The laminæ of the peritoneum, which fix down the cœcum coli, formed a part of the hernial sac. In consequence of the accumulation of fæces in the protruded intestines, there was a degree of atony and enlargement of the displaced bowels. It is impossible to reduce such a hernia, as the natural attachments of these bowels constitute a part of the hernial sac: hence they are fixed to the bottom of the scrotum, excepting where the cul de sac of the cœcum only is protruded, which is not fixed down to the hernial sac. Mr LAURENCE has made the following judicious remarks on this kind of hernia: "These descents," says he, "must take place gradually; the displacement of parts, connected as the cœcum and colon are in their natural situation, must be a slow process, and consequently hernia, formed suddenly by any accidental cause, cannot be of this kind."

* I have extracted these cases from a copy of his Lectures, written in the year 1773.

CLASS III.

OF WORMS PROPER TO THE HUMAN ALIMENTARY CANAL.

THERE are some worms which are proper to the alimentary canal; and others common to it, and to other parts of the human body. Thus hydatids, which are originally lodged within the liver, have often been discharged into the stomach or intestines, or externally upon the surface of the abdomen; or hydatids originally lodged within the lungs, have worked their way downwards, and been discharged at the navel; or they have got into the branches of the windpipe, and been coughed up.

SECTION I.

OF WORMS PROPER TO THE ALIMENTARY CANAL.

THIS branch of Natural History has been very highly cultivated by TYSON *, REDI †, LE CLERC ‡, PALLAS §, FYSHE

* Phil. Trans. 1683.

† REDI, FRANC. Osservazioni intorno agli animali viventi, che si trovano negli animali viventi; Firenze 1684.

‡ CLER. DANIEL. Historia naturalis et medica latorum lumbricorum intra hominem, et alia animalia nascentium, ex variis Auctoribus, et propriis observationibus, &c. Geneva, 1715.

§ PALLAS, Dissert. de infestis viventibus intra viventia; Lugduni Batavorum, 1760.

PALMER *, ANDRY †, WERNER ‡, GOEZE §, BLOCH ||, BRERA ¶, RUDOLPHI **, CARSLYLE ††, JOERDENS ‡‡, and BREMSER.

There are several different species of worms which are proper to the human alimentary canal, and which are capable of living within it, viz. the Teniæ or tape worms, the Ascaris lumbricoides, or long round worm, and the Ascaris vermicularis, or short round worm, &c.

The Trichuris, and one or two other species, were unknown to the antients.

My pupil Dr WILLIAM ELFORD LEACH, a distinguished naturalist, had, for several years, devoted much attention to those worms that infest the human alimentary canal, and had formed a large collection of them, from which, and from those in the Museum of the University, and from that of the late Dr BARCLAY, he drew out the annexed arrangement of them into genera and species, which has been printed verbatim, from a manuscript

* Tentamen Med. Inaugurale De Vermibus Intestinorum; Edinburgi, 1766.

† Traité de la Generation des Vers. 3e edit.

‡ WERNER D. E. F. Vermium intestinalium, praesertim tæniæ humanæ, brevis expositio; Lipsiæ 1782. Continuatio prima, secunda, et tertia, curante, I. L. FISCHER, Lipsiæ 1782, 1786, 1788, 8vo.

§ GOEZE I. A. E. Versuch einer Naturgeschichte der Eingeweidewurmer thierischer Koerper; Leipsig, 1787.

|| BLOCH Traité de la génération des vers des Intestins, et des vermifuges; Strasbourg, 1788.

¶ BRERA, Lezioni Medico-Practiche sopra i principali Vermi del Corpo umano vivente, e le così dette Malattie Verminose.—The figures of the Worms appended to this book, are by far the best which I have seen, and were drawn and engraved by ANDERLONI.

** Entozoorum, sive Vermium, Intestinalium Historia Naturalis, auct. CAROLO ASMUNDO RUDOLPHI, 3 vols.

†† Linnean Trans.

‡‡ JOERDENS J. H. Entomologie und Helminthologie des menschlichen Koerpers; III. T. Hof. 1801, 1802, fol.

kindly communicated to me. He also superintended the execution of the drawings for the subjoined engraving, Plate IV.

" To Dr Monro.

" Dear Sir,

" According to your request, I have examined all the worms in our respective collections with considerable attention, and have now made up my mind on the subject of the three new genera, and the characters of the species. In the round worms we have the following genera: 1. Trichocephalus, 2. Ascaris, 3. Opseidofera, 4. Enterabius. The two last are new genera; the former of them containing the worm which I passed myself, the latter the Ascaris *vermicularis* of authors, which differs not only in its external, but likewise in its anatomical characters, from the true Ascarides. I have therefore given it a new generic name, which I have called *Enterabius*, to do away with a very ridiculous notion of its inhabiting the roots of putrid plants, as well as the intestines. I may observe, that I am acquainted with one other species, which inhabits the intestines of the horse. On the Tape-worms I have very little to say, the anatomical characters and economy having been so admirably described by Anthony Carlisle, Esq. in the second volume of the Transactions of the Linnean Society of London. One new genus is added, to include the Tænia *lata* of Hooper and Carlisle, which I have named *Gasterostoma*, from the position of the mouth; and I believe no other species has been hitherto discovered in any animal.

" The following is a table of the genera of Intestina, which inhabit the human intestines, with short characters:

TABLE.

- Corpus
  - Teres
    - Antice obtusum ..... 1. TRICHOCEPHALUS.
    - Utrinque acuminatum
      - Labium integrum ... 2. ENTERABIUS.
      - Labium trinodum
        - 3. ASCARIS.
        - 4. OPSEIDOFERA.
  - Complanatum
    - Os laterale ..... 5. TÆNIA.
    - Os superficiale ..... 6. GASTEROSTOMA.

" With your permission, I will take up a little more of your time with giving the generic characters at more length.

1. TRICHOCEPHALUS. Os obtusum; pars postica corporis capillaris, parte anteriore duplo longior, tenuissimus.

2. ENTERABIUS. Labium integrum; (os transversum?) cauda tenuissima.

3. ASCARIS. Labium trifidum aut trinodum. Rostrum nullum. Corpus lineis longitudinalibus duabus rectis.

4. OPSEIDOFERA. Labium trinodosum; rostrum cylindricum (contractile?) Corpusculum pone labium utrinque hemisphæricum. Corpus lineis quatuor longitudinalibus; duabus latiusculis rectis; alteris angustis, undulatis aut angulatis.

5. TÆNIA. Oscula ad corporis latera, in singulo articulo.

6. GASTEROSTOMA. Oscula in ventre singuli segmenti.

" The species next come under consideration, but I fear the matter will not allow of any decisive characters which shall distinguish these from any other species which may hereafter be discovered.

" DESCRIPTION OF THE SPECIES.

1. Trichocephalus.

Sp. 1. *Hominis.* Supra subcrenatus, subtus lævis, anterius subtilissime striatus.

Gmel. *Syst. Nat.* 1. 3038. 1.

Trichuris auctorum anatomicorum.

Long. corp. 2. unc.

Habitat in cæco intestino; apud nos certe infrequens.

A tolerable figure is given by Werner in his Verm. Intest. tab. 6. fig. 138, 143. See also Plate IV. fig. 1.

2. Enterabius.

Sp. 1. *Vermicularis.* Rugis annularibus obscuris; corpore utrinque attenuato, antice obtusiore, postice attenuatissimo. (*Os transversum*, Linn.)

Ascaris *Vermicularis* auctorum.

Long. corp. 3—4 lin.

Habitat in rectis intestinis præsertim juvenorum frequentissime, gregarius.

Plate IV. fig. 2.

3. Ascaris.

This genus contains a vast number of species, three of which inhabit the human intestinal canal, and have doubtless been considered as one species, although, on comparison, they afford very essential marks of distinction.

Sp. 1. *Brevis.* Corpore breviore, transversim fortissime striato, interstitiis subtilissime strigosis.

Long. corp. 5 unc.

Plate IV. fig. 3.

Habitat in intestinis rarissime.

Mus. Monro, Leach, Donovan.

Sp. 2. *Lumbracoides.* Corpore longiore transversim forte striato, interstitiis subtilissime strigosis.

Ascaris *lumbracoides* auctorum.

Long. corp. 7½ ad 9 unc.
Habitat in intestinis passim.
Plate IV. fig. 4.

Sp. 3. *Lævigata.* Corpore tenui, elongato, læviter transversim vage striato, interstitiis subtilissime strigosis.
Ascaris *lumbracoides*, HOOPER.
Long. corp. 10 ad 12 unc. et supra.
Habitat in intestinis vulgatissime.
Plate IV. fig. 5.

4. OPSEIDOFERA.

Sp. 1. *Ascaridiformis.* Corpore carneo-rufescente, antice subpellucido, linea perlaceo-albida (intestina?) ab ore usque ad medium et ultra producta.
Long. corp. 8 unc. et supra.
Mus. LEACH.
Habitat in hominum intestinis rarissime, semel tantum obvia.
Plate IV. fig. 6.

5. TÆNIA.

I have forborne to give specific characters to the species of this genus, as it is evident we know too little of them to be enabled to draw them so as to be discriminative hereafter; it has therefore been judged better to omit them. In the following list, therefore, the species will be given with their synonyms, and a reference to the plate; which being done accurately, will enable any one to make out the species.

Sp. 1. *Lata.*
Tænia *lata* LINNÆI, GMELINI, LEACHII.
Plate IV. fig. 7.
Habitat in Britannia rarissime.
Museis BARCLAY, MONRO, LEACH, HOPKIRK.

The two uppermost figures represent two portions of the same worm, taken from the different extremities; the lower figure, part of the larger end reversed, to shew the other side. This species is called *lata*, not from the great breadth of the animal, but from the great breadth in proportion to the length of the joints.

Sp. 2. *Dentata.*

Tænia *dentata* BATSCH. GMEL.

Habitat in Britannia rarissime.

Museo MONRO.

Plate IV. fig. 8.

The upper figure exhibits one side of the animal, which was of the same proportion throughout; the under figure, the same reversed.

Sp. 3. *Variabilis.* LEACH MSS. *Intestinorum.*

Habitat in intestinis rarissime, bis tantum obvia.

Mus. BARCLAY, LEACH, MONRO.

Plate IV. fig. 10.

There are three portions from different parts of the animal shewn; both sides are alike.

Sp. 4. *Vinculum.* LEACH *Intestinorum* MSS.

Habitat in Britannia, Suecia, at valde infrequens.

Museis BARCLAY, MONRO, LEACH.

Plate IV. fig. 12.

Two portions: both sides are alike.

Sp. 5. *Monroi.* LEACH *Intestin.* MSS.

Habitat in Britannia rarissime, semel detecta.

Plate IV. fig. 11., where two pieces are shewn.

Sp. 6. *Solium.*

Tænia *solium*, LINN. GMEL.

β Tænia *elongata*, HERMAN. *Mem. Helminth.*

Habitat in intestinis vulgatissime.

Plate IV. fig. 9.

The upper two figures shew portions from the same worm: the lower figure was passed with four or five inches more, and I am sure is no more than a variety, although considered by HERMAN as a distinct species.

Sp. 7. *Tenuis.* LEACH *Intestin.* MSS.

Habitat in intestinis gregaria, haud frequens.

Museis MONRO, BARCLAY, LEACH, JAMESON.

Plate IV. fig. 13. shews the perfect animal with its head.

6. GASTEROSTOMA. LEACH *Intestin.* MSS.

Sp. 1. *Lata.*

Tænia *lata*, HOOPER, CARLISLE, BLUMENBACH.

Gasterostoma *lata*, LEACH MSS.

Plate IV. fig. 14.

Habitat in Britannia infrequens.

It has often been a matter of surprise to find this species considered as Tænia *lata* of LINNE, when he expressly says, both in Fauna Suecica, and in the twelfth edition of the Systema Naturæ, 'Tænia *lata* osculis *lateralibus* solitariis.' He has referred to some figures, which references are possibly wrong; hence, probably, the confusion, which too frequently happens; for when plates are given or referred to, the descriptions are forgotten."

I do not propose to follow the arrangement of any of the authors; but merely to give such general remarks on intestinal vermes as my own experience and observation furnish.

TÆNIA.

It may be proper to make some general remarks on the anatomical structure of this genus, which, although chiefly drawn from the examination of Tænia solium, may be considered as applicable to all the species.

Tape-worms are covered by an elastic and porous membrane, which, when examined by a microscope, seems smeared with a tenacious liquid, which exudes through pores.

Under the membrane, some scattered fibres of a white colour are seen, the external of which are fixed into the inferior margin of each joint, and are disposed in a longitudinal manner; the inner set of fibres following a transverse course.

The alimentary canal, which takes its rise from the mouth, divides into two distinct canals, which pass along the margins of the joints; and in the last joint these canals are impervious.

Besides these longitudinal marginal tubes, there are trans-

verse canals, which pass across the inferior margin of each joint, and communicate with the longitudinal canals.

These canals were first injected by ERNEST *.

Besides the above canals, there is a pretty large canal in the centre of each joint: this was injected with quicksilver by my Father, and has been particularly described by Dr F. PALMER, in his Thesis: it divides somewhat like a tree into a number of small lateral branches, which communicate with the lateral oscula, by small openings.

This system of vesssels is generally filled by a white fluid, which has been supposed to be subservient to the generation of the animal, and, on account of the course of its smaller branches, has been called the Arborescent Ovaria.

All the species of tæniæ are said by WERNER to be hermaphrodite.

Knots have been frequently observed in the worm, which has led to the supposition, that, as two pairs of the oscula were in contact, the worm was in a state of copulation.

The head is placed at the smaller, and the tail, which has an oval termination, at the larger extremity of the worm. There are some who do not admit that the terms Head and Tail are correct; because each joint has its proper vessels, and seems capable of existing, for some time, independently of the other joints.

ASCARIDES.

Ascaris vermicularis (*Enterabius vermicularis* of Dr LEACH). —This worm is very common in this country, not only in children, but also in adults.

A great many of these worms have been found at one time within the rectum of infants.

Ascarides, when recently discharged, are nearly transparent.

This is the smallest and most common species of worm, and it is found generally in the rectum. They are about half an inch in length, and divided into three parts. The head, in

* Vid. HALLER, Disput. Med. vol. iii.

which three vesicles may be observed, with an aperture in the middle, is obtuse, and the tail ends in a sharp point.

According to GOETZE this worm is viviparous; but according to BREMSER oviparous.

This worm has a distinct cuticle, cutis vera, and annular muscles.

The male seems to have only an œsophagus, stomach, and intestines. The stomach is a round bag, situated at the sides of the œsophagus; this, according to GOETZE, constitutes a distinguishing character of the species.

The male organs of generation have not as yet been detected.

In the female, the apparatus for generation is visible. It begins as a slender tube, from a small opening, which is situated near the middle of the body; it gradually becomes larger, and surrounds the intestinal canal.

The uterus is not bifurcated as in the next species, Ascaris lumbricoides; and its end is as large as any other part of it.

Ascaris lumbricoides.—This worm has generally been called Lumbricus. It was formerly supposed to be the same as the earth-worm, but it is very distinct in its characters.

It has a round body, about the thickness of a small writing pen, and is generally from six to fifteen inches in length. Vid. Plate IV.

The smallest are whitish, and almost transparent, when examined soon after they have been passed; the larger are of a greenish-yellow colour.

They are very prone to putrefaction; the larger sooner putrefy than the smaller. I have seen the largest burst in the course of a day or two after being voided.

The head is divided into three lobes, which are joined at their bases, betwixt which the mouth of the animal, which is of a triangular form, is placed. The anus of the animal opens a little way from the extremity of the worm, upon the under surface, by a curved fissure.

The body has a rugose appearance, and there are four lines placed nearly at equal distances, which pass along the animal; two of these are much more apparent than the other, from being much broader.

By these lines, fibres, probably circular muscles, are intersected in such a manner that each consists of two semicircular portions.

Anatomical Structure of Ascaris lumbricoides, or Lumbricus of authors.

The animal has a strong, thin, elastic cuticle; the true skin is also elastic and transparent, and thicker than the former.

The muscles, which are seen through the skin, do not surround the worm, but are, according to Dr Hooper, two distinct sets of muscles which act in opposition to each other; and each of the two longitudinal lines which extend from the head to the tail of the worm, are composed of two distinct tendons, which serve for the attachment of the semilunar muscles, which cover the whole of the worm.

The cuticle, and true skin, are so transparent, that I have been able to distinguish the sex of the animal through these.

The abdomen, which is lined by a fine membrane, which may be called peritoneum, contains a transparent fluid, the intestinal tube, and an apparatus which is subservient to generation.

The œsophagus, at its beginning, is small; it continues increasing in size. In the abdomen, where it may be called Stomach or Intestinal Canal, it is capable of receiving a common-sized surgeon's probe; and, about a quarter of an inch from the anus, it becomes narrower and straighter.

The alimentary tube is filled by greenish matter.

Some have supposed this worm to be hermaphrodite; but the sexes generally appear distinct.

I have remarked, that the females are larger and more numerous than the males; and are generally in the proportion of four or five to one.

The parts of generation begin, or rather terminate, near the

middle of the worm, by a slender tube, which opens about the middle of the animal.

This tube soon becomes larger, it is then called Uterus; it divides into two canals, which are considerably larger than the uterus, then suddenly diminishes in size, and at last terminates in a number of small opaque threads, which float in the lowest part of the belly, and embrace the intestines.

These smallest floating tubes are never empty, but are filled with an opaque fluid, in which there are a number of globular bodies floating.

In the male, the small tubes lead to a larger tortuous canal, which may be called Vesicula Seminalis, which is rather more than an inch long, is unequal in its diameter, and follows somewhat of a tortuous course. To the extremity of this, a conical shaped body, which may be called Penis, is connected by its base.

Some authors have supposed that these worms are viviparous; which appearance is produced by a part of the appendages of the uterus having burst through the integuments of the animal.

Cloquet of Paris has lately published a learned dissertation on this worm.

TRICHOCEPHALUS HOMINIS, *or Whip-Worm. Plate IV.*

This species is rarer than any of the other intestinal worms.

This worm has been said to be found sometimes in the bodies of those who have died from fever.

Pascal * found several of these worms in the bodies of those who were affected by what he has called Mucous Phthisis. It was described and shown by my Father, in his lectures in 1794, as an intestinal worm.

The body is round and elastic, from one to two inches long, and it has a filiform tail, about one inch and a half in length.

The head is acute, and the mouth orbicular.

* Bulletin de la Faculté de Medecine de Paris.

This worm has been frequently found adhering to the smaller and also to the beginning of the larger intestine, and I happened to see it expelled along with the fæces. It coiled itself up, and died in a few minutes.

Different authors vary in their opinions respecting the anatomy of the worm. According to some, the animal has a proboscis, which it can eject at pleasure; according to GOETZE, that is the penis of the animal.

The stomach and intestines form a long canal, which proceeds from the head to the extremity of the worm, and is largest at its beginning; is much smaller at the tail of the animal.

The ovarium, which frequently contains ovula, and a limpid fluid, is a convoluted canal, and similar to that of the female Ascaris vermicularis.

Besides the species of worms already treated of, others of a very different description have been occasionally discharged by stool. I allude, in particular, to caterpillars, or the larvæ of insects *.

* I sent, for examination, several specimens of them to Dr LEACH, who favoured me with the subjoined report.

"They are all the larvæ of insects, as follows:

"No. 1, The ova of the Musca vomitoria.—My friend DONOVAN informed me, that he had seen the larva of this insect in the intestines of a body in Windmill Street) in a state of putrefaction. The eggs, most probably, were deposited at the mouth, or anus, and the larvæ had found their way thither on their hatching, which soon happens.

"Nos. 2, 3, and 4, larvæ of three unknown species of coleopterous insects. No 3. is figured in the Medical Journal, vol. viii. p. 48. fig. 8. I am pretty certain that it is what the farmer terms the Wire-Worm. Of what insect it is the larva will soon be made known, as Sir J. BANKS, at this time, is breeding a great many, in order to ascertain this important fact.

"Nos. 5 and 7, The larvæ of Papilio Brassicæ, or some species much allied to it.

"No. 6. Pupa of some musca.—Species unknown to me.

Of the Symptoms of Worms.

The symptoms occasioned by worms are frequently very various and sometimes ill defined. They occasion a derangement of the functions of the alimentary canal, and certain sympathetic affections.

Worms lodged within the alimentary canal always derange its functions more or less; hence those afflicted by them have a pale, sallow or leaden complexion, their features are collapsed, have an anxious expression of countenance, suffer from headach *, tinnitus, uneasy sensations in the stomach, loss of appetite, or sometimes a voracious appetite †, the belly is often swelled and hard, nausea, sometimes vomiting, flatulence, fœtid breath, tenesmus, griping, costiveness, sometimes purging, and discharge slimy or bloody stools; their urine deposits a copious sediment, they become much emaciated, generally sleep ill, and grind their teeth during sleep. The pulse is often irregular, and there is a slow remitting fever in many cases.

There are also many anomalous symptoms occasionally observed, as dry cough, difficulty in breathing, and pains in the chest. Some patients, after labouring under very acute pain in the belly, are attacked by an inflammation, which is followed by erosion of the coats of the intestines, and the lumbricus escapes into the cavity of the abdomen, or makes its way through its parietes.

Besides the above symptoms, sudden flushing of the face, itching, and sometimes a trickling of blood from the nose ‡, grinding of the teeth, and talking during sleep, and convulsive cough, are the occasional concomitants of worms §; and we

* Vide Sauvages, Class iii. Gen. 22.

† Vide Ephem. German. Dec. 11. An. 6. Obs. 33.

‡ Vide Baglivi, Praxis Med. Lib. i.

§ Vide Friend, Hist. Phys. vol. i.

sometimes also observe, lethargy, chorea *, catalepsy †, epilepsy, tetanus ‡, dilatation of the pupil, and other symptoms, which bear a strong resemblance to those of Hydrocephalus acutus.

There are also exceptions to the above observations.

There is every reason to suppose, that worms have existed for some time within the stomach or intestines, without giving rise to much uneasiness, and the first notice of the disease has been the passing of a worm by stool or by vomiting.

There are many authors who have enumerated certain symptoms as being peculiar to the tænia, ascaris and trichuris, &c.; but I suspect, with the exception of the Ascaris vermicularis (which creates uneasiness, violent heat, and itching at the nose and anus, alternate costiveness and diarrhœa, and tenesmus, slimy stools, and sometimes prolapsus ani,) we have not yet arrived at such a pitch of accuracy in the diagnosis. Lastly, nothing is known regarding the origin of worms.

SECTION II.

OF WORMS CALLED HYDATIDS,

WHICH ARE FOUND WITHIN THE ALIMENTARY CANAL, AND ALSO IN OTHER PARTS OF THE HUMAN BODY.

By the term Hydatid, is to be understood a round or oval-shaped semi-opaque pulpy bag, possessing a contractile power, without an external opening, of a pearly or yellowish colour, containing a watery fluid, and often a number of smaller hydatids, included within its proper capsule or cyst.

Cuvier and Rudolphi regard these cysts or hydatids, as the general envelope or habitation of a genus of animals, called by the latter Cystocercus, and containing several species.

* Vide Ephem. German. An. 5, Dec. 7, Append.

† Vide Barrere, Obs. Anat. p. 167.

‡ Vide Sauvages, Class xi. Gen. 24.

Hydatids are of very different sizes; some are not larger than a millet-seed, others are equal in bulk to an ox's bladder.

The coats of hydatids are generally thin and semitransparent, although sometimes so thick as to be perfectly opaque.

The habitat (to make use of the expression of modern naturalists) of hydatids is also different. They have been discharged by vomiting, and by stool *; frequently they are attached to the peritonæum, and especially to that part of it which covers the liver, or they are imbedded in that organ, or attached to the kidneys or to ovaria, or some part of the alimentary canal, or lodged within the brain.

Hydatids have also, though more rarely, been found in the cellular membrane, likewise between the muscles, and sometimes, though still more rarely, within the bones.

There formerly existed a great variety of opinion respecting the nature of hydatids.

Naturalists now seem to agree that they belong to the animal kingdom, and constitute a genus of animals, of which there are several species; but sufficient observations on recent or living hydatids, have not yet been made, to enable us to draw up generic or specific characters †.

Hydatids, like intestinal worms, are incapable of independent existence, and therefore exhibit a contractile power only when examined immediately upon being discharged from a living animal. The remaining for many hours within the dead body, generally deprives them of the principle of life; and hence all specimens of hydatids are not observed to contract, and such as retain the power of contraction for some time after being expelled, may be considered as unusually tenacious of life.

Purulent matter, which is sometimes lodged within the same viscus, also proves fatal to hydatids; and in this case, of course, they show no contractile power.

* Vide Philosoph. Trans. Vol. xxii.

† The generic name of *Hydria* has been proposed, but no character of the genus has been established. It seems not improbable, that the hydatids of the human body must form a separate genus, distinct from the hydatids of sheep.

The hydatids found in human bodies, are different from those of quadrupeds.

Of the human hydatids, there are the following kinds.

1*st*, Where there is only one large hydatid of a globular form, contained within a cyst *.

2*d*, Where there are several hydatids within the same cyst, of different sizes and colours, some being of a pearly, and others of a straw or amber colour †; and some of the larger of these are found to contain others.

A *third* kind of hydatid has been also described, but this is rare. The figure in Plate IV. of the hydatid, was taken of this kind: it is of the size of nature. There were sixty or seventy such hydatids floating in the abdomen of a person who died from ascites. In this variety, a number of hydatids have been inclosed one within another, like a nest of chip-boxes.

The *fourth* kind may be called the cellular hydatid, as it is peculiar to the cellular substance of the muscles. The cyst of this kind is of a considerable thickness, and consists of several distinct layers, which sometimes acquire a cartilaginous hardness.

There is a *fifth* kind of hydatids, which, from being compressed together, and forming a substance about the size of a garden pea, has been mistaken for indurated lymphatic glands. This kind has not, so far as I know, been described. The hydatids are firmly united to each other by a very adhesive mucus, and by a thin membrane, besides which, each of them is enveloped by its own proper capsule. These hydatids are very small, being about the size of the ovula in the ovaria of fishes.

* Vide Case VII., in which eight English pints of fluid were contained within a large hydatid; there were no small hydatids within it, and the whole of the inner surface of the hydatid was perfectly smooth.

† Vide Case IV. The cyst of the hydatid contained four pints of water, and a great many hydatids of different sizes, some about the size of a nutmeg, others as large as a billiard-ball, floated loose within the largest hydatid; and within several of the larger hydatids, there were clusters of small spherical bodies grouped together, which adhered to their inner sides.

This kind is often found in the choroid plexus of the lateral ventricles of the brain, in cases of apoplexy and hydrocephalus.

There is a *sixth*, though very rare sort of hydatid, which also, so far as I know, has not been described. In this, the hydatids are united laterally to each other. I have met with only two examples of this variety of hydatids, and in both they were connected with the liver. There were, at the same time, a greater number of hydatids of different sizes attached to the peritonæum, and floating about in the general cavity of the abdomen. One of the patients, a boy, was supposed to labour under ascites, his belly being enormously swollen, his breathing much oppressed, and he was not relieved by an erect posture. The superficial veins of the abdomen were greatly enlarged. During nine months before death, he had severe pain in the right hypochondrium, and a considerable partial tumour was observed in his belly, which increased with great rapidity for ten days before his death. Upon dissection, about 4 lb. of a fluid like tar ran out of the abdomen. A large hydatid was found adhering to the convex part of the liver; and six others were found adhering to this. The stomach was displaced, the pylorus being as low down as the brim of the pelvis, and the greater share of the intestinal canal lodged within its cavity.

The watery fluid * contained in hydatids, is generally transparent and colourless, is to the taste slightly salt, and in some instances, a part of it is coagulated by heat, or by the addition of acids, or ardent spirits.

In some cases, the contents of the cyst are tinged with yellow, which is probably owing to an admixture of bile, exuding after death; for the yellow colour is observed only in hydatids which are connected with the liver and gall-bladder.

There are also tumours, the contents of which seem to be

* According to Dr JOHN HUNTER, this fluid contains very small hydatids, of different sizes, the largest being $\frac{1}{100}$th part of an inch in diameter, and the smallest being less than a red globule of the blood. Vid. Trans. for the Improvement of Medical and Chirurgical Knowledge, vol. i. p. 38.

coagulable lymph, and a number of hydatids which have burst, the coats of these being shrunk and inverted.

There is a seventh kind of hydatids, with narrow necks, which are frequently attached to the placenta. I have also seen hydatids of the second species, connected with the placenta.

Some of the bowels, as the ovaria and kidneys, are said at times to have been converted into hydatids, but it would be more accurate to speak of the conversion of these bowels into watery vesicles (the genuine hydatid being rarely found within these bowels). These vesicles have only one coat, they are not inclosed within firm cysts, and do not produce their like, nor do they possess any degree of contractile power like the genuine hydatid.

Of the Sac of Hydatids.

The sac of the hydatid is formed of condensed cellular substance, and the thickness of the sac generally bears a ratio to its size and situation.

This sac is secured in its place by several bands of cellular substance, which pass between it and the bowel within which it is lodged, and in the abdomen it is covered by the peritonæum.

The thickness of the sac of a hydatid is proportioned to its size; although there is a considerable difference in this particular, the sac being thickest where it is most exposed: thus, when the greater part of the sac is surrounded by the substance of a bowel, as of the liver for instance, that part only of the sac which is exposed is of a considerable thickness, and is sometimes cartilaginous, or covered by layers of bone.

I have observed that the inner surface of the sac is by no means uniform, but always somewhat irregular, and lined by a very thin layer of fat.

A glairy gelatinous liquor is also interposed between the sac and the hydatid, which prevents the hydatids from being injured by friction.

The sac of a large hydatid is sometimes divided into compartments, which serve to prevent the smaller hydatids, contained within the opposite ends of the sac, from pressing upon each other.

Of the Coats of Hydatids.

The coats of hydatids are not of a uniform density, being much thicker in some than in others; and even in the same hydatid, we generally observe some portions of these coats of greater density than others; so that in the same hydatid, there is a difference as to transparency or opacity in the different parts of its coats.

Hydatids have two coats, an outer and an inner, and the outer coat is considerably thicker than the inner.

There are no fibres in the outer coat of a hydatid visible to the naked eye; yet the outer coat possesses the distinguishing character of a muscle, the power of contraction upon the application of a stimulus.

The inner coat of the hydatid is very thin, semitransparent, soft, pulpy, and very tender, and in very large hydatids possesses a small share of elasticity. The interior surface is lubricated by a fluid, which renders it slippery to the touch.

From the inner side of some of the larger hydatids, there are several excrescences, which are made up of a congeries of very small hydatids, and the size of these bears a ratio to the size of the hydatid. These excrescences are retained in their situation by a very thin transparent membrane, which covers them.

There is still another appearance which I have remarked, viz. a number of small cells formed by folds of the inner membrane of the large pregnant hydatid, containing the small ones.

It has not yet been determined what is the proportion of hydatids which may be called pregnant.

In some cases, the greater part of the inner coat is studded over with these small excrescences, but in other instances there

are only two or three such excrescences from the parent hydatid.

Upon examining the coats of very large hydatids, even without the aid of a magnifying glass, very small hydatids may be seen adhering to the coats of the hydatid, which would seem to show that hydatids are multiplied in the same manner as some of the fungi of the vegetable kingdom.

Bloodvessels, Absorbents, and Nerves of Hydatids.

The coats of hydatids are provided with very small bloodvessels, absorbents, and nerves.

The bloodvessels proper to the coats of the hydatid, have no immediate connection with those of the organ within which it is lodged: the hydatid, in this respect, resembles a worm lodged within the human body.

I have, in several instances, filled, with great success, the bloodvessels of the organ within which hydatids were lodged; also those upon the sac of the hydatid; which, where the hydatid is of considerable bulk, are of a larger size, and which, like those in the neighbourhood of other preternatural tumours, acquire an unusual size. None of the injection got into the vessels of the coats of the hydatid. But other authors have affirmed, that they had injected the vessels proper to the hydatid.

Watery vesicles, or Dropsical Cysts, as they have been named by some authors, are very different from hydatids, for in these we observe only a single thin coat, firmly attached to the neighbouring parts, upon which several bloodvessels, filled by red blood, may be observed.

Such cysts frequently adhere to the extremities of the Fallopian tubes, to the ligaments of the uterus, to the choroid plexus, to the placenta, kidneys, or are sometimes lodged within the glandular viscera, and are also sometimes imbedded in the mammæ and testicle. I have seen them filled by a fluid of the

colour of the ink of the cuttle-fish, when these organs have been reduced to a scirrhous state.

Though the arteries proper to the coats of hydatids be very small, yet the watery liquor which fills the hydatid is secreted by them, and in some cases even bone.

The hydatid is probably nourished by absorption, and not by continuous vessels from its cyst. It may be compared in structure to the Echinus esculentus of LINNÆUS; that is, absorbent vessels take up its nourishment from the containing cyst: and in like manner, the small hydatids contained within a larger hydatid, after being separated from it, or loosened from the ovarium, in which they were formed, suck up their nourishment from the liquor of the hydatid which contains them.

By what vessels the liquor, which has been absorbed, passes into the cavity of the hydatid, or forms young hydatids, we do not know; probably such vessels exist as in the echinus.

If hydatids contract, upon the application of a stimulus, it must be granted that these are under the influence of nerves, though these nerves be so small as not to be obvious to our imperfect senses.

Of the different states in which Hydatids are found.

The rudiment of the hydatid is connected to the coats of the pregnant hydatids, and appears with other small hydatids, in the form of small excrescences, which are attached to the large pregnant hydatids.

After a time, these small hydatids are detached from the parent hydatid.

Hydatids sometimes burst within their sacs.

We sometimes meet with tumours, which are made up entirely of pieces of coagulable lymph and hydatids, the water having been removed by absorption; hence the tumour does not communicate a sense of fluctuation, as when the hydatids were entire.

The external coat of hydatids has sometimes been converted into bone. I have several preparations, which afford a striking illustration of the manner in which bone is formed upon the coats and sac of hydatids. The ossification begins from a few central points upon the coats of the hydatid, and by subsequent depositions, the pieces of bone gradually become larger and larger, so that at length a considerable mass of bone is formed.

Of the manner in which the Cysts of Hydatids are formed.

The sac containing the hydatid seems to be formed in consequence of the irritation of the hydatid.

In the same manner, where a large quantity of purulent matter has been contained within the viscera, we generally observe a sac, provided with arteries, veins, nerves, and lymphatics, as is obvious from the very varied contents of these different sacs, and the spontaneous removal or absorption of their contents.

There are also similar instances in the vegetable kingdom, as in the production of galls on the oak, &c.

Of the Effects of Hydatids upon the Organs which contain them.

Hydatids which attain a considerable bulk, not only mechanically affect the organ within which they are lodged by their pressure, but, by the irritation which pressure gives, produce still farther changes upon it.

On account of the particular stimulus which hydatids as living animals give, the organ containing them, or to which they are attached, undergoes still farther changes, in consequence of an action excited; which perhaps may not improperly be termed *specific:* in proof of which, the organs within which hydatids are contained, or to which they are attached, are sooner, and to

a much greater degree affected, than by the ordinary fixed dropsical cysts, whether of the natural or preternatural kind.

Thus a large quantity of water accumulated in the ventricles of the brain in hydrocephalus internus, sometimes occasions, in an infant, a disunion of the bones of the cranium from each other, and the head attains an unnatural bulk.

No part of the cranium becomes soft, thin, or is absorbed; but if hydatids are lodged in one of the ventricles of the brain (which is not uncommon in sheep), the cranium over that ventricle becomes soft, and may be cut without turning the edge of the knife, and loses considerably of its thickness. In some cases, holes are formed in it, although the dura mater remains entire between the cranium and the brain, and even although the cyst containing the hydatids is still covered by a seemingly sound portion of the brain and pia mater.

The same happens in the human body; for, in the first case stated, where a hydatid of the size of a goose's egg was found in the right ventricle of the brain of a man, covered by a gelatinous matter, without any fibrous adhesion to the membrane lining the ventricle, the cranium was found to be much thinner on its right side than on the left, and in particular the right parietal bone was not thicker than a wafer.

In like manner, the pleura, peritonæum, and vaginal coat of the testis have been greatly extended for a length of time, but the containing membrane continued entire; whereas, when hydatids are collected within these membranes, a slight degree of inflammation is excited; this is followed by adhesions; the cyst containing the hydatids is destroyed, by which the hydatid escapes from its original situation. There is a much greater disposition to the destruction of the cysts, which contain the hydatid, and other containing parts, than when water is accumulated within the shut cavities.

Cases 2d, 3d, 4th, 5th, and 9th, are marked proofs of this fact, and also the case which occurred to Dr Home. The hydatids were, in that instance, probably generated within the liver, from which they extended to the abdomen, and also upwards towards the thorax; and, had the patient lived but for a

short time longer, they probably would have got into the lungs, as the diaphragm was extremely thin opposite to the sacs of the hydatids: the hydatids might also have got into the branches of the trachea, and been discharged by coughing *.

In the same manner, hydatids formed in the substance of the kidneys, have worked their way out of the pelvis of that organ, and have been discharged with the urine.

As hydatids seldom prove fatal when they have found an outlet, and as there is a disposition in nature to discharge hydatids from the body, an attempt should be made to assist or to second the efforts of nature by art.

In the first place, a tumour filled with hydatids, situated in the extremities, or on the external surface of the body, may be with safety removed. Hydatids lodged within the cavities of the body may also be extracted, providing the organ containing these has contracted an adhesion with the containing parts, as was done in Case 7th, with complete success.

PLATER † has related the case of a young woman who had a tumour in the right hypochondrium, which was very painful, especially when she lay on the left side: it at length burst, and a large quantity of a serous fluid was discharged, besides a number of hydatids, after which the patient obtained a complete cure.

GUATANNI's ‡ testimony is equally strong. He has related a case in which the parietes of the abdomen over a tumour in the region of the liver became very thin, and the tumour, in consequence of violent coughing, at length burst externally, and 300 entire hydatids, together with a quantity of a serous fluid, were discharged.

The opening remained fistulous for some time, but at length closed, and the patient recovered.

In the same manner, when hydatids have been accumulated within the uterus, these may be removed from it, as was done by Dr KILGOUR of Musselburgh, with perfect success.

* Vide Note at the end.

† Vid. Obs. Select. Mantissa, Obs. xviii. p. 44.

‡ Vid. GUATANNI, de Extern. Aneurysmat. p. 119.

A lady was supposed to be in labour, and the Doctor was sent for to deliver her. The pains were at first very slight. After some time, a bleeding came on, which led the Doctor to examine the parts. He found the os tincæ a little dilated, and discovered that the uterus was filled by hydatids. The bleeding continuing, he was induced to endeavour to remove the hydatids, which he accomplished, and brought away a basinful of these. The lady got well in a few days, and afterwards had four very healthy children. Thus the cause of the tumour is removed, which is not effected by opening a fixed dropsical cyst.

In many cases where there has existed a swelling of the belly, it has suddenly disappeared upon the discharge of hydatids, by vomiting and purging. After a time, should another such tumour begin to form, as in Cases 2d, 4th, and 6th, in these circumstances, though it is by no means certain that the sac and the containing parts adhere to each other, if the tumour be stationary, it may even, in some such cases, be advisable to puncture the sac with a large trocar, and empty it of some, or of the whole, of the hydatids; or, if this cannot be accomplished, to inject into it the smoke, or the infusion of tobacco, or a very weak solution of camphor, or to give mercury, or some other substance which may kill the hydatids, but which is not dangerous to the patient. Prudence, however, suggests the propriety of endeavouring to ascertain, by experiments upon animals, the effects of those liquors which are to be used as injections.

The effect of the smoke of tobacco, in Case 8th, in which hydatids were lodged in the lungs, is an inducement to the prosecution of such experiments; and there is even reason to suppose, that camphor, turpentine, and some other substances, which are very destructive to worms and insects, and which are readily and safely absorbed in such quantity as to communicate their taste and smell to the blood in the human body, might, in cases of hydatids, be of use when taken into the stomach, or even when applied to the skin of the patient.

Of the Concomitant Symptoms.

As the history of the symptoms occasioned by hydatids, can be collected only from a variety of cases, I have subjoined several of those which have fallen under the observation of my Father and of myself.

Case I.—A stout man, 20 years of age, complained of constant headach, chiefly on the right side, followed by a dilatation of the pupil, and epileptic fits, which proved fatal to him.

On dissection, the cranium was found to be much thinner on the right than on the left side, particularly the right parietal bone, which in many places was not thicker than a wafer. On opening the right ventricle of the brain, a cyst about the size of a goose's egg was found within it, filled with a watery liquor, and surrounded by a gelatinous matter, which did not adhere to the membrane lining the ventricle.

Dr Grieve Mackenzie, who had attended the patient, was so obliging as to send the cyst to my Father, which appeared to me of the same structure as that of pregnant hydatids.

Case II.—A stout man, 26 years of age, had a large swelling, in which fluctuation could be felt, connected with the concave part and under edge of his liver. As there had been no symptoms of inflammation or suppuration, my Father supposed the swelling to be owing to a cyst filled with hydatids within the liver. Mr Andrew Wood, who also visited the patient, was of the same opinion. Soon after this, the patient vomited a great number of hydatids, of different sizes. In the course of the four following years, the sac filled again, and discharged itself into the stomach repeatedly.

The liver was sensibly enlarged, and had descended about an inch lower than the edges of the ribs, and was somewhat more sensible to the touch than usual. The patient's liver gradually became smaller, and at length retreated within the margin of the chest.

The patient enjoyed perfect health for ten or twelve years afterwards.

Case III.—My Father was consulted by a woman, 40 years of age, who had a large swelling within the left side of her belly, which resembled a dropsy of the ovarium; but as she had suffered more pain in it than is common in that disease, he suspected that it might be owing to a cyst full of hydatids.

About a fortnight afterwards, the tumour subsided during the night time, and the patient told him that she had passed several watery stools with skins in them.

Case IV.—Mr D. C., about 30 years of age, consulted my Father, on account of a large tumour within the left side of the belly, in which there was the fluctuation of a liquor, and as there had been no symptoms of inflammation and suppuration, he supposed it to contain hydatids. Several months afterwards, in the year 1775, he was again called to the patient, along with his surgeon, the late Mr John Balfour.

A tumour, in a state of inflammation, was projected between the 12th rib and os ileum of the left side, and there was an opening of the skin, at the point of the tumour, through which it seemed probable that the contents of the tumour would soon be dis- charged. It was therefore agreed to enlarge the opening in the skin, and, upon introducing the finger into the wound, and pressing on the abdomen, the fluctuation of the liquor in the cyst was distinctly perceived. An incision was therefore made into it, and 4 lb. of hydatids were discharged.

The orifice closed in a few weeks, and the patient considered himself for several years as cured. But after a time, the patient said that he began to feel another tumour forming within his belly, in nearly the same place as the former; and a tumour actually formed, which gradually increased in size, but did not give much uneasiness, or prevent him from following business. The tumour still continued to grow larger, and in the year 1794, my Father was again desired to visit the patient along with his surgeon Mr Dewar.

An acute inflammation had taken place, in the same place as formerly, which was followed by suppuration. The tumour soon burst, and discharged several pounds of a turbid milky matter, in which there appeared to be portions of hydatids. Two days afterwards, feculent matter was discharged from a hole that had been eroded in the left side of the colon. This, notwithstanding the opening, healed in a kindly manner, and the patient enjoyed good health for several years afterwards. He died from a very different disease.

Case V.—The abdomen of a man, 28 years of age, swelled greatly, owing, as was supposed, to ascites. There was an unnatural opening at the umbilicus.

On enlarging, and perforating likewise, the containing parts with a large trocar, about 60 lb. of hydatids were discharged: and the late Dr Bate, physician in Montrose, informed my Father, by letter, that the swelling was gone, and the patient had recovered.

Case VI.—About thirty years ago, the late Mr William Anderson, surgeon in Edinburgh, carried my Father to visit a man, 40 years of age, who had a swelled liver, which was followed by ascites, jaundice, and the discharge of hydatids by stool, and who died in the course of six weeks. My Father expected to find a sac with hydatids attached to the stomach or intestine, and communicating with them; but instead of this, the outer part of the sac containing the hydatids was found entire, and did not adhere to the alimentary canal. On opening the cyst, the concave part of the liver was found wasted to a considerable depth, and at the bottom of the cyst the branches of the biliary ducts were seen without dissection, bare, and greatly enlarged, with a number of holes in their sides, through which the hydatids had passed into the duodenum.

The great enlargement of the biliary ducts was probably produced by the irritation of the hydatids, and by the mechanical obstruction caused by the pressure of the hydatids upon the lower ends of the biliary ducts, to which the pressure of an en-

larged lymphatic gland, which lay over the common duct, had probably contributed.

Case VII.—In the year 1783, my Father was consulted by Mr ——, 12 years of age, who had a swelling in the upper and right side of his belly. The swelling gradually increased very considerably. In the under part of the swelling, the liver was found in a sound state. At last the fluctuation of a liquor above the solid part of the tumour became very obvious.

As the patient had not lost his appetite for food, had no frequency or fulness of pulse, no bilious disorder, no symptoms of inflammation, suppuration, or of scirrhus in the liver, my Father imputed the fluctuation which he perceived, on applying one hand to the upper part of the tumour, and striking it with the other, to hydatids, contained in a sac above the liver, between it and the diaphragm; and the gradual descent of the body of the liver, to the increase of the sac containing the hydatids. As the tumour continued to increase in size, my Father proposed to the late Mr William Inglis and Mr F. Dewar, surgeons, who were now called in, *to make an incision into the sac*, which was agreed to, and performed with much caution.

The peritoneum lining the containing parts was found to adhere to the cyst, which, from the long continuance of the swelling, was formerly suspected.

Upon dividing the external coats, a thick but soft semi-opake membrane presented itself, and on cutting this, 8 lb. of a clear liquor were discharged, but no small hydatids. On examining the soft membrane within which the liquor had been contained, it proved to be of the same structure as other hydatids, and the coats were somewhat thicker than any of these, owing probably to its greater size.

My Father now laid hold of the large hydatid with his fingers, and by pulling it gently, he detached the whole of it from the tough, external coat, formed by the peritoneum, which inclosed it.

After the operation, the wound was carefully covered by pledgets, and thick compresses, over which a broad flannel rol-

ler was applied, in order to exclude the air, and to keep the opposite sides of the cyst contiguous.

In a few days the patient became feverish, he suffered much from thirst, his pulse was quicker than common, and there was a discharge of purulent matter from the sore, a sufficient proof of previous inflammation in the sides of the cavity.

The cure was completed within ten weeks. I have seen the patient frequently since the operation. He has had no return of the complaint. He is now forty-nine years of age, and enjoys perfect health, and is one of the stoutest men in Edinburgh.

It may be worth while to observe, that in this Case, and in Case IV. no bloodvessels were visible on the proper coats of the hydatids, nor in two other such cases, in which the bloodvessels of the cysts which contained the hydatids, were of large size, and had been filled with a coloured size injection. In all these four cases, no part of the liquor which the hydatids contained *coagulated*, when ardent spirits were mixed with it, or by boiling it: from which it appears, that the liquor contained within the hydatid is materially different from that of a common dropsy of the belly, or that of the ovarium.

Case VIII.—I had occasion to visit a man, 32 years of age, along with my Father, in 1801, on account of a pain in the right side of his breast, behind the mamma, which was not removed by bleeding, nor by the application of a blister. He had no oppression or difficulty in breathing, and could sleep on either side, or on his back, and his pulse was not at all affected. He was relieved by coughing up portions of hydatids, and also entire hydatids, some of which were of the size of a hazel-nut, and others as large as a walnut, and he sometimes coughed up these in such quantity as would have filled a pint bottle. The larger hydatids contained a clear viscid liquor, and the smaller ones a yellow liquor, which he said had a bitter taste. A few days before coughing up the hydatids, the patient suffered very acute pain in the breast, which he compared to that of a pointed instrument entering his breast; and for two or three minutes before the hydatids were discharged, he was seized with violent

coughing, and a sense of suffocation, which continued for two or three minutes *.

For eight months afterwards, he occasionally coughed up hydatids.

The disease began when he was fourteen years old.

We recommended to him to smoke tobacco, and to draw the smoke as deep as he could into his chest. He did so; and, during the following eight years, had no return of his disorder †.

Hydatids have frequently been accumulated, in considerable quantity, within the cavity of the abdomen, and have proved an impediment to the passage of the fæces, or even to delivery.

Case IX.—In this case a man of middle age had been afflicted by a dropsy of the belly, and jaundice for some time, when three or four tumours, of different sizes, appeared in different parts of the parietes of the abdomen.

These, when pressed, evidently contained a fluid.

The patient lived only for a few months.

Upon dissection, the above mentioned swellings were found to be hydatids adhering to the peritoneum lining the belly. There were at least an hundred hydatids, of different sizes, within the cavity of the abdomen, some of which adhered to the liver; the others were floating loose in the large quantity of water which filled the belly.

Case X.—This case was treated by my learned friend Dr Home, in the Royal Infirmary, 5th November 1807. Two large distinct moveable tumours were perceived, considerably elevated above the surface of the abdomen of a woman. One occupied part of the umbilical region, and rose a little above the umbilicus, was circumscribed, hard, unequal, and somewhat moveable. The other was seated in the epigastrium, towards

* Mr Brodie of London, (Medical Gazette, vol. i. p. 334.) has described two cases in which cysts apparently connected with the liver considerably elevated the inferior ribs. The cure was accomplished by a puncture with a flat trocar, introduced below the margin of the ribs.

† Martinet of Paris has also published a case of hydatids of the liver, cured by operation.—Vide Med. Chir. Review for 1828, p. 459.

the left side; was uniformly rounded, immoveable, firm, and elastic. The veins of the integuments covering it were tortuous and enlarged. There was also felt a general hardness along the right side of the belly. General health and spirits little impaired, though she had become considerably emaciated of late. Pulse 90; heat and respiration natural; mouth dry; tongue clean; appetite and digestion good. Urine at times rather scanty; very dark coloured, and tinged linen of a deep yellow.

Six years and a half previously, had a tumour of the size of a tea-cup, which was for about a year and a half stationary; had had pain of the right hypochondrium, shooting to the right shoulder, and more lately œdema of the legs. General swelling of belly had come on gradually. She lingered for six weeks under Dr Home's charge.

"*Dissection.*—The integuments of the abdomen were found to be very thin over the large tumour in the epigastric region, which was filled by a large quantity of yellowish limpid fluid. The sac containing this fluid being laid open from end to end, was found to consist of two coats, the external of a dense and firm texture, the internal thick but very tender, of a light yellow colour, very elastic, and adhering loosely to the external cyst.

"From the inner surface of this internal membrane, there were numerous distinct masses, of a cauliflower appearance, varying much in size, of a beautiful whiteness on the surface, and were yellow and gelatinous internally.

"The fluid in this sac appeared to contain numerous very minute hydatids. This tumour was situated within the sac of the peritoneum, and adhering pretty generally to that membrane.

"The tumour was entirely connected on one side with the left lobe of the liver. The tumour which was during life felt at the umbilicus, was found to consist of two lobes, a larger and a smaller, of the same appearance as the former tumour, to which it was connected by a production of the left lobe of the liver, but no communication subsisted between the cavity of the

first sac, and this tumour, when cut into. This sac was found to contain numerous hydatids."

The greater part of the left lobe was converted into an enormous sac, similar externally to the former, occupying the thorax, adhering to, and pushing up as far as the third rib, especially on the left side of the diaphragm, which was very thin, and with difficulty separated from it. In a case described by Dr Foart Simmons *, there was an aperture in the diaphragm, through which hydatids passed from the abdomen into the thorax; and, in a case by Collet, hydatids originally formed within the liver were discharged by coughing. This sac was found, when opened, to be lined with a delicate membrane, similar to that of the *first sac*, but exhibiting no cauliflower protuberances. Within it was contained a large quantity of serous-like fluid, and an immense number of hydatids of various magnitudes and colours.

"The gall-bladder and gall-ducts were very much enlarged.

"The other abdominal viscera were much deranged in situation, but quite natural in structure, excepting the left kidney, which was much enlarged, and very flaccid."

The following case, which I had occasion to meet with, affords additional evidence of absorption and ulceration of the sac containing hydatids.

Case XI.—Patient a male, æt. 45. *Symptoms.*—Abdomen fluctuating, tense, and painful, especially in region of umbilicus. Soft tumour of the size of a hen's egg, at lower part of sternum, in the direction of linea alba, receding on pressure, and causing no uneasiness; constipation; œdema of inferior extremities; diarrhœa with tormina; quantity of urine small. The tumour in abdomen gradually increased, the surface of which ulcerated, and its contents were discharged externally. It contained nearly a gallon of purulent matter, with innumerable hydatids, varying from half an inch to an inch in diameter, and large *frusta* of the delicate membrane usually found in such

* Lond. Med. Communic. vol. i.

tumours. The discharge continued upon coughing, or any exertion; no appetite; frequent singultus; puriform discharge, with hydatids, from tumour. Patient died exhausted.

Dissection.—Peritoneum of parietes of abdomen thickened; inner surface rough, and covered by shreds and flakes of soft blackish matter. Smaller intestines adhered to each other, and were covered by a thin transparent membrane, resembling the mesentery, which was intimately agglutinated to them. In the cavity thus formed by this membrane and the abdominal peritoneum, there was one pound of thick dark-coloured fluid; and between the rectum and bladder several concretions apparently of an osseous character. Liver much diminished in size; and, on the convex surface of right lobe, there was a large round sac covered by the peritoneal coat of the viscus, containing a limpid fluid, and numerous large spherical hydatids, some transparent, some opaque, and some collapsed.

Case XII.—This case occurred to my late much esteemed friend and venerable colleague Dr Duncan, whose account of it is subjoined, with the history of the appearances, after death, by myself, which fully explained the most remarkable circumstance in the history of the case,—the disappearance of the tumour in the right hypochondrium in the horizontal position.

"*March* 18. 1807.—John Brown, aged 38. The whole abdomen is very much enlarged, and affords to the touch a distinct sense of fluctuation. When in the erect posture, there is observed, about the upper part of the hypochondriac, and extending over the greater part of the epigastric region, a large circumscribed tumour, possessing evident fluctuation, which subsides immediately on his assuming the horizontal posture, when an uniform tense swelling occupies the whole abdomen. Pressure applied under the margin of the false ribs, on the right side, excites so considerable a degree of pain as to cause him to wince under it.

"The skin over the whole body, and the tunica adnata of both eyes, are of a deep yellow colour. The urine of a very

dark yellow appearance, and linen, when immersed in it, is very deeply tinged. The alvine excretion is said to be of a white colour, and rather thick consistence.

" Appetite impaired, occasional sickness and inclination to vomit, cough, expectoration, great dyspnœa, which is always most severe in the morning, and is induced on stooping forward, or making any exertion.

" Pulse 100, tongue white, great thirst, heat moderate, urine very scanty, belly costive.

" *Dissection.*—The dropsical water in the abdomen was as dark coloured as the urine of the patient was on his admission, and gave a deep yellow tint to a cloth immersed in it. The impregnation from bile had, indeed, gone farther than in any case I recollect to have seen; for the cartilages of the ribs were coloured by it to the centre.

" The surface of the liver had somewhat of a mottled green colour, very like to many marbles, and more especially to the Portsoy serpentine. The substance of the liver had also the same appearance, with the exception of the centre of the right lobe, which was rather of an olive or dirty yellow colour.

" The liver was of an uncommon size, and the convex surface was more prominent than usual towards the middle. This was not owing to any disease in the glandular part of the organ, but to a sac of a yellow colour, and of the size of a large orange, though of an oval shape, and irregular in its surface, situated in the region of the portæ of the liver.

" Over this sac, which was filled with hydatids, the vena portarum, the hepatic artery, and its great branches, as also the hepatic nerves, which were much larger and much harder than common, passed; and the branches of the hepatic nerves could be distinctly traced along the gall-ducts.

" The hypatic, cystic, and common ducts were so much stretched in their course along the surface of the large sac, as scarcely to admit of air to pass through them. The ductus communis was much enlarged in the portion not compressed next the liver.

" The gall-bladder contained but a small quantity of bile; and, from being contracted in several places, had an irregular figure, and scarcely exceeded, in size, that of a child's at birth.

" The adjacent parts betrayed marks of previous inflammation. The stomach and great arch of the colon were more intimately united than usual by the omentum, and there was also a strong adhesion between the liver and the kidneys.

" All the parts adjacent to the liver, more especially the kidneys, were tinged of a deep yellow colour."

Case XIII.—In this case there was a large collection of hydatids in the abdomen, which were removed by operation, and the patient obtained a complete cure.

Patient a male, æt. 44.—A tense, elastic, colourless, and somewhat painful tumour, extending from os pubis to a little above the umbilicus. Unusual fulness in direction of right colon, relieved by discharge of flatus; emaciation, with œdema of lower extremities; pulse feeble; tongue foul; no appetite; torpor of bowels; urine diminished in quantity; no unusual thirst; restlessness.

Tumour in abdomen appeared seven weeks ago, and has gradually increased since; friction giving temporary relief. Occasional tormina of bowels; sense of diminution of tumour after evacuation of fæces and flatus; distinct fluctuation in tumour; quantity of urine *now* natural. About a month and a half after admission, an incision was made through integuments of abdomen in the direction of left linea semilunaris. Upon the introduction of a trochar, a quantity of yellowish fluid was discharged; and the wound being dilated, several hundred hydatids, of various sizes, escaped along with a quantity of the yellow fluid. This operation, which was performed by the late Dr Hay, was followed by complete relief.

CONCLUSION.

The preceding history of hydatids, and of their effects upon the organs within which they are lodged, seems to me to have established the following propositions.

1*st*, That hydatids are not peculiar to any one part of the human body, but are most commonly connected with the investing membranes of the liver, ovaria, or kidney; and they often escape from the first of these bowels into the stomach, intestines, cavity of the abdomen, or they are discharged externally.

2*d*, That there is no resemblance between the hydatids which are peculiar to quadrupeds and those of the human body, which is obvious by instituting a comparison of the preceding description of the hydatid of the human body with those of quadrupeds, which have been published by HARTMANNUS*, TYSON †, PALLAS ‡, SCHROEDER ||, FONTAN §, and Sir E. HOME ¶.

3*d*, That, as the smaller hydatids adhere to the inner surface of the larger, the larger hydatids may be called pregnant; or that these animals are multiplied like some vegetables, by the adhesion of the smaller hydatids to the coats of the larger hydatids.

4*th*, That the coats of the bowels containing the hydatids are much more frequently destroyed than when water only has been collected within these; hence the hydatids escape from their original situation, and sometimes find their way, by unnatural passages, into the intestines, urinary or biliary canals, into the windpipe, &c. or are discharged externally. The above observation, which occurs in the first edition of this book, has been confirmed by subsequent observations, and especially by those of MERAT, in the *Dict. des Scien. Medic.* t. xvi. p. 139; and it appears from what has been stated in the *Memoirs of the Royal Academy of Sciences*, for 1777, p. 212, that the sac containing the hydatids sometimes bursts within the body, which is indicated by the patient feeling a something give way, and by chronic inflammation of the peritoneum.

5*th*, That many patients recover upon the discharge of the hydatids.

6*th*, That hydatids may, when floating within the cavity of the abdomen, be discharged through an artificial opening made

* Vid. Mis. Nat. Cur. Dec. 2. An. 4to.
‡ Vid. Phil. Trans. for 1691.
|| Vid. SCHROEDER de Hydatid.
† Vid. Phil. Trans. for 1795.
§ Vid. Misc. Zoolog.
¶ Vid. Opus Scelti, tom. 6.

in the parietes (as in Case 13th), and that, even when adhering to one of the bowels of the abdomen, they may be removed with safety by incision, providing there exists an adhesion between that viscus and the parietes of the abdomen, as in Case 7th.

Of the Distoma hepaticum, or Fasciola hepatica.

This worm is found in the liver and gall-bladder of man, but chiefly in some of the lower mammalia. It has been long known, and was classed by LINNÆUS in the genus *Fasciola*, and by GOEZIUS in the genus *Planaria*.

Of the eighty-one species of the Distoma described by RUDOLPHI, the hepaticum is the first. BREMSER asserts that there are above 140 species of distoma.

Its common name in this country is the *Liver-fluke*. Its shape is somewhat oval; its surface is smooth, and its neck is somewhat conical, and very short. The pores are rounded, and the ventral is the larger of the two. The Distoma hepaticum varies considerably as to size,—from one line in length, and one-third of a line in breadth, to an inch in length, and six lines in breadth. Its colour is either a dirty white, or a light yellow, or approaching to green, or brownish.

Those which are found in the human body are of a very small size, varying from one to four lines in length, and from half a line to a line in breadth.

The anterior pore or sucker is round, with a conical neck; is generally directed obliquely downwards; is less than the one situated in the ventral aspect, and is of a dirty white colour.

The posterior or ventral sucker is a little projecting; is situated in the broadest part of the belly, and is larger than the one already described; its direction is not uniform.

Both extremities are obtuse.

RUDOLPHI states that there is a considerable projection (cirrus) between these two pores.

The alimentary canal arises from the anterior pore, and soon divides into innumerable small branches, which seem to anastomose freely with each other at the sides of the worm. They contain a substance of a dirty yellow or orange colour, which

may be either spontaneously ejected, or mechanically pressed out, at the anterior pore.

The ova are elliptical: those which are mature are placed behind the ventral sucker, "cirro edenda." The others are dispersed every where throughout the body.

Bremser conjectures the tubes seen in the middle of the body to be the oviducts; and that those which are situated at the sides of the worm compose the alimentary canal.

Some authors have asserted, that they are met with in the ramifications of the vena portarum. Aware of this opinion, I have examined the liver of the sheep, with a view of ascertaining the habitat of these animals, and have never found them in the bloodvessels, but have always observed them to lodge in the biliary ducts. From the biliary ducts they frequently find their way into the duodenum, and are discharged per anum. They not unfrequently attack sheep and cattle *epidemically*.

The Distoma hepaticum is but rarely met with in man. I have never seen it in any human liver or gall-bladder, nor preserved in any museum.

In the sheep it is very common.

Of a New Species of Oxyuris.

Mr Rhind has described, in his valuable Treatise on Worms*, a new species of the oxyuris, and termed it the Oxyuris angulata. It is about two inches in length. The body is bent in the form of a very obtuse angle. Its head is furnished with a proboscis, in the centre of which is a small mouth. The tail is six-eighths of an inch in length, of a tapering form, and about one-third of the thickness of the body of the worm.

Of Imperfect Worms.

The Tænia solium is generally passed in detached portions, varying from six to eight inches in length, especially if no powerful anthelmintic has been exhibited. Sometimes, however, *separate articuli* are passed. Couletus called them a species of Ascaris. Others considered them to be peculiar worms, by

* Edin. 1829.

the union of which the tænia was formed, and called them *Cucurbitini*. It is more probable, however, that, instead of their forming the tænia, it is the *disorganisation*, as it were, of the tænia that gives rise to them; as they appear to be merely *detached articulations of the Tænia solium*. Very often they do not *exactly* resemble the articuli observed in the entire worm; thus one of the lateral oscula may be closed up, or one side may be much more prominent than the other, &c. May this be explained, by supposing that a *new specific action* must have taken place *before* the detachment of any considerable portion of the animal?

As neither BREMSER nor RUDOLPHI have given any plate of these separate articuli, I have subjoined an accurate representation of several which were passed by a female. It is very remarkable, that each of these portions seemed to enjoy a complete and separate existence. They coiled themselves up on being touched, and even ascended some way on the sides of the vessel in which they were contained. I have added a more particular description of them, which was furnished to me by that excellent naturalist the Reverend Dr FLEMING.

"The white flat bodies, transmitted for examination, selected, as you state, from about two hundred, varied in length from three to seven-tenths of an inch, and were in breadth about two-tenths. They were transversely wrinkled, with one extremity thin, narrow, and a little rounded; the other thicker and broader, with its margin even, concave, or sub-bifurcated. A tubercle, with a depression in the middle, occurred on the margin of one side. All the characters, indeed, which these bodies exhibited, intimated, in a decided manner, that they were detached joints of that formidable inmate of the human body, the *Tænia solium*. The narrow, or anteal extremity of some of the specimens, when examined by the microscope, exhibited evident marks of laceration. In one example, there was an adhering fragment of a second joint, bearing a great resemblance to the lower segment in the middle of the figure in the sixth plate of BREMSER's Atlas. In one of the joints I observed many eggs, similar to those which RUDOLPHI has figured (magnified) in the ninth figure of the third plate of his Synopsis Entozoorum, as belonging to Tænia

crateriformis. The circumstance of these joints separating, and being voided in their detached state, is not peculiar to the Tænia solium. Three months ago, I witnessed the album græcum of a dog covered with the separated living joints of the *Tænia cucumerina*."

The worms above described are different from any which are found in the earth and waters, and live only within the human body. I have seen such worms passed alive, but they died in six or eight minutes, after having made several convulsive contortions.

Hydatids are found not only within the intestines, but also in other parts of the body; but there are certain worms which are found only in certain situations, as the *Filaria papillosa* in the aqueous humour of the eye of the horse in Asia, the *Dracunculus*, or *Filaria medinensis*, in the cellular substance under the human skin, and the *Fasciola hepatica* in the gall-ducts; in these situations they live and grow, but they speedily die when removed. The joints of the tænia do not seem, from what has been above stated, to be capable of an independent existence.

Climate also seems to give a predisposition to certain kinds of worms; thus the Tænia solium is not unfrequent in Germany, France, Italy, and Britain, whereas the Tænia lata is more common in Russia, Poland, and Sweden. The Guinea worm never occurs in this country; I have seen it, but it was imported; and the worm proper to the aqueous humour of the horse has never been observed in Britain. Among the predisposition to worms may also be mentioned the period of infancy, and a damaged state of the functions of the alimentary canal.

The Tæniæ Lumbrici and Ascarides not only give occasion to the symptoms which have been above enumerated, but also occasionally to different nervous disorders, as chorea, epilepsy: lumbrici sometimes have proved fatal, by perforating the coats of the intestine.

Tubercles in their commencement have been said to be hydatids. This opinion seems to gain weight from figure 2d of

Plate I. appended to my book on the Morbid Anatomy of the Brain.

I have no doubt that the coats of hydatids, like those of serous cysts, are converted into bone; and there are two remarkable specimens in the Anatomical Museum of the University of Edinburgh, which afford striking illustrations of this observation; the one is taken from the brain, the other was connected with the kidney.

The former preparation is thus described in the Catalogue of the Museum, p. 149:—

"Dura mater, slightly thickened, adheres, by means of a vascular membrane, to a tumour covering upper and lateral surfaces of anterior and middle lobes of left hemisphere of brain. Falx cerebri elevated towards left side. Tumour, formed by an osseous sac, of an oval form, seven inches in length, from before backwards, nearly three in breadth, thin at margins, an inch in thickness at centre. Outer surface convex, composed of a thin plate of bone, and covered by a fibrous membrane. Inner surface in contact with pia mater, concave, and in some parts cartilaginous; but chiefly formed of thin osseous scales, invested by a thick, fibrous membrane, in several places extremely vascular. Cavity of osseous sac, which contained several ounces of serum mixed with portions of cholesterine, is lined by a smooth, delicate membrane, studded with white, irregular, resplendent spots. Pia mater and structure of brain of their natural appearance. Patient, a boy, subject to epileptic fits. Fell from a window and fractured his skull three days before death."

The latter preparation is thus described in the Catalogue of the Museum, page 206:—

"Large cyst, nearly of the form, and which occupied situation, of right kidney. Cyst osseous, in some places cartilaginous, imperfectly subdivided by septa of a similar structure, and lined by a fine smooth membrane. It contained about ℥xviii. of a serous fluid, mixed with a large quantity of *cholesterine*, several masses of which were of the size of beans. Ureter obliterated. Renal artery extremely contracted. Vena cava inferior firmly attached to the cyst, which intimately adhe-

red to concave surface of liver, through the medium of ligamentous laminæ investing the cyst. Liver granular; considerable effusion of pus over inflamed peritoneal coat. Left kidney was soft, white, and much enlarged; its infundibula contained several small particles of *cholesterine;* left ureter much enlarged. Margins of lungs slightly emphysematous. Hypertrophy of left ventricle. Patient a weaver, æt. 38. Symptoms:—General uneasiness; swelling and tension of abdomen; œdema of lower extremities, extending to scrotum; constipation; dyspnœa in recumbent posture; slight dry cough; urine scanty and albuminous. Symptoms of four months' duration. Had a similar attack sixteen years before."

But I cannot subscribe to the above opinion as to the origin of tubercles. It is adverse to my observations upon tubercles, which I have examined in all their grades, and of different sizes, on many occasions, and when attached to different serous membranes. They have appeared to my unassisted as well as to my assisted eye to be solid, and to be the products of inflammation.

If the tubercles be seated in the lungs, or connected with the peritoneum, or bowels of the abdomen, there is generally, as in other cases, an effusion to turbid serum in these cavities, and shreds of coagulable lymph shooting through it in various directions; and, when tubercles are found in the lungs, some part of them is frequently found more or less condensed. Besides the symptoms which precede death, are those originating from an inflammatory action, as quick or hard pulse, acute pain in the affected part; and, in the case of the abdomen, tenderness, increased by pressure.

In support of the above opinion, it may be observed that the application of a stimulus gives rise to tubercles. My learned colleague Dr Alison, sent to the Museum two specimens of the lungs of rabbits, in which tubercles had been produced by a small quantity of mercury injected into the windpipe. The animals were killed eight days afterwards. Each tubercle contains a minute globule of mercury.

Hydatids are frequently lodged within the lungs, liver, spleen,

kidneys, ovaria, mammæ, and testes, when these parts are in a morbid state.

It may be doubted whether the hydatids be the cause or the effect of the disease.

Hydatids have also been found in parts of a scirrhous structure; and they have been stated by writers on midwifery frequently to give rise to abortion, and to the destruction of the ovum; or the hydatids are said to be formed after the destruction of the ovum, or of the retention of a part of the placenta, or in consequence of coagula remaining in utero. The symptoms of hydatids in utero bear a strong resemblance to those of pregnancy.

The number of the hydatids in a blighted ovum varies very much; in some, the whole, or a greater part, of the mass is converted into hydatids.

It is not improper to add that Mr THUILLER has described a case, in which hydatids were discharged from the middle until towards the end of pregnancy *.

The liver-fluke of sheep proves the cause of disease of the liver, and also of a very great enlargement of the biliary ducts. I have seen the hepatic duct enlarged to twice the size of the vena portarum, when these worms were lodged within it.

BREMSER has enumerated seven doubtful species of human intestinal worms.

1. Ditrachyceros rudis.
2. Ascaris Stephanostoma.

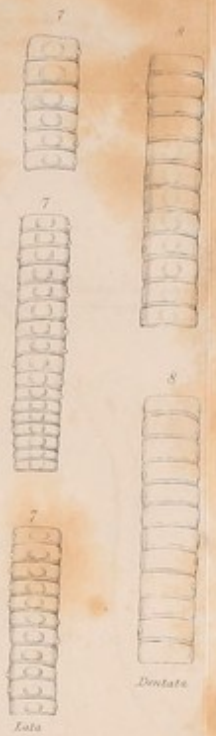
* Upon this department of the subject, the following authors may be consulted with advantage:—

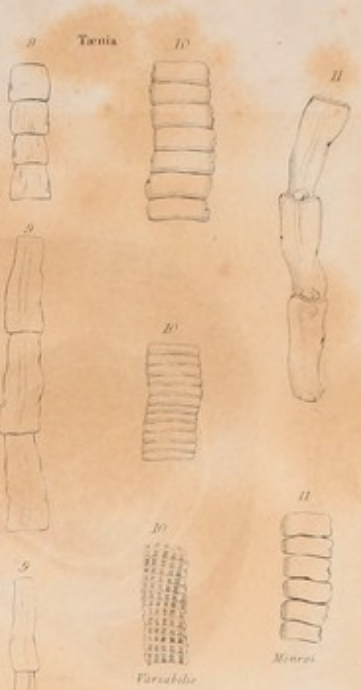
WATSON, Phil. Trans. vol. xli. p. 711.
Dr DENMAN's Engravings.
STALPART, Vander Wiel. tom. i. p. 301.
MILLS, Med. and Phys. Journal, vol. ii. p. 447.
MAURICEAU, Obs. 367.
ALBINI, Annot. Acad. lib. i.
WRISBERG, Nov. Com. Gotting. tom. iv.
BAILLIE's Morbid Anatomy.
Sir A. COOPER's Illustrations of the Diseases of the Breast.

PLATE IV.

Fibrina of the Blood passed by a Dysentery Patient.

15


7 8 7 8 Dentata. Lata


9 Tænia 10 11 12 9 10 11 12 Vesiculosa Variabilis Monros

9 10 11 12 Vesiculosa

9 Solium

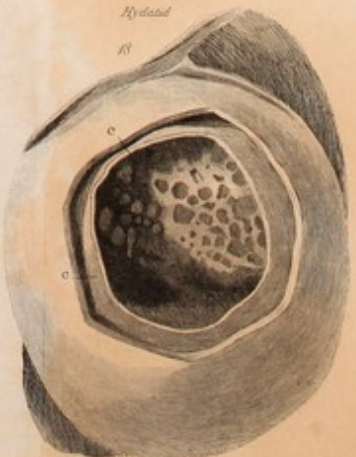
1 Trachocephalus

4 14 5 4 Gastrostoma lata Ascaris lumbricoides Ascaris lanceolata

2 Ascaris Vermicularis of authors 6 Head of Fig 6 3 Ascaris brevis 6

16 Hydatid like a nest of Pill Boxes

17 Hydatid


18 c c

13 18 Tænia lineata

3. Ascaris Conosoma.
4. Cercosoma.
5. Hexathrydium venarum.
6. Hydrometra hydatica.
7. Diacanthos polycephalus.

Before concluding this branch of the subject, it seems necessary to add, that substances, like bloodvessels with their branches, have been frequently passed by stool, and have been frequently mistaken for worms.

EXPLANATION OF PLATE IV.

In this large Engraving, representations are given of the greater number of worms described in the preceding pages, and the names of the worms have been put upon the engraving.

There is only one of the figures which seems to require a more particular explanation,—that shewing the mode of multiplication of hydatids, which takes place by the accretion of very small hydatids to very minute cells within the larger hydatid.

The parent hydatid is lodged within the distinct cyst A, the internal surface of which is directly applied to the outer surface of the hydatid; but there is no direct connection between these by the medium of bloodvessels and nerves.

The outer surface, B, of the hydatid is smooth.

The hydatid has two coats of unequal thickness, the innermost being much thinner than the outermost, which latter possesses a considerable share of elasticity, and curls up when torn.

The innermost coat is a very delicate membrane, and is gathered up so as to form a number of small cells, C, C, in which the smaller hydatids, which are collected into small clusters, D, are for a time lodged, but afterwards are detached from the parent hydatid.

The figure above shews that each of the hydatids, after it has attained a certain size, becomes in its turn a parent hydatid.

These figures of hydatids were taken from drawings, made for me in the year 1800, by Mr Clift, Conservator of the Museum of the Royal College of Surgeons of London.

CLASS IV.

ORGANIC DERANGEMENTS PROPER TO THE COATS OF THE ALIMENTARY CANAL.

The coats of the alimentary canal are different as to structure, and therefore liable to different organic derangements. Organic derangements occasionally are propagated from their original seat to the other coats; and it is of much moment, in various points of view, to endeavour to trace their origin and influence during their progress upon the neighbouring tissues and general system.

Pathologists have not yet investigated the organic disorders proper to the coats of the alimentary canal, in all their details and relations; nor have they marked with sufficient precision the distinctions between those organic derangements which are common to all the coats of the alimentary canal, and those which are originally proper to each, and in which all are sometimes, in the progress of the disease, involved.

To detect the origin, and to trace the progress and manner in which organic diseases are propagated, is a very difficult, though very important, task, and requires much patient research, and also experience of many cases of the same description.

On many occasions, morbid anatomy supplies only the means of examining diseased structure in its advanced stages; and hence the difficulty of tracing the progress of disease from the examination of a few cases.

Those authors who have had but a limited sphere of observation, have rather retarded than accelerated the progress of morbid anatomy, by publishing imperfect descriptions of the effects of organic disease; and, by giving a partial view, have in many

cases contradicted each other, each having presented to his reader a different portrait of the same organic derangement.

Distrusting the results of partial observation, I have endeavoured, by a careful examination, and comparison of various specimens of organic derangements, preserved in the large museum of morbid anatomy, which was formed by the industry of my Father, and has of late been very much extended, to correct (as Sir JOSHUA REYNOLDS has recommended) "what is erroneous, to supply what is scanty, and to add, by my own observation, what the industry of my predecessors had yet left wanting to perfection."

There have been two very different plans followed by authors in treating this subject. By the one, all the organic diseases of the pharynx and gullet are described under one head; those of the stomach under another; and those of the intestines under a third. But such a plan seems to me liable to many well-founded objections.

By the other plan, the organic derangements of the *muscular* coat of the pharynx, gullet, stomach, and intestines, are described in one chapter; those of the *cellular* coat in a second; those of the *mucous* coats in a third; and those of the *peritoneal* coat in a fourth: or that mode is pursued which Dr CARMICHAEL SMYTH * has adopted in his invaluable Essay upon the Different Kinds of Inflammation.

There are many advantages peculiar to the latter mode of prosecuting pathological inquiries.

It points out how far organic diseases are modified by the structure, function and situation of the part affected; and saves much unnecessary repetition in the description.

This method of distributing the subject into parts is not artificial and arbitrary, but rather natural; for it has an immediate reference to the manner in which many organic derangements take their origin; these being limited at first to one of the coats of the alimentary canal, and being propagated to the other coats only in consequence of their continuance. It is

* Vid. London Medical Communications, vol. ii. Lond. 1790.

founded, therefore, upon the principles of philosophical induction.

This view of the subject suggests a corresponding division of the symptoms, viz. into those which are general, and characteristic of all the organic diseases of parts of a similar structure; and into those which are accessory, and which originate from the peculiar function and situation of the part affected. "The great difference of the symptoms," says Dr CARMICHAEL SMYTH, "is more owing to a difference in the function of the part inflamed, than to any specific difference in the nature of the inflammation, which, in most instances of visceral inflammation, is nearly of the same kind; terminates in the same manner; and requires the same general treatment *."

Lastly, this method of investigating the organic diseases of the alimentary canal may tend materially to the improvement of pathological anatomy, by directing and fixing the attention of future inquirers to the origin and progress of organic derangements, may pave the way to the detection of those general principles which should be pursued in the treatment, and may introduce an improved method of arresting the progress of disease, or of eradicating it.

CHAPTER I.

OF THE MORBID AFFECTIONS OF THE MUSCULAR COAT OF THE ALIMENTARY CANAL.

THE morbid affections of this coat are Spasm, Palsy, Inflammation, Suppuration, Softening, Hypertrophy, Atrophy, Melanosis, and Conversion into Fat, or into Bone and Rupture.

Tumours of different descriptions, the solitary hydatid (*Cysticercus cellulosa*), also serous cysts, are occasionally found imbedded in muscles.

* Vid. Lond. Med. Commun., vol. ii.

SECTION I.

OF SPASM AND PALSY OF THE COATS OF THE ALIMENTARY CANAL.

General Observations on Spasm.

THE study of spasmodic disorders is peculiarly worthy of attention, on account of their frequency, number, severity, and danger, and also on account of the light they reflect upon the physiology and pathology of the muscular fibre.

In spasmodic disorders the muscles take on an inordinate degree of contraction, for a longer or shorter space of time; and occasionally one part of a muscle is in a state of unnatural contraction, whilst the rest of it exercises its natural functions. These spasms are common to the muscles which are under the dominion of the will, and to those over which the will exercises no control *.

* The subjoined is a list of Authors who have written on various Spasmodic Diseases.

HOFFMAN (CASPARUS), Dissertatio de Spasmo seu Convulsione ejusque causis, in 4to, Altdorpe 1620.

HEISTER (LAURENTIUS), Disssectio Mulieris miris spasmis brevi defunctæ.

V. EPHEMERID. Naturæ Curiosor. centur. v. et. vi. p. 166.

KALTSCHMIED (CAROLUS FREDERICUS), Dissertatio de Affectibus Spasmodicis Vagis, in 4to. Jenæ 1754.

BAUMER, Programma de iis quæ spasmis rigidis particularibus communia sunt, in 4to. Gissac 1776.

CULLEN, G. M. G. xlvi. SUAV. Nos. Method. cl. 4. 0. 11. G. vii.

PAUVAY, ibid. G. viii. LIN. G. cxxviii. VOGEL, G. clxxxiii.

VOGEL, G. clxxxi.

VOGEL, G. clxxxii.

CULL. Nosol. G. xlvi.

SAUV., idem. sp. 1.

SENNERT., SAUV. et aliis Journ. de Med. Avril 1764, p. 336.

SAUV. ibid. sp. 2.

PLANER, Dissertatio de Spasmo seu Convulsione ejusque causis, in 4to. Tubingæ 1790.

To the spasmodic contraction of the latter description of muscles, of which little or no mention has been made by SAUVAGES, CULLEN, or by that very learned and voluminous author Dr MASON GOOD, it is my intention to limit the attention of the reader at present; and my prescribed limits do not permit me to indulge in so wide a range as to consider the spasmodic affections of all the involuntary muscles, but only those proper to the passages for the food. In discussing this subject, which must be admitted to be of peculiar interest in an anatomical, physiological, and pathological point of view, it is proposed to endeavour to discover the source from which this unnatural contraction of the muscles proceeds, to trace its progress and consequences, taking, at the same time, notice of its effects in occasioning a derangement in the functions of the part more immediately affected, and also in deranging those of the animal economy at large.

Such inquiries are essential to our present purpose, as indicating the means best calculated to remove the cause of the symptoms, and of all the mischief. Before advancing to my more immediate object, it seems necessary to advert generally to the peculiar distribution and mode of action of the muscles, which bring about such a morbid contraction of the muscles proper to the passages for the food, the bile, and the urine, concerning the existence of which anatomists of the highest distinction are not agreed. For instance, the existence of the muscular fibres of the gall-bladder and gall-ducts, those of the ureters and urethra, and those forming the sphincter of the bladder, has been denied by authors, whose great name and extensive information have given great weight to their authority.

ANDREÆ, Dissertatio de Constitutionis ævi nostri spasmodicæ quibusdam momentis, in 4to. Erfordeæ 1797.
MARX, De Spasmis. Hal. 1765.
BOEHMER, de Spasmorum, &c. 1762, Hal.
COOKE on Nervous Diseases, 2 vols.
FABRICII de Spasmod., &c.
HAMILTON on Purgatives.

In attempting to decide upon the opposing facts and discordant opinions upon the subject, an appeal to minute dissection and to experiments upon living animals, was requisite; from, which it appears, upon a review of all the circumstances, that every part of the passages for the food, the bile, and the urine, possesses a muscular structure, and is endowed with a muscular power of action. It is no doubt true, that the fibres of the muscular coat are not equally large; but in the passages for the food, in the pharynx, gullet, and stomach, they are quite obvious; whereas the longitudinal fibres of the intestines of many individuals are so small as to escape our most minute investigation; and, with regard to the uriniferous canals, it may be added, that muscular fibres are in many persons obvious at the connections of the ureters and urethra with the bladder of urine, but invisible in other portions of the same canal.

No less contrariety of opinion exists as to the varied mode of action, and extent of action, of the muscles proper to the passages for the food, the bile, and the urine, which probably have a reference as much to the disposition * as to the magnitude of the muscular fibre.

On the theories as to muscular contraction, it is not my intention to expatiate, but merely to state a few circumstances regarding it.

The muscular coats of the alimentary canal possess a great and very perfect degree of muscular power. Those of the stomach and intestines may be contracted to a great degree. The latter contract in so perfect a manner, as to propel air, and even quicksilver, through the alimentary tube, contrary to its gravity.

According to physiologists, a muscle is capable of contracting itself to a third of its length; but there are several muscles of the human body which contract to a much greater extent:—Thus the sphincter oris may be extended, so as to include all the fingers, and the next moment it may be contracted upon a needle; and,

* See my Father's observations on the advantages which are derived from the oblique direction of the muscular fibres, and Sir E. Home's observations on the distribution and mode of action of the muscles of the heart.

in the same manner, the bladder is capable of containing 6 lb. or 8 lb. of urine, and in a short time, the whole of it, excepting a few drops, may be expelled.

In forming an estimate as to the degree of muscular contraction, we must not, as MAGENDIE observes, "confound muscular contraction with the modifications which it suffers in diseases, as convulsions, spasms, tetanus, wounds of the brain, &c.; we must also take care not to confound the contraction of which we are speaking, with the phenomena that the muscles present some time after death."

By the contraction of the muscular coat of the alimentary canal, their contents are pushed onwards, and this contraction is speedily followed by relaxation; thus the coats of the alimentary tube are rendered subservient to their particular purpose. But when these passages are spasmodically contracted, there is, at least for a time, no degree of consequent relaxation. A spasmodic contraction occasionally takes place through the whole of the muscular coat of the stomach or intestines, but more frequently it is only partial, or proper only to certain portions of the muscular coat.

The partial is more frequent than the general contraction of the hollow bowels, and is various as to its extent; in some instances so much so, that the stricture does not exceed a few lines in breadth.

Some very interesting circumstances regarding this partial contraction merit particular notice, from which it may probably be inferred, that certain portions of the muscular coat are much more irritable than others. For example, the spasmodic constriction of the gullet most frequently happens at the connection of that tube with the pharynx; the cause of which cannot be explained on the principles of anatomy, as the same structure pervades every part of that musculo-membranous canal. The stomach is sometimes contracted in or near to its middle, dividing the cavity into cardiac and pyloric portions, which are again sometimes subdivided into two or three distinct sacs, so that it somewhat resembles that portion of the intestinal tube called *the colon*.

A spasm which had been at first partial, in some instances becomes general over the whole muscular system ; and it passes with great rapidity from one part to another. There is great diversity as to the duration of spasm ; it is either permanent, remitting, intermitting, or periodical, and sometimes is so very slight as to create only a kind of tremulous motion of the part affected, but at other times it is very intense.

It may be also remarked, that the intensity of the contraction varies in different parts of the body, as much as its duration. Thus the spasmodic contraction of the stomach is of short duration, but that of the gullet frequently lasts for many weeks or months.

This contraction of the middle of the stomach has been noticed by many anatomists.

Mr William Cowper has described, (in his explanation of his 34th plate), what he has named " *two bunches* in the lower part of the stomach," and Schneider and Blassius have made mention of cases, in which the stomach has been divided into three sacs. Sir Everard Home has also described the contraction in the middle of the stomach as taking place " whilst the process of digestion is going on." " The contraction in the middle of the stomach was probably the cause of death, as no other appearance of disease was met with : the body was exceedingly emaciated *." The spasmodic contraction probably takes place at the moment of death, for, after the lapse of 24 hours, it goes off, unless it be the effect of disease ; which holds true, also, with respect to the intestinal canal, the gall-bladder, and bladder of urine.

The contraction in the middle of the stomach does not invariably go off ; for in this, as in other instances, the temporary stricture sometimes lays the foundation of a permanent one.

Stricture sometimes takes place in the lower portion of the smaller intestines, but much more frequently in the lower portion of the larger intestine.

In a few cases the bladder of urine is so contracted as to

* Lectures on Comparative Anatomy, vol. iii. p. 138.

form several sacs. We frequently meet with different portions of the bladder contracted around small stones; and the constriction is so very great, that the passage between the open cavity of the bladder, and the cyst containing the stone, is remarkably small. I have seen it of so small a size, as only to be capable of containing a hog's bristle.

There is no peculiar portion of the bladder in which these cysts are found, nor is there any peculiar muscular apparatus which is adapted to bring about a contraction around the stone. Therefore, the muscular fibres of the bladder are of so irritable a nature, and so disposed, that they are capable of contracting around any stimulating substance which is applied to any part of the bladder. The late Mr ALLAN informed me, that he had met with an instance, in which there were two stones lodged within the bladder. One of these was readily removed by the forceps, but the other could not be extracted at the time. It therefore occurred, that, as the groping for a considerable time with the forceps in the bladder proves extremely dangerous, it would at the moment be more prudent to desist from further attempts to extract the stone, which was then very firmly grasped by the contracted portion of the bladder, and that the stone would probably come away of itself along with the urine, in consequence of the subsequent relaxation of the contracted part of the bladder. This accordingly happened, and the patient recovered *.

A contraction sometimes takes place in *the middle of the bladder*, so that that organ somewhat resembles an hour-glass. I have had occasion to meet with two instances of this description. Both patients were of the same age, six years old, and both were afflicted by stone of the bladder, for which they underwent an operation. The one was cut according to the lateral method, the other by the high operation, by my colleague Dr BALLINGALL.

Both died after the operation; the one, who had undergone the lateral operation, survived it four days; the other, who underwent the high operation, died in the course of thirty-two

* Vide DESCHAMPS, Traité de l'Operation de la Taille, t. iv.

hours. In both, the coats of the bladder were much thickened, so that the capacity of the bladder was much diminished, and in both there was no appearance of constriction in the middle of the bladder, after the lapse of a few days; and it may not be improper to add, that I could not detect any appearance of extraordinary thickening towards the middle of the bladder, the seat of the spasmodic constriction in either case.

The contraction of the gravid womb occasionally is so complete in its middle, that only a finger can be passed through the contracted portion; so that, in order to extract the placenta, it is necessary to overcome the stricture, by passing one finger after another through the contracted part. At length, the contraction is taken off, but the doing so gives considerable pain to the woman.

The vagina is also liable to a partial and spasmodic contraction, which sometimes takes place at its mouth, or towards its middle, and this is occasioned by the partial contraction of the sphincter muscle, proper to that canal. The Fallopian tubes are also sometimes spasmodically contracted into a spiral form, by the partial contraction of their muscular coat. A partial contraction of a portion of the intestinal canal, of the biliary ducts, and of the urethra, also sometimes occurs.

The ductus communis choledocus, and the ureters, are most frequently constricted at their conjunctions with the duodenum and bladder of urine; and, in short, the hollow bowels and canals proper to these have a general muscular coat; but there is no peculiar apparatus for producing a partial contraction, which is more frequent than the general contraction of the same hollow bowel or canal connected with it.

SECTION II.

OF THE CAUSES OF SPASMODIC CONTRACTION OF THE MUSCULAR FIBRES.

It would lead to a very long digression, totally foreign to the object of this work, to enumerate the various causes which

have been supposed to give rise to a morbid sensibility, or to what has been called the *nervous temperament.* The chief of these causes have been summed up by Dr GREGORY, in the following paragraph in his Conspectus Medicinæ, vol. i. p. 389:— "Habitus corporis nimis sentiens, et nimis mobilis, homines spasmis opportunos reddit; hinc malum fœminis, infantibus, debilibus, luxuriosis, desidibus, sanguine plenis, familiare."

Much light has lately been thrown upon the influence of the brain over muscular contraction, and on the properties of the muscular fibres, by NYSTEN, WILSON PHILIP, C. BELL, MAJENDIE, ROLANDO, FODERA, and FLOURENS, to whose works I beg to refer the reader, as these subjects are too extensive to be discussed in a book of this description.

The very intimate connection existing between the nervous and muscular systems, renders it probable, that, in every case of spasmodic contraction, the nervous system is primarily affected. The spasmodic contraction of the passages for the food is generally excited, in consequence of the application of a local stimulus, as by acrid ingesta, flatulence, acrid bile, an extraneous body, by a calculus in the intestines, gall-ducts, or uriniferous passages, a tumor, or by worms, or by inflammation, the poison of lead, exposure to cold, by dentition, and even by violent emotions of the mind.

Spasm is likewise excited not only in the part to which the irritation is more immediately applied, but also in the more remote parts, in consequence of the application of a stimulus. Thus the spasmodic stricture of the urethra has been sometimes occasioned by the irritation of chirurgical operations, or by fracture or dislocation of the extremities, and by dentition.

The effects of local stimuli upon persons of different constitutions are very different. Thus, some have a call to make urine, when but a few ounces of that fluid is collected within the bladder, but others not until the bladder has been considerably distended, by a pound or more of urine. This is to be attributed in part to the different degrees of irritability, and also to the influence of habit. Another proof of the different degrees of sensibility of the bladder, is, that the injection

of tepid water into the bladder has sometimes alleviated the excruciating torture occasioned by stone in this organ, when the inner mucous membrane, perpetually irritated by the stone, was probably in a state of unnatural excitement, or chronic inflammation; whereas, on the other hand, the introduction of an instrument into the bladder, or even of tepid water, is to others intolerable, and a source of excruciating agony or fainting. It may be also remarked, that the severity of the symptoms of stone in the bladder of urine is by no means proportioned to the roughness or smoothness of the surface of the stone. I have repeatedly seen those stones, which, from the extreme roughness of their surface, are called mulberry, extracted; and these did not, before the operation, excite greater uneasiness than a stone with a perfectly smooth surface. It may be added, that there are several well authenticated cases upon record, in which the coats of the bladder, and of the pelvis of the kidney, had so far lost their natural irritability and sensibility, that a stone has been found within these organs after death, when there was not even *the most distant suspicion during the life of the patient, of the existence of* such a cause of irritation *.

A spasmodic contraction of the urethra is occasionally considerably aggravated by different causes, and more especially by cold, and also by an attempt to pass a metallic instrument which has not been previously put into tepid water, or by an attack of inflammation, or by excess in wine or spirits. In the same manner, those afflicted by stone in the bladder of urine are liable to paroxysms of pain, after walking or riding. What has been above stated applies also to the gullet. The muscular fibres of the gullet, even though not inflamed, sometimes become much more irritable than common, especially in women of a debilitated habit of body. Hysterical women are also subject to spasm of the gullet, to which, the great distention of the stomach by wind contributes. Even young women, in whom there is no

* Vide Cooke's Edition of Morgagni, vol. ii. p. 375.—Boneti, Sepulch. Anat. lib. iii. sect. 24.—Shenk. De Vesic. Urinaria, obs. 269.

degree of globus hystericus, are subject to this kind of constriction, when exposed to a stream of air; and also, when the air is highly charged with the electrical fluid, as before, or during, a thunder storm. This kind of obstruction, which is only temporary, either goes off spontaneously, or yields to the bougie, but is apt to return.

By particular poisons, especially that of *hydrophobia*, the muscles acquire a morbid sensibility; and, when reduced to that morbid state, their contraction is excited by causes which, in other circumstances, exert no influence over them. Thus, after the bite of a mad dog, the muscles of the pharynx are thrown into immediate and violent contraction, by the sight or noise of water, or by the application of a drop of water to the mouth.

Trismus and Tetanus have also been occasionally induced by irritation of different descriptions, as by a bite *, from a wound of a finger †, from inflammation of fauces ‡, from amputation §, and from burns ‖.

A certain degree of spasm is the usual concomitant of a permanent contraction of the gullet, intestines, and urethra, occasioned by a thickening of the coats of these canals, by inflammation of their mucous membrane, and also by other organic disorders of these passages; and it proceeds, on many occasions, to a most alarming height, creating, in the case of the pharynx and larynx, great difficulty in breathing, in the case of the gullet, great difficulty in deglutition, and in the intestines, most obstinate constipation.

The case described by Mr KERCAREDEC is a strong example of the violent symptoms occasioned by spasm of the muscles of the pharynx, larynx, and gullet, which sometimes accompanies organic diseases. It proceeded so far as threatened suffocation,

* LAZERETTO, Edin. Med. and Surg. Journal, vol. xiii. TAUNTON, Med. and Phys. Journal, vol. xxxvii.

† NUCK, Lond. Med. Obs. and Inq. vol. i. CURTIS, Med. Chir. Trans. vol. vii. NAYLER, Med. and Phys Jour. vol. x. BROWN, Med. and Phys. Jour. vol. xix. HOWSHIP, Med and Phys. Jour. vol. xxii.

‡ MORRISON on Tetanus. § DICKENSON, Lond. Med. Repos. vol. i.

‖ WAYTE, Edin. Med. and Surg. Jour. July 1821.

when the patient attempted to swallow. After spitting up a few morsels of her food, she could swallow it tolerably well.

These attacks were periodical, and were succeeded by sore throat, and almost complete dysphagia, and nothing passed down excepting when she lay almost in a horizontal position.

The difficulty in swallowing was succeeded by difficulty in inspiration, which could not be removed, and she died in the course of three months. Upon dissection, the mucous membrane of the pharynx was found covered by vegetations of a cauliflower appearance.

The mucous membrane of the larynx was red and swollen.

I have above described spasm of the rectum, occasioned by intestinal concretions impacted within that bowel.

This spasm, combined with organic disease, cannot, in some instances, be obviated for a considerable time, and hence the patient is most obstinately constipated for months. A well marked illustration of the above fact is given in the Nouvelle Bib. Med. A female, at birth, could not pass her meconium, but a passage was afterwards procured.

After she menstruated, she enjoyed good health for two years, got fat, and supposed her disorder removed.

But after some time, she perceived a prominent tumour on the left side of the navel, which proved a cause of very acute pain, and was followed by insuperable costiveness, swelling and hardness of the abdomen, to remove which, the patient took an ounce of castor oil; violent colic, vomiting, and hiccough followed, and she died after most severe suffering of eight days' duration.

An incision had been scarcely begun in the linea alba, when the integuments gave way; the large intestines, which were enormously distended, and which contained upwards of thirty pounds of hardened fæces, protruded and burst.

The rectum was found inflamed and thickened, and a transverse fold passed across it, in the centre of which, there was an orifice, which scarcely would admit the point of the little finger.

The spasm of the alimentary canal, of the biliary and urini-

ferous passages, occasioned by spasm of the muscular fibres proper to these passages, may be obviated, to a certain extent, by antispasmodic remedies, and even when it is combined with organic disease.

When much pain and irritation exist, the detraction of blood, and the use of a tepid bath, should precede the use of opium, and other antispasmodic remedies. Spasm is often combined with inflammation, and more especially when the bladder is spasmodically contracted by the irritation of a stone lodged within it. If the patient be young and plethoric, the lancet proves highly beneficial; but if he be far advanced in life, and of a debilitated habit of body, in consequence of having been long afflicted by stone, or some other disease of the bladder, leeches are to be preferred. If leeches cannot be procured, the application of cupping-glasses to the loins has the effect of facilitating the introduction of the catheter, when its progress has been impeded by a spastic constriction of a part of the urethra. If the spasm be seated in the neck of the bladder, ureter, or urethra, the application of a number of leeches to the perineum is useful, together with the warm water clyster, and the liberal use of warm diluent and demulcent liquors, as linseed tea, or the decoction of althea; thus the acrimony of the urine is mitigated, and the spasm removed.

In the gall-stone jaundice, the patient experiences great relief from bladders, filled with warm water, applied to the pit of the stomach. Of all antispasmodic remedies, *opium is undoubtedly the best, and it is to be given by the mouth, or in the form of clyster, and in large doses.* This remedy is of singular efficacy in spasmodic attacks of the gullet and intestines, in the gall-stone jaundice, and in the case of small stones lodged within the bladder of urine. Its antispasmodic virtue is very much increased, when combined with the warm bath, the temperature of which ought to be about 96° of Fahr.; and it is necessary that the patient should remain in the bath for nearly an hour, in order that the remedy may have its full effect.

Before introducing an instrument into the urethra, and also before the operation of lithotomy, it seems to me to be always advisable to give a large dose of laudanum, not only to mitigate the excruciating pain of that operation, but also to facilitate the discovering the stone, and its extraction from the bladder; in the same manner, as the application of the infusion of the extract of belladonna to the eyebrow or eyelids facilitates the extraction of a cataract, by dilating the pupil of the eye.

The stone within the bladder is sometimes grasped, and firmly retained, by the contraction of the muscular fibres, after an incision has been made into that organ; but if a large dose of laudanum has been previously given, the extraction of the stone will be easily accomplished, and the danger of pinching the bladder by the forceps (which is frequently the cause of inflammation of that organ) is averted.

The use of laudanum, also, removes those sympathetic sensations in distant parts of the body, which are excited by any great irritation in the vicinity of the neck of the bladder of urine.

In a paper which I published some time ago on Spasm, cases are given by the late Mr ALLAN, in which stones lodged within the bladder were retained in that situation by a spasmodic contraction of the muscular fibres of the bladder.

Lithotomy was performed on one of these patients, by Mr LIZARS; and Mr ALLAN stated to me by letter, that, "on the evening of the third day after the operation, I introduced my finger into the wound, and hooked out, with the utmost ease, a stone about the size of a turkey-bean, which was lying in the inner opening. The patient recovered without one bad symptom, and this operation I have frequently revolved in my mind, and kept the case in view, as a guide in similar circumstances.

"In a conversation which I lately had with you, respecting the spasmodic action of the bladder, you observed, that you thought this untoward circumstance might be, in a great measure or altogether prevented, by exhibiting a tobacco clyster, or giving a large dose of opium, a short time before the opera-

tion, and you suggested the propriety of this practice. My objections to the tobacco clyster are, that we can never exactly know the extent of its influence on the system; a quantity which, in one person, will produce little effect, will, in another, depress the powers of life to a dangerous degree; and, as far as my experience goes, patients with strangulated hernia, who have received the tobacco-clyster, previous to being subjected to an operation, never recover so well as those to whom it has not been administered. I should therefore give the preference to the opium.

"On the 31st of last month, a boy, three years and a half old, presented himself with stone in the bladder. From the irritability of system incident to this period of life, from the rectum being prolapsed immediately on the sound being introduced into the bladder, and from the obstruction which I experienced in passing the instrument through its neck, when this viscus was empty, I was prepared for some difficulty in the extraction, and therefore judged this to be a proper case for the trial of the opium. I ordered the patient to be placed upon a milk and vegetable diet, to be immersed in the warm-bath at bed time, for several nights in succession, to have five minims of laudanum each night, and his bowels to be kept freely open by laxatives. The rectum was washed out with tepid water, on the morning of the operation, and two hours before cutting he had a draught, containing fifteen minims of laudanum.

"On the 6th of June, I performed the lateral operation with the knife; and, on passing my finger into the bladder, readily felt a stone, but I had no sooner introduced the forceps than it disappeared. This repeatedly occurred; and it is worthy of remark, that if I withdrew my finger for a minute, on again introducing it I readily felt the stone; but when I moved my finger freely within the cavity of the bladder, it was as effectual in exciting spasmodic action, as when the forceps was introduced. I changed the posture of the patient, and injected some tepid water, but with no advantage. I now ceased to introduce any metallic instrument, and after the bladder had remained

for a little while quiescent, again introduced my finger slower into the wound, when I felt the stone above the pubis held in the contracted folds of the bladder. On attempting to hook the stone, it fell down to the lower and anterior part of the bladder. I then put my finger upon it, passed along the finger a small lever, which I had got made for the occasion two days before the operation, and, with the assistance of another finger in the rectum, easily turned out a rough stone, the size of a French olive."

That very experienced surgeon Sir A. Cooper, has also observed, " I have seen a difficulty arise in performing this operation, from a partial contraction of the bladder, by which the stone has been firmly embraced, so as to impede the use of the forceps. This arises from the sudden escape of the urine which the bladder contained previous to the operation. The fundus of the bladder, and half of the organ near to it, embrace the stone closely ; the forceps are passed into the anterior part of the bladder, and opened at its cervix ; but, in attempting to seize the stone, only one of its extremities is nipped by the forceps, which slip from it immediately the surgeon tries to extract the calculus : this occurs several times, until the patient becomes exhausted, when the contraction of the bladder subsides, and then the stone is readily seized. In such a case, the flat forceps answer best, gliding most easily over the stone. If the patient does not retain his urine for a long period before the operation, this difficulty seldom occurs."

The cases described in the London Medical Gazette for February and March 1829, which occurred to Mr Key, are equally in point. In the first case, " on the introduction of the forceps, the size and situation of the stone occasioned fresh obstacles. Neither the blade of the instrument nor the finger could, without force, be insinuated between the stone and the bladder, *which was firmly contracted around it.* When at length the stone was grasped by the forceps, it appeared much too large to be withdrawn by the opening, and Mr Key, without releasing it from the instrument, cautiously enlarged the incision. Still, however, the calculus was

too large to pass through it; but, being soft and friable, it soon broke under the pressure of the forceps, and many fragments were extricated, leaving behind them larger pieces, which, owing *to the firm contraction of the bladder,* and the almost convulsive struggles of the patient, could not be removed." Mr KEY, therefore, gave the BOY FIFTEEN *drops of laudanum, and proceeded to inject warm water freely into the bladder*. This produced the effect not only of mechanically distending the cavity, but also *of causing the muscular coat to relax*. " Syringeful after syringeful was thrown in, each making way for the more free introduction of the forceps, and the removal of portions of the calculus, until, at length, by the alternate use of the syringe and forceps, the whole was removed." In the latter, there was a contraction in the middle of the bladder, so that it was very difficult to extract a large stone which was lodged in the sac next to the fundus.

It was stated to me as a strong objection to my observations on the contraction of the bladder, that that organ does not possess the power of completely discharging its contents, and an experiment was cited in proof of that opinion. A gentleman informed me that, after having discharged his urine, he had immediately afterwards passed a catheter into his bladder, and drawn off some urine.

Such an experiment is not, in my mind, conclusive: it affords only an instance of the imperfect contraction of the bladder of the individual.

The bladder cannot be regarded, in its sound state, as such an nactive reservoir: it is an organ of much sensibility, and, by the very peculiar arrangement of its muscular fibres *, capable of contracting in a healthy person to such a degree as to expel very nearly the whole of its contents. Experiments upon living animals and pathological observation confirm such an opinion; and if the bladder be still further stimulated, as by cutting into it, the con-

* Vide description of course of these muscular fibres of bladder, in my Elements of Anatomy, vol. ii. p. 155–6, Plates VIII. and IX.

traction is, in many instances, perfect. With the view of determining this point, I prevailed upon a butcher, before killing a sheep, to pass his knife into the bladder of the animal.

Upon examining the bladder, it was found contracted into a small hard ball, and its cavity was completely obliterated; and lest it might be said that this contraction took place during the struggles preceding death, the bladders of other sheep that had been killed in the usual way were examined, but were not contracted in a similar manner.

The complete contraction may be induced by the irritation of a stone within it. I have in my possession a specimen, in which the bladder was so much constricted that it would hold but very little urine. There is a groove upon the surface of the stone, through which the urine passed to the urethra, and which had been rendered deeper by the catheter, which had been employed in the earlier part of the disease, when this patient laboured under a suppression of urine.

Professor Russel was so polite as to favour me with a drawing, from a preparation in his possession, in which the bladder of urine had been contracted, like an hour-glass, upon a stone, which filled both compartments, and also a part of both ureters.

There are other medicines which are useful in resolving spasm of the canals for the food and urine.

The *tinctura muriatis ferri*, as a means of removing spasm of the urethra, was introduced into notice by Mr Cline. He prescribed ten drops every ten minutes in a glass of water, until the urine came away in a stream. When administered in the mode above mentioned, it powerfully affects the stomach, and, from sympathy of other parts, produces syncope, or a very near approach to it.

Camphor is of peculiar efficacy in spasmodic disorders, when administered in large doses, according to Hoffmann and Pinel.

The former laborious physician has related the case of a hypochondriac, who, when in a very despondent state, on account

of the death of his wife, was attacked by spasmodic constriction of the larynx, and top of the gullet. He could neither speak nor swallow, and breathed with difficulty. The spasmodic constriction of the gullet continued with great obstinacy; and if, by any chance, a portion of food slipped over the pharynx, it was immediately stopped, and prevented from entering the stomach. The patient was advised to take a mixture, containing 30 grains of camphor, with some olive oil, at intervals; but, by some chance, he *took it all at one dose*, by which he was completely cured.

PINEL prescribed a camphorated liniment, consisting of a drachm of camphor to an ounce of olive oil, as a remedy for a woman of sixty years of age, whose gullet was affected by spasmodic contraction, of six months' duration. The patient *took the whole of the liniment at once, and was thereby cured.*

Blisters, and other external applications, are useful in the spasmodic contraction of the urethra and stomach; but their effect is far inferior to the remedies which have been already mentioned; and, it may be added, that, though blisters sometimes produce strangury, they remove the spasmodic contraction of the urethra.

From what has been stated above, as to the spasmodic constriction of the muscular coat of the passages for the food, the bile, and the urine, it follows,

First, That, though a muscular structure be not equally obvious in the different portions of the passages for the food, the bile, and the urine, yet they all possess the peculiar characteristic feature of the muscular fibre, a contractile power, upon the application of a stimulus, and are also under the influence of antispasmodic remedies; and, therefore, they are to be considered as parts of a muscular structure, and endowed with a muscular contractile power, even though muscular fibres be not distinguishable by our imperfect senses.

Second, That there is no peculiar arrangement of muscular fibres of the stomach, or bladder of urine, which is adapted to produce a partial contraction in any particular part of these passages.

Third, That the contraction is various as to its extent, degree, and duration; and, when of long duration, is sometimes succeeded by a permanent organic stricture.

Fourth, That the partial degree of contraction in the hollow bowels gives rise to different symptoms, according to the part affected, proving, in some instances, fatal in a short space of time, as in the stomach and intestines; but, in other organs, life may be continued, though the spasm be in the middle of the womb, or middle of the body of the bladder, and though that spasmodic contraction be of considerable duration.

Lastly, That the inordinate degree of contraction which sometimes takes place in the canals for the food and the urine, may, in its earlier stages, frequently be removed by antispasmodic remedies.

In the preceding pages, a general delineation of the facts and arguments in favour of the muscular structure, and muscular contractile power of the canals for the food and the urine, has been given. Though each of the arguments, singly considered, cannot be said to be absolutely conclusive, yet, when taken collectively, they form a very strong, and, in my mind, perfect body of evidence.

With this light before us, we can readily account for the gradual and continued progress of the food and the urine, through their proper canals; and also for those peculiarities and irregularities which occasionally occur, as to the passage of the contents of these canals; and the keeping in view the influence of this muscular power, is, as it were, the *master-key* that unlocks every intricacy, and resolves every difficulty.

Though local stimuli be the most frequent causes of the spastic constriction of the muscular coat of the passages for the food, the bile, and the urine, yet a cause diametrically opposite, the want of the usual stimulus, sometimes produces the same effect.

Thus the urethra has been, in the first place, contracted, and ultimately rendered impervious, when all the urine has for some time passed through the canula of a trocar, which had been em-

ployed for puncturing the bladder above the ossa pubis; in the same manner as the muscles shrink after an attack of palsy, and the alimentary canal in cases of abstinence.

SECTION III.

OF THE CONSEQUENCES OF THE TEMPORARY SPASMODIC STRICTURE.

The temporary spasmodic stricture, when of considerable duration, is frequently followed by a permanent organic stricture. Thus, gall-stones, urinary and alvine concretions, occasion a constriction of the passages within which they are imbedded, both above and below them, by which they are firmly fixed in a certain situation.

In the same manner, small calculi entangled between the muscular fasciculi of the bladder of urine, occasion, from their stimulus, an enlargement of the muscular fasciculi of that organ, so that its inner surface bears no distant resemblance to that of the inner surface of the heart: thus those small concretions become very firmly fixed in their places, and the passage of communication between the small stone and the open cavity of the bladder is, on some occasions, so small as only to admit a hog's bristle.

The portion of the canal above the stricture becomes very much expanded; after which, inflammation, ulceration, and erosion follow. Thus fæces, bile, or urine escape into the abdomen, pelvis, or scrotum; and, from an unnatural communication having been established between the neighbouring parts, purulent matter passes from the gullet into the windpipe; or the urine is discharged through a fistulous opening into the intestinum rectum.

Another effect of an impediment to the free egress of the food and urine, is the protrusion of the internal mucous membrane between the muscular fasciculi of the constricted intestine or

bladder, which forms a considerable pouch communicating with the cavity of the intestine or bladder. I have seen such herniæ of the internal coat of the bladder considerably larger than an orange.

SECTION IV.

OF SPASMODIC CONTRACTION OF PARTICULAR PORTIONS OF THE PASSAGES FOR THE FOOD.

HAVING premised the above remarks regarding spasm in general, I shall subjoin a few observations on spasm of particular portions of the alimentary canal.

Of the Spasmodic Contraction of the Pharynx.

THE spasmodic contraction of the pharynx is much more rare than that of the gullet, excepting the cases of hysteria.

The most violent and permanent degree of contraction of the pharynx, the result of the morbid state of irritability of the mucous membrane, occurs in hydrophobia, of which the subjoined case, which I saw along with my distinguished colleague the late Dr RUTHERFORD, is a striking instance.

" NELLY STUART, æt. 74.—On the 3d of July had the back of her right hand considerably torn by a dog, at which she imprudently aimed a blow, as he was running on the highway, apparently furious, and pursued by the country people as mad. She was at first a good deal alarmed by the accident, and within a few hours had the wound carefully washed with a solution of soap in water, and afterwards covered with lint. The sore was dressed regularly, and it healed as soon as could have been expected from its lacerated nature, without being attended by any considerable pain, except at the knuckle of the fore-finger. After the sore had cicatrized, some swelling of the

surrounding teguments still remaining, she was advised to pour salt-water on the hand, which she did for some weeks, with the effect of removing every degree of fulness. During the whole of this period, she used no internal medicines; and, after recovering from the tremor into which she was at first thrown, she seemed to entertain no apprehension of any dangerous consequences from the bite.

" She continued free from any complaint, except occasionally a slight pain in the above mentioned knuckle, till Thursday evening, the 13th of September, when she was affected with a severe pain, stretching from the knuckle to the cicatrix of the sore, and from that along the ulna and outer part of the humerus to the shoulder. Much about the same time, she was seized with a cold shivering, followed by heat, thirst, sickness at stomach, and other febrile symptoms. These, during the night, were relieved by a profuse sweat, which continued during the greater part of the Friday following; but, towards the evening, she perceived an unusual difficulty both of articulating and of swallowing, although she felt no pain or uneasiness about her throat. It would appear that she passed a very restless night between the 14th and 15th, being tormented with an excessive thirst, but incapable of swallowing, without experiencing violent convulsions.

" On the Saturday morning these symptoms continued, and she complained much of the pain stretching along her arm, and shoulder. She was brought into the hospital about seven o'clock in the evening, and had immediately a draught with fifty drops of laudanum. She appeared much agitated and fluttered by the smallest noise. Her looks had a strange mixture of wildness and timidity. She was perfectly sensible, but found great difficulty on attempting to speak, though, after some efforts, she was able to articulate distinctly, and her words were then uttered with extreme rapidity. On proposing to her to swallow any liquid, she appeared much frightened; and though, on repeated requests, she consented, yet the sight of the fluid never failed to excite strong symptoms of abhorrence, and convulsions of her face and neck. After waiting some time, till

she could call up sufficient resolution, she carried the cup hastily to her mouth, turning away her eyes, and then gulped down the contents with inconceivable rapidity, amidst violent convulsions of the muscles of her face, throat, and upper part of her body. For some time afterwards, she continued much agitated and convulsed, with efforts to retch, much sobbing, and frequent anxious respiration. She talked in the intervals with great unconcern of the wound of her hand, but complained much of the pain of her shoulder; at the same time insinuating, that it was only a rheumatic pain, to which, it seems, she had been formerly subject. Pulse 102, somewhat sharp, but not strong; skin very warm, but moist; tongue white and clammy; she still complained of thirst, but had no headach, or uneasiness about her throat.

" About eleven on Sunday, her looks were extremely wild, at the same time expressive of great horror. When spoken to, she was immediately affected with convulsive motions about the throat, which precluded any utterance. By degrees she recovered the use of speech; said she had no pain, but extreme thirst; her tongue was white and clammy; pulse, at first, above 100, presently, however, it sunk to somewhat above 80. When drink was offered her, the convulsions in the throat were immediately induced; her looks and gestures were still more expressive of distress; however, she was persuaded to try to take a little gruel out of a spoon. This, after various efforts, she snatched at suddenly, and gulped down, with seemingly great pain and distress, and violent agitation of all the muscles of her face and throat. Such paroxysms were frequently renewed by the mention of any liquid, or any question or object which caused any sort of surprise. But all the while she was completely sensible, and in the intervals of the fits gave a distinct account of her previous situation, and seemed much affected with the distress of a patient that lay opposite to her; expressed also her gratitude for the kindness that was shewn to her, and her resolution to attempt whatever might be judged proper for her recovery.

" The external fauces were well rubbed and covered with

lint, soaked with the following spirit, sp. vin. camph. ℥ ss. æther, laudan., a. a. ʒij. ; and the following draught was ordered, camph. ℈i, æth. ʒi, laudan. gtt. lx. aq. hord. q. s. One-half of this was got over with great difficulty. Her pulse became much slower and weaker. Some time after she got the remainder. Three P. M. she was nearly in the same state as before. She was persuaded to swallow some morsels of bread, soaked in milk. In the course of the afternoon she was moved into a more convenient apartment, as she seemed manifestly more agitated by the appearance of many persons around her. She only got another draught. Eight P. M., when I saw her, she appeared to be extremely distressed and disturbed. Answered, after the convulsions were subsided, with haste, and seemed rather confounded ; presently, however, was soothed, and spoke quite rationally ; lamented her own situation. When asked if she was in pain, replied, no ; what particular uneasiness she had—Do you not see? seemingly referring to a certain degree of strangulation and interruption of breathing betwixt a hiccup and cough. Her pulse was feeble and quick. Her skin cool ; tongue as before. After a short while, she expressed great gratitude for the attention that was paid her ; prayed fervently that she might be enabled to endure, with patience and resignation, the trial to which she was subjected, till it should please the ALMIGHTY to release her from her sufferings, and that no unguarded expression might escape her, that could convey want of the most perfect submission to His will.

" She said that she thought she could now try to swallow ; a spoonful of milk was given, which she swallowed with the usual convulsions. Soon after she remarked, that it was not that but her medicines which she required. A spoonful of her usual draught was given, but the convulsions were now much more violent ; her breathing was more interrupted, long intervals being observed betwixt each successive inspiration, and her pulse sinking so low as hardly to be felt. By degrees she recovered ; and being raised again, she herself proposed to take another spoonful ; this was accompanied with less commotion than before ; but she then requested to be allowed some rest after the

severe struggles she had undergone. At this time it was very apparent, that the glare of a candle, or any bright object, immediately caused the convulsions. I asked if she thought she could take a bit of bread soaked in wine; to which she answered, that it would not be amiss. Some little bits she afterwards got over, and the remainder of the draught. Eleven P. M. all the symptoms were more violent; still, however, she was distinct; seemed at first very uneasy at my approach, as she dreaded another dose; was immediately startled, and convulsed when a candle was brought before her; said she could not bear the sight of it; when offered a bit of bread with wine, entreated it might not be insisted upon, as she was sure it would not, did we know the painful struggles it occasioned her. Her pulse was not to be felt; breathing more cut or interrupted; tongue white, and much viscid saliva appeared to have collected about the fauces; a cough, or some motion betwixt that and hiccup, became much more frequent, and at times caused such a noise as might, by a lively imagination, be compared to the barking of a dog. An emollient injection was ordered; and after the operation of it, an anodyne and fœtid one. The former was administered, but immediately returned without any fœculent matter. She had had no stool since admission, though she had passed a small quantity of urine. The anodyne injection she could by no entreaty be made to receive. During the night she had no sleep, but tossed about perpetually in great agony, frequently delirious, and affected with convulsions, extreme anxiety, and sense of instant dissolution. At nine A. M. all the symptoms seemed aggravated; she had often short paroxysms of universal convulsions and tremor. The pulse was not to be felt at the left, and hardly at the right wrist; about 120: she often tossed about; starting up in bed, and threw herself down again; the catching at her breathing was incessant; often recovering, however, she presently recollected herself; said she had no pain, and, notwithstanding her seeming agony, could specify no particular distress. She asked for a mouthful of cold water, which she got over in part, with violent struggles, and immediately cried out she was gone. She

was, however, prevailed on to swallow a bolus of op. gr. ij., camph. gr. xv. This occasioned a similar paroxysm to that which had been induced by the water.

" Some time after, when she had become more quiet, she was put into a warm bath. This caused no particular distress, and she remained free from convulsions while in it. Unfortunately she seemed to sink so fast, and grew so faint, that the time could not be protracted beyond fifteen minutes. She was replaced in her bed, and presently became more agitated than before the bath ; but, as soon afterwards too many visitors had got into the apartment, she became much more delirious, restless, and convulsed. About one P. M. a second bolus was ordered, and, though with much horror and reluctance, she got it swallowed, and after it a spoonful of wine, and apparently with more ease than the former. Nor were the succeeding convulsions either so violent, or so long continued. In less than half an hour, however, they returned ; her delirium increased to frenzy ; she struck at her attendants, so that it was necessary to confine her arms by means of a jacket. It was said that she then attempted to wound her attendants by biting ; however, in a few minutes after, the convulsions becoming more general and severe, she expired a few minutes before two.

" The body was examined forty-eight hours after death.

" Though so considerable a time had elapsed between her dissolution and the examination of the body, not the smallest symptom of putrefaction had made its appearance.

" The fauces, larynx, and pharynx were found in a state perfectly natural ; there was not the least vestige of inflammation, suppuration, or even abrasion ; no unusual collection of saliva. The œsophagus was examined during its whole course, without any morbid appearance being discovered. The stomach was contracted to a very small size ; and upon opening it, the smell of the camphor she had swallowed before death was distinctly perceived. The cardia was slightly tinged red, from the small quantity of conserve of roses she had taken ; but on wiping it clean, it appeared, as well as the rest of the stomach, perfectly

sound. The whole abdominal viscera were in a natural state; the larger intestines alone being distended by flatus.

" The thoracic viscera also were in a state unusually sound. No adhesions between the lungs and pleura costalis. No morbid appearance whatever in the lungs themselves. The heart not more distended with blood than usual, and the blood in a coagulated state."

Inflammation of the pharnyx is also an occasional concomitant of hydrophobia.

This inflammation, in some cases, extends down to the gullet and stomach *.

The inner membrane of the pharynx is also thrown into folds, so that the inner surface of this organ bears a resemblance to the inner surface of the intestine, which appearance is probably produced by the spasmodic contraction of the muscular fibres of the pharynx; and from this cause also, the amygdalæ are much compressed and forced outwards.

SAUVAGES has informed us, in his Dissertation sur la Rage, that the bodies of those who have died from hydrophobia do not putrify so soon as usual.

According to Dr BAILLIE, the inner membrane of the pharnyx, gullet, and stomach, is much inflamed, but is not thickened.

The inflammation, he has added, " is not very observable."

* The following authors have also remarked the inflammation of the pharynx, gullet, and stomach, viz. Dr BAILLIE *, MORGAGNI †, Drs BABINGTON ‡, FERRIAR §, TAVRY ‖, MARCET ¶, POWEL **, Mr BORRET ††, Dr PINCKARD ‡‡, Sir ASTLEY COOPER §§, in a rabid dog, and Dr BEDDOES.

Sometimes the inflammation has been stated by Drs BEDDOES and RUSH to affect the larynx and trachea; and the muscles of deglutition and speech have been observed by the latter ‖‖ to be suffused by blood.

But in none of the authors quoted, is there mention made of the spasmodic contraction of the construction of the pharynx.

* Morbid Anatomy. † Vide Letter viii. Art. 25. ‡ Med. Communic. vol. i.
§ Med. Facts and Obs. vol. i. ‖ Vide Mem. de l'Acad. des Sciences.
¶ London Medico-Chir. Transact. vol. i. ** London Med. and Phys. Journal, vol. xx. p. 209.
†† London Med. and Phys. Journal, vol. xxi. p. 271. ‡‡ Ibid. p. 59.
§§ Vide Med. Records and Researches, p. 136. ‖‖ Vide London Méd. and Phys. Journal, vol. xx. p. 360.

Dr Mead has stated, that the stomach has sometimes been reduced to a state of gangrene by this disorder.

Dr Brandreth of Liverpool has published one of the most important dissections of hydrophobia.

The patient had received several lacerated and punctured wounds, from the dog's teeth, in both wrists, and in one hand.

The most careful excision was practised within half an hour after the bite was received, and caustic was afterwards applied; but as the worst wound was above the pisiform bone, and among the ligaments, it was impossible to destroy the parts effectually.

The patient laboured under the usual symptoms, and what was remarkable, he forced himself to swallow liquids almost to the last.

Opium and colchicum were the principal remedies employed. The patient lived for nearly eleven months after the receipt of the bite.

Dissection.—The dura mater was preternaturally vascular. The arachnoid was opake, and between it and the pia mater there was some serous effusion. The pia mater was vascularity itself, and presented a complete mass of highly injected blood-vessels, the colour of which was not that of congestion so much as of inflammation, approaching to scarlet. The medullary structure of the brain presented, when sliced, a number of bloody points. There was nothing particular in the lateral ventricles, except that the plexus choroides were very large, and of a dark reddish-brown colour. The cerebellum presented nothing remarkable, excepting a high degree of vascularity, like the cerebrum. The vessels of the dura and pia mater were every where highly injected. The theca vertebralis was vascular, and, upon lowering the head, an ounce of serum ran from the sheath within the vertebral column.

Neck and Arm.—The vasa vasorum of the carotid artery were rather tinged. The par vagum manifested a general blush of inflammation, the sheath of the nerve was injected with blood-

vessels, and small ramifications of vessels were observed running parallel to the fibres in the cellular structure connecting the fibres. The fourth, fifth, sixth, and seventh cervical nerves were next exposed, and the vascularity of their sheaths was strikingly evident, as well as the ramifications of bloodvessels, highly injected, between the fibres of each nerve. Some of them were so much altered in character as to resemble muscular fibre. Their external surface was almost scarlet, while the internal was of a pink colour, and the vessels could be distinctly seen by means of a small magnifying glass. The dissection was continued down the arm. The branches of the cutaneous nerves upon the inner side of the arm, leading up from the cicatrix, which had been painful, presented the same appearance above described. The deep seated nerves were not inflamed. The first absorbent gland, at the inner side of the elbow, and the absorbent glands leading to the axilla, together with the axillary glands, were examined, but presented no deviation from health. The cicatrix, which had been painful, was very vascular, and this and another had a small portion of gelatinous substance effused in the cellular membrane under them. The others presented no such appearance.

The lining membrane of the mouth, underneath the tongue, was much inflamed. The fauces, uvula, and pharynx were in a high state of inflammation, particularly the pharynx. The œsophagus, especially near the cardia, was very vascular. The lining membrane was here almost completely denuded, for the space of six or seven inches; what did remain, peeled off, like the cuticle of a blistered surface. Some patches of inflammation were seen on the internal surface of the stomach. The intestines were natural, but distended with air. The other viscera were healthy. The larynx and trachea were inflamed, as was the pleura. The lungs were in a state of extraordinary congestion.

Spine.—The bodies of the third, fourth, and fifth cervical vertebræ were raised from the fore part, and the theca vertebralis was found covered with injected bloodvessels. The medulla spina-

lis was natural, but at the point where the filaments pass from it to form a nerve, evident appearances of inflammation were visible. This was observed at the origin of all the cervical nerves in the portion of the medulla spinalis, which was exposed. Upon removing the bodies of the lumbar vertebræ in the same manner, the sheath was found extremely vascular, and there was some extravasated blood within it. The nerves in the pelvis, and those passing to the lower extremities, did not present the same inflammatory appearance as was observed in those of the neck and upper extremities."

From the above statement, it appears, that, in this case, there was an extensive inflammation of the nervous system, and of the mucous membrane which lined the mouth, fauces, gullet, and stomach.

SYMPTOMS OF HYDROPHOBIA.

The peculiar symptom from which the name Hydrophobia is derived, namely the dread of water, is usually preceded by extreme irritability and irregularity of temper, lassitude, general uneasiness, headach, attended by giddiness, drowsiness, disturbed sleep, sense of faintness, depression of spirits, oppression at the præcordia, and aversion to light and society.

There is a painful sensation in the part bitten, which extends to the neighbouring parts, to the trunk of the body, and even to the fauces. Though it be probable that the poison is absorbed, yet the lymphatic vessels and lymphatic glands have not been observed to be indurated or swelled.

The state of the pulse is very variable, in a few cases not much accelerated; but, in others, much more quick and hard than natural.

Some patients suffer acute pain in different parts of the body; but, in others, it is limited to the neck, which is at the same time very stiff. A sense of constriction is felt in the throat and breast, and the breathing and deglutition are difficult; in some patients convulsive inspiration may be observed,

as upon going into the cold-bath; in others, there is a severe struggle for breath, which is interrupted by deep sighing and sobbing. The patient has a great dread of water, or any other fluid, even though he suffers much from thirst, and heat of his gullet and stomach. Upon attempting to swallow, the greater part of the fluid is rejected through the nose, and the greatest anxiety, spasms, a sense of strangulation, and a loss of sense follow.

Though fluids are rejected, solids pass down in some cases.

The thirst and internal heat increase with the desire to drink; and the patient, incapable of swallowing his saliva, spits it out, and suffers much from a dryness of the mouth and throat.

So great is the horror for water, that even the sight of a fluid, or of a looking-glass, or the noise of water poured from a tea-pot, throws some patients into strong convulsions.

I visited a patient to whom this happened, notwithstanding which, she had so much resolution as frequently to attempt to drink, and often succeeded, but in a few minutes afterwards the aversion to liquids returned as strong as ever; and she at last died while endeavouring to swallow.

In some cases the patient falls into a state of melancholy, his memory fails, and he falls into a soporose state; but there are other instances in which there is great mental irritation, wildness and redness of the eyes, frothy saliva in the mouth, and anxious and timid expression of the countenance.

The least noise is offensive, as the opening or shutting a door; a bright light, or even sometimes the sight of any thing white, gives uneasiness.

Fever comes on, with quick but low pulse, and this is followed by delirium; and the patient, bereft of reason, attempts to bite his nurse, and even his dearest friends.

Some have lucid intervals, during which they are sensible, melancholy, and resigned to their fate, and warn the bystanders of their danger.

After a time the agitation and delirium increase, with the convulsive twitchings of the muscles, and difficulty in breathing; the pulse throbs violently, cold sweats follow, and the

patient expires, after having been much convulsed, and generally in the course of six or eight days from the appearance of the more urgent symptoms.

OF SPASM OF THE GULLET.

Spasm of the gullet is partial, or general; is much more rare than that of the adjoining muscles of the larynx.

When the gullet has been partially constricted, the patient feels as if some extraneous body were lodged within it, accompanied with an ascent of air, owing to the stricture preventing it from passing off by eructation; and when the spasm is seated in the lower part of the gullet, the food is either retained for some time by the spasm, before it reaches the stomach, or it is rejected as soon as it arrives at the seat of the constriction.

A spasm of the gullet sometimes comes on very suddenly, while the subject of the attack seems in good health; and its duration is various, for in some cases it lasts only a few hours, but sometimes for many days, weeks, or years.

I was acquainted with an elderly gentleman, who was twice in the course of his life seized by a spasm in his gullet during dinner, and, upon both occasions, he lost the power of swallowing suddenly, when he seemed, in other respects, to be in good health.

The first attack of the disorder lasted only for a few hours, and was removed by an anodyne clyster; but the second was of three or four days' duration.

This patient, for ten years, enjoyed perfect health, and died from inflammation of his lungs.

In some cases upon record, the spasm was very readily removed, but in others it proved obstinate.

Oysterdyck * mentions a case in which such spasms lasted for twelve days.

Mr Aird † has made mention of a case in which the spasm

* *Vide* Bleuland, De Sana et Morbos Œsophag. Structura, p. 56.

† *Vide* Edinb. Med. Essays, vol. i.

of the gullet continued through the whole course of a long life.

A very singular and very obstinate case of a similar description occurred in our Hospital, in 1792, under the charge of the late Dr RUTHERFORD.

The patient lived for three years after recovering the power of swallowing, and enjoyed a tolerable share of health. She died in consequence of inflammation in her lungs. The state of her gullet was very accurately examined by Dr RUTHERFORD, who found it perfectly sound.

To illustrate more fully the symptoms of Spasm of the Gullet, I have subjoined the history of a case of that description, which was attended by my Father, Drs WARDROP, KEITH, and Mr G. BELL, and for which I am indebted to Dr KEITH. In this case, the stomach was also much diseased.

"October 10, 1810.—A. B. æt. 45, has laboured for about two years under occasional fits of dyspepsia, which he ascribes to his sedentary mode of life. For some months past, has had slight, though not constant, difficulty in deglutition, and pain about the middle of the sternum, which only is felt after swallowing, or drawing a full inspiration, or in running, &c.

"16th. During breakfast, observed, that, on attempting to swallow bread along with his tea, it stops in the œsophagus for a few seconds; a rumbling noise, as if from the discharge of wind, is then heard, and immediately after the food passes into the stomach. These effects are most perceptible at breakfast.

"17th. A probang was introduced, but in its progress was stopped, when about half-way down the œsophagus; a large bougie was then passed, and a stricture felt distinctly.

"19th. The probang was again introduced, and with some difficulty surmounted the stricture. The introduction produces slight pain, which soon goes off, but he still swallows with much difficulty. The probang passed till the 28th. It was then attempted to retain a circular probang, of half an inch diameter in the stricture, but the great uneasiness it produced immediately forced it out. Such a probang was passed with ease

several times beyond the stricture, but a considerable resistance was felt in withdrawing it. The patient was not relieved till the 9th of November.

" Still complains of difficulty of breathing on any slight exertion, and of constant pain about the sternum, stretching to the clavicles, which were much increased by a full inspiration. Soon after, being under the necessity of taking a short journey, during which he was exposed to cold, he was attacked by a slight quincy on his return; this increased all his symptoms of dysphagia, and prevented the introduction of even the smallest instrument. During a few days he used a mucilaginous mixture, with opium, and the symptoms remitted, and the probang passed as before.

" The instrument was now only used once a fortnight. About the end of December he was attacked with acute pain, tumefaction, and inflammation, in the superior part of the joint uniting the metatarsal bone with the first phalanx of the great toe of the right foot, for which he could assign no cause. By the use of leeches, saturnine applications, and blisters, the pain, swelling and inflammation, were nearly removed by the middle of January.

" He had then a slight febrile attack, which lasted only two days, and left him in a better state of health than he had experienced for some months past.

" In about a week he had a second similar attack, which also suddenly disappeared in the course of two days, but left him much debilitated. On the 10th of March, he vomited a considerable quantity of a dark-coloured mucous fluid, which was very fetid. This kind of fluid was occasionally rejected. About the beginning of April his appetite almost entirely failed him; he was troubled with constant flatulence, and acidity in the stomach. There was also considerable tension in the epigastrium, and pressure here produced much pain and singultus; but at other times he felt no pain in the stomach. To remove the oppression of the stomach, he used to excite vomiting, by which a quantity of thin, black, mucous matter was with difficulty brought up, with considerable alleviation. If he excited vomiting im-

mediately after eating or drinking, none of the food was ejected, but only the black coloured matter. At the beginning of May, his memory became greatly impaired; at which time, though much reduced, he was still able to sit up and walk about. He was also often troubled with acute pain in both elbows, or in the left shoulder; these came on suddenly, and were not removed until he became warm in bed. He continued in this way till he died, greatly emaciated, on the 26th of May. About a month previous to death, the probang was introduced, and passed nearly as easily as it did when first used.

"*Dissection.*—The cartilages of the ribs were ossified. The cavity of the thorax contained about 1½ pounds of serous fluid. The lungs collapsed, were free from adhesions, and in other respects perfectly sound. The pericardium contained a few ounces of a similar fluid. The heart was free from disease. On opening the abdomen, the stomach appeared greatly distended; the right lobe of the liver, from its superior edge, to a considerable extent downwards, was attached to that part of the stomach lying under it by strong adhesions, so that it was impossible to separate the one from the other, without laceration of their substance. The stomach being opened, was found to be filled with the same dark-coloured fluid that he vomited previous to death. The internal part of the stomach, to the extent of more than a hand-breadth over which the liver adhered, was in a state of fungous ulceration, with elevated and irregular edges. The contiguous parts were not inflamed, nor did the coats in the other parts of the stomach appear diseased. The pylorus was contracted, and that part of the stomach immediately above it enlarged, in the form of a pouch. The orifice of the cardia was perfectly free, nor could the least appearance of stricture or disease be traced through the whole extent of the œsophagus. The small intestines were distended with flatus, and none of the matter found in the stomach could be traced in them. The great arch of the colon was contracted, and filled with hard scybalæ. The liver, except in its adhesions to the stomach, was in a natural state. The gall-bladder was

flaccid; the omentum was deprived of its fat; the spleen, pancreas, and kidneys were perfectly sound."

The following case affords also a good specimen of the symptoms of spasm :—

Whilst a delicate young lady, aged sixteen, was at dinner, a small bit of bread stuck in her throat. By making an exertion, she got it forced down into the stomach; but, ever since that time, she has had a degree of pain and difficulty in swallowing, which has gradually increased, and even now she swallows liquids with difficulty.

" No tumour is to be felt in the neck, and pressing the œsophagus pretty strongly, between the thumb and finger, she does not suffer pain from so doing. The spot where every thing stops is nearly an inch above the clavicle; and when food passes the part, she feels as if it were a pin sticking in the place. When liquids pass that part of the œsophagus, they meet with no farther interruption in their passage into the stomach.

The following important case of spasm of the gullet has been given by HOFFMANN. A man, in consequence of excessive grief, was seized with spasm in the pharynx, and difficult deglutition, and felt as if some foreign body had been thrust down his throat. During the accession of the spasmodic contraction, the patient was subject to shivering and sometimes shaking of his extremities, constipation, formation of wind in his intestines, want of sleep; had hard pulse, and limpid urine. This disease lasted three months, with intervals between the paroxysms. When HOFFMANN was consulted, he prescribed mucilaginous substances, combined with antispasmodic medicines, and chiefly his own anodyne liquor, to which remedies he added pediluvia, and soothing frictions on the outside of the neck; and, in this manner, he cured his patient in six months.

Dr ABERCROMBIE, in his very valuable book on the Pathology of the Stomach and Intestines, has published a very interesting case of spasm of the gullet.

" My attention was first particularly drawn to the disease by the case of a lady, forty years of age, who had been under treatment more than a year, for what was considered *a stricture of the œsophagus*, accompanied by all its usual symptoms. Various courses of medicine, and the frequent use of bougies, had been employed without benefit. I scarcely know what induced me to propose, instead of the bougies, an egg-shaped silver ball, attached to a handle of silver-wire, to be passed occasionally through the stricture, which felt to be at the distance of about four inches below the pharynx; and, to my astonishment, the affection was completely removed, by four or five applications of this instrument. The patient continued well for more than a year, and then had a return of the complaint, which was removed in the same manner; and she had afterwards several slight returns of it, which always yielded readily. Lastly, In the case of lock-jaw, which I had occasion to meet with, the patient, towards the termination of the disease, was seized with a sense of stricture across the lower part of the chest, and great difficulty of breathing, followed by loss of power of swallowing; and these symptoms being followed by spasms of the muscles of the legs and arms, he became insensible, and died in twenty-four hours.

In a former work, the Morbid Anatomy of the Brain, I endeavoured to point out the influence of nervous irritation in deranging the functions of the stomach. Since the publication of that book, I have seen additional proofs of that fact, and more especially in the case of a man I visited along with Dr Saunders, who, for several days before death, was afflicted by perpetual vomiting, which could not be checked by any means. The food had undergone very little change within the stomach. These symptoms were followed by apoplexy.

Drs Breschet and Mylne Edwards have lately endeavoured to prove that mechanical irritation, applied to the lower parts of the eighth pair of nerves, produces the same effect as the cutting out a portion of the nerve. Dr Philip, in a late paper, made mention of several circumstances which invalidate such an opinion. He observed that a certain quantity of digested food will

always be found in the stomach of an animal for five or six hours after the eighth pair of nerves has been divided, and even after the lapse of ten or twelve hours, from its being less completely changed, and therefore expelled more slowly than in the natural state.

Dr Wilson Philip has also proved by experiments, that the irritation of the nerves had no effect whatever in forwarding the digestion of the food, neither did it tend to obviate the difficulty in breathing consequent to the section of the nerves *.

OF THE TEMPORARY SPASMODIC CONSTRICTION OF THE STOMACH AND INTESTINES.

A temporary spasmodic contraction of the stomach and intestines is by no means unfrequent, either in the one or other of these parts, though seldom common to both, and is induced most frequently by a derangement of the functions of the alimentary tube.

Each of these states occasions symptoms highly distressing, some of which are excessively painful, and followed by the most serious consequences.

This morbid contraction proceeds from other causes, and much depends upon discriminating the source of the evil in its earlier stages, as it then may frequently be obviated; but, if neglected, the most serious disorders, such as inflammation, ulceration, gangrene and rupture, sometimes follow.

Dyspeptics suffer from slight spasm of the stomach, from food of difficult digestion, various acrimonies within the stomach, worms, or other extraneous bodies lodged within it; and this spasm proceeds sometimes so far as to prove highly dangerous, and in some cases fatal. Of the effect of indigestible substances inducing spasm in the stomach, innumerable examples might, if necessary, be cited. Baron Haller has stated, that the inflation of the stomach consequent to eating melons had proved fatal. I have seen it create most excruciating pain; and my

* Vide Phil. Trans. Part I. for 1829.

father was consulted by a gentleman who suffered the most excruciating torture in his stomach and bowels, after having eaten a large quantity of nuts. The most acrid purgatives were given in vain, and at length relief was given by a tobacco clyster. Many oxen, horses and sheep, have died from devouring a large quantity of young clover. The air generated in the above cases leads to the spastic constriction of the orifices of the stomach, and to great distention of that organ. Pigs are occasionally so voracious, as to eat such a quantity of food as occasions great distention, and rupture of the stomach.

I had occasion to see a patient, at the Dispensary of this city, who had so very voracious an appetite, that I was led to inquire particularly into her history. She stated that she had been deformed at birth, and did not menstruate at the usual period. When about eighteen years of age, she suddenly became giddy, was seized with nausea and vomiting, and fluttering at her heart. She was somewhat relieved by vomiting. She had frequently such attacks. Body in general regular, though sometimes she had bilious diarrhœa. Her urine, which was always voided with difficulty, was occasionally white and thick. Her appetite *became inordinate.* Her usual food was oatmeal porridge, and of this, the mother said, she used to take about *six English pints per day*, and about a bottle of porter; but from what her neighbours stated, and a seeming disposition on her part to conceal the quantity, I am apt to suspect that the mother's account *is rather under the truth.* She generally rejected a part of her food: and as soon as the vomiting ceased, her desire for food returned so violently, that she was unable to resist it. A spasmodic affection of the pharynx often prevented the food from reaching the stomach; she was then tortured by the most intolerable hunger. The catamenia became very profuse, and continued for a week, and were succeeded by leucorrhœa. Pulse about 80. Had a disposition to sleep. Her appetite became still more voracious. The catamenia ceased about eight months before she died, which seemed to have been occasioned by apoplexy.

I was present at the dissection of the body. The dura mater

was of a dark purple colour, and the pia mater and arachnoid coat were much thickened, and adhered to each other very firmly; and the medullary substance of the brain was of the colour of liver.

The stomach and intestines were examined with the most scrupulous attention, *and were found to be in every respect in a healthy condition.*

Very various degrees of distention of the stomach have been observed: it sometimes is so great that the stomach fills the greater share of the abdomen, and conceals, in a great measure, the intestines; and the distended stomach instead of lying across the body, is frequently placed nearly in a vertical direction; and further, the distention is not accompanied by hypertrophy of the muscular coat, as sometimes takes place in respect to the heart and gullet, but by attenuation of the coats.

According to ANDRAL, distention of the stomach is sometimes accompanied by whiteness, softening, and abrasion of the mucous membrane, which was probably the effect of chronic inflammation, as anorexia, constant pain in the region of the pylorus, and a voracious appetite preceded death.

It remains to be considered, whether a constriction of the middle of the stomach invariably takes place during the digestive process, or whether it be the result of spasm. The latter seems to me to be the more probable opinion, and for the following reasons:

A partial contraction at or towards the middle of the stomach, has been sometimes observed in some persons who have suffered a violent death, and also in those who, during life, had laboured under a derangement in the functions of the stomach.

But such a contraction in the middle of the stomach is not uniformly observed even when the body is examined before it is cold. WEPFER has made mention of it in his examination of the stomach of a woman who had been executed on account of the murder of her child; but my dissections of executed criminals have not led me to make a similar remark. According to Sir E. HOME, the contraction at or near to the middle of the stomach constantly takes place during the process of digestion,

and, like other muscular constrictions which take place during life, goes off in the act of dying.

If the above observation be admitted to its full extent, it seems probable, that such a contraction would have been observed by all accurate anatomists; whereas Dr S. SOEMMERING, perhaps the most distinguished anatomist of the day, does not consider the contraction at or near to the middle of the stomach, to be natural, but the product of the pressure of stays; and has added, that there is no trace of such a constriction in the middle of the stomachs of children *.

The same author has described a *constriction near to the pylorus* as the natural form of the stomach, which I have also observed; and, in some cases, as DE HAEN has justly remarked, the stomach has *been constricted in several places*, so as to resemble the colon.

There are other arguments hostile to the opinion of Sir E. HOME. There is no muscular band appropriated to that purpose, and a constriction frequently takes place in other organs of the body similarly constructed as the stomach, but subservient to a different purpose, as the gall-bladder, biliary ducts, the ureters, bladder of urine, urethra, the uterus, and vagina. This temporary constriction, as in the case of the urethra and gullet, has sometimes paved the way for the permanent organic stricture.

Lastly, a spasmodic constriction at or near to the middle of the stomach, is, according to the statements of MORGAGNI, Sir E. HOME and NACUART, a source of deranged digestion, and accompanied by great distention of the stomach.

The last named author has described a case, in which the left pouch of the stomach had been much distended, descended as low as the os ilium, and contained about two pints of brownish matter, mixed with pus, while the mucous membrane was of an unusual softness, and discoloured.

There was an aperture in the intervening indurated membrane, about four lines in diameter.

* Denkschrif des Akad. d. Wissensch. z. Munchen, tom. viii.

The mucous membrane of the pyloric sac was somewhat thickened.

A malignant ulcer was discovered when the intervening membrane was divided.

The patient, a lady of fifty years of age, had, for many years, laboured under what are called stomach complaints. In the year 1822, a tumour appeared in the region of the stomach, extending to the left os ilium, and she occasionally discharged, by vomiting, fœtid dark coloured fluid.

By various remedies, she got somewhat better; but the symptoms returned with increased severity. During the year 1826, the tumour became more apparent, and more tender on pressure. The lady became very weak and emaciated; she could retain no kind of food on her stomach, and died soon afterwards.

According to Lobstein, spasmodic vomiting is occasionally connected with an inflammation of the semilunar-solar ganglion. This may be a frequent cause of vomiting, as injuries done to the spinal cord frequently give rise to inflammation of the mucous membrane of the bladder of urine, and also to the discharge of pus along with the urine; and, in the opinion of some writers, those wandering pains in the stomach, to which hypochondriacs are liable, are to be imputed to a low degree of inflammation of the nerves of the stomach; and it may be added that, in different kinds of neuralgia, an inflammation of the nerves has been detected in some cases; whereas,

According to Broussais, gastralgia and gastrodynia are to be imputed to the inflamed state of the mucous membrane of the stomach.

Such seems to me to be too limited a view of the subject, as gastrodynia may originate either from the stomach being nearly empty, or too much distended; in proof of which, in the former case, it is relieved by taking food, and in the latter, by abstinence, or taking food only in small quantities.

Besides, pain in the stomach is often sympathetic, and the concomitant of diseases of the duodenum, colon, rectum, liver, kidney, womb, and brain, or of gout.

OF THE SYMPTOMS.

The symptoms vary in their degree and duration. On some occasions, the cramp begins in the extremities of the body, and at length attacks the stomach, but on others, it is limited to the stomach and parietes of the abdomen.

The cramp of the stomach is a very painful and alarming disorder, when it occurs within three weeks after delivery *. It is accompanied by sense of twisting in the affected part, by small, contracted, and irregular pulse, and cold extremities; and difficult breathing, and a hard tumour is felt in the seat of the stomach, if the recti muscles be not spasmodically contracted.

Cramp in the stomach is sometimes connected with hernia at the navel.

I had occasion some years ago to visit an old fat lady, who had been, during the greater part of her life, the victim of dyspepsia, and of occasional severe attacks of cramp in that organ, which were frequently relieved by large doses of laudanum, and the application of a blister to the stomach. There was no very obvious external tumour at the navel, as the hernial swelling, which protruded a little beyond the peritoneum, was buried and concealed in the subcutaneous fat. In my opinion, this patient's death was rather to be imputed to an effusion of a small quantity of a serous fluid between the membranes, and into the ventricles of the brain, than to the hernia, the contents of which did not exhibit the usual symptoms of strangulation.

No morbid appearance could be discovered in the stomach, excepting a small patch of lymph on its smaller curvature. The symptoms in many cases come on in distinct paroxysms, and the respirations are sometimes short and interrupted, owing to spasm of the diaphragm.

The spasm is sometimes followed by hæmatemesis, gastritis, or laceration of the mucous membrane of the stomach.

* Vide Burns' Midwifery, p. 498, 7th edition.

OF THE TEMPORARY SPASMODIC CONTRACTION OF THE INTESTINAL CANAL.

A SPASMODIC contraction of the intestines is very frequent, and varies as to its seat, degree, extent, and duration.

This spasmodic contraction constitutes the disease commonly called Colic, which in its more aggravated form has been called *Ileus*, or *Iliac Passion*.

To enumerate the various causes of colic, is totally foreign to the object of this book: some of these have been described in the preceding pages, as extraneous bodies, worms, displacement, &c.

The earlier symptoms of colic are slight and occasional pain in the region of the navel, and which, in many cases, shifts its place, but at other times, is acute and fixed; great anxiety, headache, acute pain in the region of the clavicle, intermitting pulse, syncope; and even epilepsy has, in some cases, been consequent to distention of the colon, and, in some few cases, palpitation of the heart of several days' duration.

Ileus is accompained by still more acute pain of the abdomen, especially in the region of the navel, by considerable distention, and generally by loathing of food, nausea, and vomiting of bilious looking fluid, and often of fæces, and, on some occasions, even the clysters that have been administered have been rejected by vomiting.

Colic, and its more acute form ileus, is sometimes unaccompanied by fever, but there are many exceptions to this general observation.

When, from any cause, the progress of the contents is impeded, the intestine becomes more or less distended, the distention begins near to the obstructing cause, and is at length propagated to the whole or greater part of the intestinal tube.

Ileus occasionally proves fatal, and very speedily so in some cases, from the mere distention of the bowels.

Many years ago, I had occasion to examine the body of a lad of 14 years of age, who had been a patient of my father, who

died from this cause, after having suffered for five days most severely, from obstinate constipation, acute pain in the bowels, and bilious vomiting. No other morbid appearance was discovered than a very great enlargement of the smaller intestines.

Ileus often proves fatal by inducing inflammation of the muscular coat, but that inflammation has been detected by a post-mortem examination, when, before death, there had been no symptoms which led to a suspicion of its existence.

This inflammation is not characterised by the extreme tenderness of the abdomen which accompanies peritonitis.

It is proper also to repeat the observation already made in the chapter on hernia, that the state of the pulse is not an unerring index to the state of the intestines, as an intestine has been found inflamed when the pulse before death had been little affected; and hence if the larger intestines be sound, a passage may be procured by purgative clysters, whilst the inflammation of the smaller intestines is proceeding rapidly to its fatal termination.

An inflammation beginning in the muscular coat may be rapidly propagated to the other coats; or the peritoneal or mucous coat may be the primary seat of disease, and hence the great variety observed in the symptoms.

Spasm of the intestines also sometimes proves fatal, more especially to children, by paving the way for intus-susceptio.

The intestines of children being much more irritable than those of adults, are very frequently alternately contracted and dilated; the contracted part passes within the larger adjoining portion, occasioning the disease called intus-susceptio.

I have, during the examination of the bodies of children, and more especially of those who were victims of diseases of the spinal cord, detected several such intus-susceptions in the same body.

Intus-susceptio takes place in the act of dying, or some time before death: in the former case, the included may be readily withdrawn from the including portion of intestine; but in the latter, that cannot be done, as the included and including portions of intestine are fixed to each other by it.

The mere contortion of the intestinal tube has occasionally so far impeded the progress of the fæces, as to occasion very considerable enlargement of the intestines.

I met with a case in which a man of forty years of age had, before death, suffered most excruciating pain in his belly, which was not increased on pressure, and no stool could be procured either by active purgatives or clysters. The sigmoid flexure of the colon was twisted from left to right; which twisting could not be readily disengaged, and was renewed upon my ceasing to raise the intestine; it had proved so complete an impediment to the progress of the fæces, that the rectum was quite empty. Upon dissection, the whole of the abdomen seemed as if filled by three turns of the colon, of unusual size, disposed somewhat in a vertical direction.

A great degree of contraction of the intestine has been observed to take place in consequence of low diet. Such has been observed in some Catholic countries where individuals, as a penance, submit to very poor and scanty food. This circumstance has been mentioned by MORGAGNI, who states that SCARPI, when a young man, took very little food, and abstained for several days from drinking even water. He became most obstinately constipated, and was affected by piles.

A most remarkable example of abstinence, during two years and eight months, has been lately recorded.

The body was examined by Drs ROLLANDO and GALLO of Turin. The serous membranes were dry, and like parchment. The stomach was displaced and contracted like the colon The jejunum and ileum, and transverse colon, were also much contracted. The membranes of the intestinal tube were thickened and callous, and the sigmoid flexure of the colon was completely obliterated. The mucous membrane of the stomach and intestines was softened. Several excrescences were attached to the mucous membrane of the rectum *.

In the cases above referred to, there was no appearance of peritonitis.

* Vide London Medical and Surgical Journal, by Dr EPPS, for March 1829.

The distention of the intestines consequent to constriction, is in some cases very great. Mr Collins * has published the account of a young woman, who suffered much from very acute colic, after which a small circular tumour appeared in the right side; it gradually increased in size, so that at length it attained the size of a quart basin in its centre, and on each side it was about the size of the arm.

Mr Young has given a more remarkable case in the Philosophical Transactions, vol. xxxix. A girl, sixteen years of age, had a hard swelling in the left side of her belly, which gave her intense pain. After twelve hours, the tumour subsided spontaneously, but it returned and disappeared at first every three months, for several years, until she was married, which took place when she was thirty-five years of age. She had one child.

At length a nurse administered a large dose of jalap, which operated violently, removed the swelling, then the size of two fists, from the side. This was succeeded by tenesmus, great pain in the rectum, and retention of urine. Mr Young's assistance was at this period required, who discovered a hard substance within the sphincter, and which he removed, and cured his patient.

Various species of colic have been enumerated by authors: the Colica stercorea, flatulenta, pictonum, spastica, biliosa, accidentalis, phlogistica, scirrhosa, herniosa, dysenterica, calculosa, verminosa, hæmorrhoidalis, arthritica, scorbutica, nephritica, and hepatica.

Much pains has been taken to point out the characteristic symptoms of these different kinds of colic, and also the place of the contraction of the intestines.

The colica stercorea is said to be distinguished by the sense of weight and fulness in the bowels, and by the constipation which has preceded it.

The colica flatulenta, by the intestines being much stretched by air, by their elastic feeling, by the rumbling which the air passing from one part of the intestines to another creates; by

* Edinburgh Medical Journal, vol. i.

the pain in the belly changing its place, and by the relief which the discharging the air upwards or downwards gives; and by the constipation. This species of colic has sometimes been said to be the cause of umbilical hernia.

Bilious colic is preceded by headache, nausea, and sometimes by fainting; it is supposed to be distinguished by the acute griping pain it creates, though the abdomen be not tense; by the tongue being covered by a yellow fur; by there being considerable thirst, and often a short dry cough, bilious vomiting, and constipation; by its exacerbations and remissions, by the pulse being somewhat accelerated, and by its tendency to pass into cholera or enteritis.

The symptomatic colic is distinguished from the idiopathic by the previous history of the case.

It has been supposed to be possible, from the symptoms, to discover the seat of the unnatural contraction of the intestines. Thus, pain in the navel has been supposed to be characteristic of contraction in the jejunum or ileum: Nervous oppression, torpor, inclination to sleep, when the stomach is empty; occasional distention of the abdomen, pain in the right side, which is occasionally very great, and which stretches to the back, and occasionally to the top of the right shoulder, and which changes its place upon the expulsion of air, slight yellowness of the eyes and countenance, with an irregular and soft pulse, to indicate contraction of the duodenum: and pain in the right side, stretching upwards to the region of the liver, to indicate contraction of the caput cæcum coli.

Sauvages * has made, what appears to me, a very just observation respecting the diagnosis of the different kinds of colic. "Cum intestinum tenue et crassum diversas sedes occupet, et diversis visceribus abdominis contiguum sit, difficile est ex sensu ægrotantis partem affectam determinare, et errare in hoc assignando, quotidianum est." Besides, though the seat of the constriction could be ascertained, that circumstance does not alter the method of treatment.

* Vid. Nosol. Method. vol. ii. p. 99, quarto edit.

A languid, dejected, or maniacal expression of countenance, nausea, slight oppression in the region of the stomach, are the earlier symptoms of the Colic of Poitou.

In this form of colic, the pain is more fixed than in colic originating from other causes.

In some cases, the pulse is small, the skin cold and clammy to the touch, and the patient feels extremely weak, so that he totters when he walks. There is a want of appetite; the food that is taken is imperfectly digested, and all the symptoms are aggravated by exposure to cold, or by getting the feet wetted. On some occasions, diarrhœa comes on, which affords considerable relief for a time.

In the progress of the disorder, the constipation becomes more obstinate, and the retraction of the parietes of the abdomen in the region of the navel considerably greater.

There is also giddiness, dimness of sight, and much more acute pain at the pit of the stomach.

The patient becomes more costive as the sickness, bilious vomiting, and pain in the bowels, increase.

Upon the vomiting ceasing, the pain abates, and hiccup comes on; but the pain soon returns, and often extends to the region of the navel, to the back and loins, and even to the legs, the muscles of which are in some cases painful on pressure. The pathognomonic symptoms of the Colic of Poitou are, the acute twisting pain about the navel, which is not increased, but rather diminished, on pressure, the dragging inwards of the parietes of the abdomen, which, when pressed, feel hard or knotty, tenesmus, and obstinate costiveness.

The sphincter muscles of the bladder and anus are, in some cases, much contracted, and prevent the discharge of the fæces, the introduction of a clyster-pipe, and the passage of the urine.

The above symptoms are generally of several days' duration. Towards the conclusion of the disease, the patient suffers excessively from griping, has a disposition to go to stool, and discharges a quantity of fæces in the form of hard balls, like sheep's dung, mixed with a viscid mucus, or blood.

When this disorder has been neglected, or improperly treated, it is sometimes succeeded by palsy of the upper extremities, by extreme weakness, loss of voice, amaurosis, deafness, or epilepsy.

The palsy is occasioned by a species of disorganization of the muscles, which, according to Mr J. HUNTER, become drier, more fibrous and tough than usual, and of a cream colour; and, according to DE HAEN, the deltoid muscle was, in one case, converted into a membrane. The palsy is, on some occasions, common to both arms, but sometimes limited to one of them. It evidently affects the extensor more than the flexor muscles: Hence the head is bent, and the fingers are clenched. There is a most remarkable peculiarity as to this kind of palsy; it is not accompanied by any loss of sensibility of the affected member.

This disease seldom proves fatal; hence but few opportunities of post-mortem examinations occur. No organic derangement, excepting constriction, was observed by SENAC, who examined the bodies of fifty persons who died from the disease.

Mention has been made by WILSON and LIEUTAUD, of the partial thickening of the coats of the intestines; and ANDRAL observed, in some instances, traces of inflammation.

LIEUTAUD, in one or two cases, met with livid spots upon the intestines.

No visible organic derangement has been found in the brain, cerebellum, or nerves.

OF SPASMODIC STRICTURE OF THE RECTUM.

Stricture of the rectum is often occasioned by a spasmodic contraction of the sphyncter ani muscle, or by a spasmodic contraction of the muscular coat of the rectum, and this is by no means a rare disorder.

The most frequent cause of constriction of the rectum is a derangement in the functions of the digestive organs; and it

gives the fæces somewhat of the same flattened appearance as an enlarged prostate gland.

Spasm of the rectum, according to HOFFMAN and G. C. SCHMIDT and DESAULT, is also sometimes the immediate effect of metastasis.

This constriction of the rectum may proceed from low diet, and from the want of the stimulus of distention; and, according to HOFFMAN, the suppression of the hæmorrhoidal discharge has occasionally been succeeded by a contraction of the rectum, which occasioned death; and, upon dissection, the rectum was found contracted to about the size of the finger. Many other causes of constriction of the rectum have been enumerated in the preceding pages, as extraneous bodies lodged in it, prolapsus ani, hæmorrhoids, and fistula ani, and the operation for the cure of the latter disorder. Inflammation also proves a cause of a spasmodic contraction of the rectum. I have seen a remarkable degree of contraction of the rectum where that bowel had been wounded during the performance of the lateral operation of lithotomy. The temporary constriction of the gullet frequently has laid a foundation for the permanent constriction: the same holds true in respect to the rectum.

A spasmodic contraction of the sphyncter ani muscle is induced by constipation; and more especially in women of an irritable habit of body, by trivial causes. Constipation is succeeded by painful sensations at the verge of the anus, which go off after a short time, and do not return until the cause of the irritation is again applied.

A spasmodic contraction of the sphyncter ani muscle is sometimes antecedent or consequent to stricture occasioned by organic disease of the coats of the rectum, and also by irritation applied to the neighbouring parts, as by that of gonorrhœa, when the disease is in its inflammatory stage; in proof of which, the painful sensations in the rectum have been removed immediately by the discharge of blood from the urethra.

Spasm of the sphyncter ani has also been sometimes occasioned by the over distention of the bladder of urine.

A peculiar disposition to this painful and temporary spasmodic contraction of the sphyncter ani muscle has been stated by Mr Copland to arise from this muscle being unusually broad, so that it embraced the extremity of the rectum for two or three inches.

Spasm of the sphincter ani muscle is often followed by a low degree of inflammation of the mucous membrane, by which it contracts an intimate adhesion with the adjacent coat, and ultimately forms a kind of fold across the rectum, which, by being covered by a layer of coagulable lymph, adds considerably to the contraction of the rectum.

A stricture of the rectum is not easily detected in its earlier stages, excepting by a very minute examination; and I believe it has been frequently mistaken for dyspepsia; the more especially, as many patients, labouring under this affection, have a pale complexion, a bilious appearance, acidity of the stomach, flatulence, and as considerable relief is given by the use of magnesia and rhubarb, and other purgatives.

The earlier symptoms of stricture of the rectum are, in many instances, so slight as not to attract the attention of the patient. Stricture of the rectum has also been mistaken for a gravelish disorder, on account of the pain it sometimes creates during the passage of the urine, and in the loins, perineum, and extremity of the penis.

The bowels are at first more torpid than usual, which is accompanied by a certain degree of uneasiness in the region of the os sacrum, which scarcely amounts to pain. These symptoms are removed by purgatives. After a time, the attention of the patient is directed to the nature of his disorder, the functions of the stomach being much deranged, and owing to obstinate constipation, there is a necessity of repeating the purgative.

In the progress of the disorder, in consequence of the accumulation of fæces, oppression of the stomach and considerable flatulence follow, together with headache, tenesmus, colic pains, and tension in the course of the colon.

A gentle diarrhœa is sometimes consequent to the above symptoms, and affords, for a time, considerable relief.

The attacks of colic become more frequent and more severe, and are, on many occasions, accompanied by tenderness in the abdomen, and it now is very difficult to administer a clyster.

The nature of the disease becomes still more obvious on passing up the finger or a bougie.

The dilatation of the larger intestines is, on some occasions, very remarkable. Above the seat of the constriction, the bowel is sometimes twice its healthy caliber.

Lastly, Spasm of the sphyncter ani has been observed in persons who seemed, at the moment of the attack, to be in good health, and to have been occasioned by no obvious cause.

Dr Baillie has published the following very correct portrait of this disease :—

"This case is very different in its nature from the usual stricture of the rectum, and it is of considerable importance that it should be distinguished from it in practice. In the one case, the prognostic would be favourable, and in the other case, it would, in general, be very much the contrary.

Upon a slight degree of attention, the two cases might be confounded; but, when accurately examined, they may, at all times, be clearly distinguished from each other.

In both cases, the fæces will be found to be flattened in their shape, small in their size, and, in some degree, serpentine or twisted; but the other symptoms will be found to be very different.

In the common stricture of the rectum, the situation of the stricture is generally two or three inches above the outer sphincter, and there is a sound capacious portion of the bowel between the stricture and this sphincter.

At the seat of the stricture, the coats of the rectum are felt to be more or less thickened, and not uncommonly, in the cavity of the stricture, there is a hard irregular ulcer.

Although this disease has, in its earlier stages, little influence upon the constitution, yet, when it has made a farther progress, the powers of the constitution become very much weakened, great emaciation generally takes place, and the patient is destroyed.

In the other species of stricture produced by a contraction of the sphincters of the anus, the contraction is found, upon examination, to be at the anus, or the very lower extremity of the rectum. The inner membrane of the rectum is discovered to be sound, and the general health is not impaired."

I shall conclude this section, by subjoining a case of spasm of various parts of the body. The patient was about fifty years of age.

Oct. 23.—His lower jaw is firmly shut by the contraction of the temporal and masseter muscles, and scarcely admits the point of a quill. The muscles of the back of the neck, trunk, and lower extremities, are firmly and permanently contracted, by which the body is bent backwards. The legs are also pulled back, and the knees, feet, and toes, are firmly and permanently extended. The body rests upon the shoulders and legs, the breech being elevated from the bed. The muscles on the fore part of the trunk are also firm, hard, and contracted, as are also those of the anterior part of the thighs. At the interval of every few seconds, he is subject to severe painful spasms of the muscles of the whole body, with the exception of the arms, muscles of respiration and deglutition. Pulse 88; feeble; no passage of bowels for the last four days. Tongue foul, so far as it can be seen. The surface is covered with a clammy sweat. Six days ago he was attacked with pain, followed by spasm of the muscles of the lower jaw. The muscles of the trunk and legs were then similarly affected at the interval of every few minutes, but the back, legs, &c. have been in their present state for the last four days only.

No wound or other injury can be detected. He got himself wet some days previous to his illness.

Has been somewhat relieved by the use of purgative and occasional anodyne draughts.

27th.—Pulse towards 100, and full; pretty copious alvine evacuation, in part lumpy and dark coloured, with temporary relief to some extent of spasm, which occasionally remits.

28th.—Pulse about 90, less full; surface warm; gentle perspiration; spasmodic affection continues, particularly that of

the abdomen, which is prominent, and gives a tympanitic sound; pretty full alvine evacuation; fæces fluid, and still dark-coloured. The mixture was taken, but he declined the continuance of it on account of griping. Anodyne was given, and beef-tea taken; a bad night. Anodyne repeated since morning. He is now asleep.

29th.—Has had pretty full and repeated alvine evacuation, by the use of a turpentine clyster. That which followed the enema was accompanied with sensible relief, particularly of the back; the abdomen is also easier, with less of tympanitic sound. Enema terebinth. was repeated.

Nine P. M. was suddenly seized with a sense of stricture across the lower part of chest, and with great difficulty of breathing. The muscles of deglutition also became affected, so as entirely to prevent him swallowing. At about one o'clock, A. M. of the 30th, all the muscles of the arm were, for the first time, spasmodically contracted, and the spasms recurred every ten minutes. Soon afterwards he became insensible, with complete sinking of the features. A very irregular diffused pulsation of the heart was observed. Two strong anodyne enemata were administered without any visible effect, although they were retained. He died about nine P. M. twenty-four hours after the muscles of respiration became affected.

Upon dissection, the pia mater of the brain was found much inflamed, and especially that part of it which forms the tela choroidea.

The substance of the brain was harder than usual, and inflamed.

There was a small quantity of turbid serum in the lateral ventricles, and also in the third ventricle.

The vessels of the pia mater of the spinal cord were very much gorged with blood.

SECTION V

OF PALSY OF THE ALIMENTARY CANAL.

The food passes through the alimentary canal by means of the combined action of the muscles of respiration, and that of its proper muscular coats; which serves to mix its various parts, to expose them to the orifices of the absorbent vessels arising from the very extensive surface of that long tube, and thereby contributes materially to chymification and chylification.

The food is propelled onwards by the contractile power of the coats of the stomach and intestines, and by the contraction of the abdominal muscles, which is as essential to the due performance of the functions of the alimentary canal, as the necessary quantity and quality of the fluids derived from its mucous coat, or from the liver and pancreas, or the due action of the nerves.

These muscular agents, however, on some occasions, do not act in concert. It is evident that one of them alone is inadequate to the purpose; hence distention and the loss of power of the coats of the intestine occur in hernia, as the contraction of the abdominal muscles and diaphragm are inadequate to push onwards the contents of the displaced intestine. The same effect takes place from the relaxation consequent to tapping for the dropsy of the belly, or from organic disorders of the spinal cord.

If the imperfect action of the muscular coat of the stomach impedes chymification, and that of the intestinal tube chylification, a morbid irritability, which often is consequent to a certain degree of inflammation of the mucous membrane, occasions the rejection of the ingesta by vomiting, or their too speedy transit into the duodenum. Such unchymified alimentary matter stimulates the mucous membrane of the intestines, so as to produce in it the same irritability as existed in that of the sto-

mach; and hence the aliment will be passed per anum before chylification can possibly have taken place.

The muscular power of the alimentary tube is occasionally inordinate or *spasmodic*, but, in other instances, deficient or *atonic*; and whenever the one state or the other predominates, obstruction to a greater or less extent follows, together with its usual fatal consequences.

Palsy seldom or never affects the whole alimentary canal, but is usually limited to the gullet, the stomach, or to a portion of the intestinal tube.

Any cause which obstructs this tube, necessarily leads to inordinate distention, to palsy, and sometimes to ulceration and rupture, if the obstructing cause continues in operation for some time.

From mere debility, as the concomitant or sequel of long continued fever, phthisis pulmonalis, or other diseases, a difficulty of swallowing frequently ensues; and such a loss of power in the muscular coat of the intestinal tube is also the frequent consequence of apoplexy, palsy, and other organic derangements of the nervous system, and also of those narcotic poisons which impair or destroy the nervous energy.

OF PALSY OF THE GULLET.

There are various degrees of palsy of the gullet, as those muscles by which deglutition is accomplished are very differently affected at different times, and, on some occasions, these muscles do not obey a slight stimulus. Hence, in many diseases accompanied by great debility, a small tea-spoonful cannot be swallowed, whilst the contents of a larger spoon readily pass down; and we often observe that the slighter degrees of palsy of the gullet may be obviated by passing a probang.

The loss of the power of deglutition is sometimes sudden: on making the attempt to swallow a liquid, a gurgling noise in the throat may be heard, which is speedily followed by the rejection of the whole or part of it,—a proof that, though the mus-

cular fibres of the gullet be incapable of propelling the food through the gullet, yet they are not unsusceptible of the stimulus of distention, and may be excited to an inverted action.

During the effort of swallowing, the whole bodily frame is much agitated, and in some instances violently convulsed; on other occasions, the patient perceives, in the first instance, a difficulty in swallowing solids only. The throat exhibits nothing uncommon, excepting paleness, and flaccidity of the velum pendulum palati, and tonsils.

The only certain means of detecting this cause of difficult deglutition, is to pass a probang into the stomach, which, in the case of palsy of the gullet, is easily done, there being no mechanical obstruction. Palsy of the gullet is generally combined with palsy of some other part of the body; but local palsy is comparatively rare; therefore I subjoin the following cases as illustrations of the nature of that form of the disease:—

Case I.—An officer of the army, upon his return from the West Indies, where he had had the Yellow Fever twice in the course of one year, consulted me on account of a difficulty of swallowing. He was much reduced, had in part lost the power of deglutition, and had become so irritable, that the attempt to swallow occasioned violent agitation, and sometimes hysterical fits. Only a small part of what he endeavoured to swallow passed into his stomach, the remainder being immediately rejected through the mouth and nose.

A probang passed readily through the gullet, but it gave him much uneasiness. Recourse was had to nutritious clysters, and by these he was for some time supported. Electricity was also employed, and, by means of it, he soon became capable of swallowing with considerable ease; for some time he could only swallow, while sitting upon the electrical stool.

By the continued use of electricity during four months, and by means of regular exercise, and cold bathing, he got well.

Case II.—I had occasion to visit a captain of a trading vessel, afflicted by palsy of the gullet, who, during the greater part

of his life, had been exposed to many hardships, and to much cold, damp, and rainy weather. He also regained in a degree the power of swallowing by means of electricity, and other stimulating remedies.

The following cases of palsy of the gullet were communicated to me by Dr CARMICHAEL SMYTH:—

"CASE I.—J. B. a country lad, 19 years of age, was, in the beginning of March 1786, seized with shivering, and pain at the pit of the stomach, which extended down the left side, and was accompanied by a slight degree of difficult breathing, although without any cough. About fourteen days after this attack, he complained of palpitation at the region of the heart, which was most severe when he was in bed, or in a recumbent posture. His appetite was good, his body regular, and his sleep natural. Had always been subject to wind in his stomach, though more so since his present indisposition. About a month after the commencement of the above symptoms, he perceived that he swallowed with difficulty meat, bread, or any solid food, although broth, milk, porridge, or other liquids, readily passed into the stomach.

"About the middle of May, the difficulty of swallowing increasing, he took nothing but liquids, and lived chiefly on milk, to which a small quantity of rum was occasionally added. The pain at the pit of the stomach continued only for three weeks, but all the other symptoms above described, viz. the difficulty of breathing, palpitation, and flatulence, owing to which his stomach at times was greatly swelled, with a sense of heat in his throat, had gradually increased. He complained likewise of being occasionally chilly or hot, and of a constant perspiration, particularly in hands and arms, and of a pain in his left side, with which he had been seized about a week before.

"He was ordered a cordial and volatile mixture, and volatile liniment to be applied externally to his throat.

"On the morning of the following day, he swallowed some milk porridge, and gruel; that evening he had a blister put upon his back, and, on Wednesday, he ate some meat and bread.

" He was ordered, two days afterwards, to take five grains of the pil. ex myrrh. compos. Phar. Lond. every night at bed-time, and had a caustic put on his left side, which entirely removed the pain, and relieved his breathing.

" In a few days, he completely recovered."

Case II.—" James Bull, a soldier, aged 32, applied for admission into the Middlesex Hospital, on Thursday the 11th January 1785. He gave the following account of his complaints.

" That, on the Sunday preceding, he went to bed in his usual health; about three o'clock in the morning he awoke, and being thirsty, got out of bed to drink some water, which was in the room, but, to his great surprise, found he could not swallow it; he then tried to swallow some milk and water, but with no better success. He said, that except having lost the power of swallowing, he was in other respects in perfect health, and felt no inconvenience but faintness and hunger, excepting when he attempted to swallow; and that upon doing this, he was in danger of suffocation, the liquor being forced back immediately through his nose and mouth. This I found to be strictly true, as I made him try to swallow a little milk in my presence.

" Upon examining the fauces, there was no preternatural appearance, only that the velum pendulum palati, tonsils, and posterior part of the pharynx, seemed uncommonly pale and flaccid.

" The probang passed readily into the stomach, a proof that there was no mechanical obstruction or stricture in the gullet.

" He had a clamminess in his mouth, with a hawking and spitting of phlegm. Upon the whole, it was apparent that the patient's complaint was a palsy of the gullet, and this was still farther confirmed, by remarking, upon a closer inspection, that his mouth was drawn a little to the left side. He was ordered to have a broth clyster immediately, and likewise to have his throat fomented with warm spiritous fomentations, and afterwards a large sinapism to be applied. In about two hours, he

was able to swallow broth. The day following he had an emetic, and with the use of warm and stimulating medicines, was in the course of the week discharged from the hospital cured."

Case III.—" Mr K——, a man between 50 and 60 years of age, of a sallow complexion, of a tall stature, and of a spare but muscular habit, had suffered for some time from stomach complaints. He had also some slight paralytic attacks in the face and arm. He suddenly lost the power of swallowing even liquids. The probang passed with ease into the stomach; and it was remarked, that, immediately after using it, he could swallow a very little milk, or any other mild liquor, although wine and porter caused coughing, and a risk of suffocation. He was supported for ten days or a fortnight by clysters and beef-tea, or milk poured into the stomach by means of a tube or canula made of the elastic gum. After some time, he gradually recovered."

Palsy of the gullet is also a symptom of some diseases; as of hysteria, of the last stages of fever, and of phthisis pulmonalis. In such cases, a small quantity of any fluid does not give the necessary stimulus; hence a large spoonful of a fluid gets down, though the patient be incapable of swallowing a smaller quantity.

OF PALSY OF THE STOMACH AND INTESTINES.

Notwithstanding the number of nerves which are proper to the stomach and intestines, these organs sometimes become paralytic.

The most frequent cause of a certain degree of loss of power of the coats of the stomach and intestinal tube, is over-distention, the consequence of some mechanical obstruction; and mere debility, and various disorders of the nervous system, produce the same effect.

This loss of power of the stomach is seldom so great, that vomiting cannot be excited. Lieutaud has supplied an excep-

tion to the above general remark, and adds, that his patient for some time before his death had complained much of a sense of weight and fulness in his stomach, which, upon dissection, was found very much distended, though the passage through the pylorus was free.

The distention of the stomach is occasionally very considerable, and accompanied by displacement of this organ. I have seen it placed vertically, instead of across the body; and the pyloric orifice lay below the navel.

The distention has sometimes proceeded so far, that the cause has been supposed to be dropsy of the belly. Bonnetus has made mention of such an instance, and most unfortunately the patient was tapped, soon after which he died.

Palsy of the stomach is characterized by languor, paleness of countenance, lips and tongue, sense of weight in the stomach, want of appetite, imperfect digestion, considerable distention, and frequent eructation of wind.

Hysterical women are liable to very considerable distention of the stomach. Dr Burns of Glasgow has most ably described different modifications of this nervous disorder. He observes, "It is usual, during some part of the paroxysm, for the stomach and bowels to seem prodigiously inflated, and feel very hard; but in an instant, and without any evident discharge of flatus, the inflation vanishes. This tumefaction, however, is often apparently increased by the spine being bent back, and the abdomen protruded. The paroxysm does not go off by much eructation, but often by ineffective efforts to vomit. It is usually accompanied with distressing feeling of stuffing, particularly after eating. Sometimes paralysis of particular members or organs suddenly takes place, and as suddenly goes off; one side may be affected, or the sphincter of the bladder or the tongue, or pharynx, may be paralytic, and continue so for many hours. The patient cannot speak, and, although tormented by thirst, cannot swallow, but spontaneously these symptoms go off for a time; and anæsthesia generally exists as long as the disease lasts, and particularly in the lower extremities. Sometimes the patient for a long period cannot sit up without

feeling a distressing sense of failure, sinking or dragging, in the upper part of the abdomen, and near the chest; or she has more temporary attacks of strong sensation, of depression and faintishness, as if she were going to die, and yet the pulse is not affected."*

It may be proper to add, that it is sometimes difficult to determine, whether the abdominal bowels or the brain be the primary seat of the disease, as these act and react upon each other in a very remarkable manner. The different abdominal bowels also influence each other, and thus very complicated and very dangerous maladies are induced.

Palsy of the intestines, of various degrees, is generally combined with over-distention, originating from the obstruction to the passage of their contents, or it may proceed from inflammation of the muscular coats of the intestines causing them to become softened, and to lose their contractile power.

The functions of the intestinal canal are impaired, not only by diseases of the nervous system, and especially of those of the spinal cord, but also by a disordered state of the functions of the liver and stomach.

Palsy of the intestines is, on many occasions, the earliest symptom of organic disease of the brain, and especially of water in the head, of which I have given several examples in my treatise on the Morbid Anatomy of the Brain; but, at the same time, I have met with many examples of constipation, more especially in ladies, which did not seem to be detrimental to their health. Some of these had no passage for eight or ten days, or even for three weeks.

Palsy of the intestines is also an occasional sequel of palsy of other parts of the body.

A striking instance of this kind occurred to Dr Hunter. The costiveness, he observes, "gradually increased, so that at length the bowels were emptied only twice in two months, while she (the patient) was eating heartily all the time, and had no sensible excretion, besides the common quantity of urine, and a continued spitting of saliva. During the last twelve days of

* Vide Burns's Principles of Midwifery, 7th edit. p. 657.

her being without any kind of solid or fluid food, or drink, she never expressed the least degree of hunger or thirst *."

Palsy of the rectum is often connected with palsy of the sphyncter ani.

A palsy of the sphyncter ani or of the sphyncter vesicæ is often connected with injury or disease of the spinal cord, or it proceeds from a general paralytic state of the body.

Various degrees of incontinence of urine take place. The urine comes off in drops when there is no inclination to void it, or a certain quantity of urine can be retained, until the call to pass it becomes so strong as to be irresistible, or the urine is discharged during sleep. The above observations are applicable also to the evacuation of the fæces.

SECTION VI.

OF OTHER ORGANIC DERANGEMENTS OF MUSCLES.

The other organic derangements of muscles are hypertrophy; inflammation and its consequences; the conversion of muscles into a membranous or ligamentous substance, into fat, into cartilage or bone.

OF THE INCREASE OF THE BULK OF MUSCLES.

When any muscle or set of muscles is much exerted, the muscle increases considerably in bulk and power. In the case of the bowels, this cannot be called a morbid change, unless when connected with organic derangements of the other coats of the stomach, intestines, bladder of urine, heart and blood-vessels, the coats of which, in these circumstances, do not find a ready exit; hence the muscular fibres of the stomach, intestines,

* London Medical Gazette, vol. i. p. 560.

bladder of urine, and of the heart, are excited to an increased action, the effect of which is to enlarge their bulk.

When the muscular fibres of the heart or the bladder of urine have attained an unnatural bulk, they are frequently at the same time somewhat indurated, assume a greyish colour, and are not so easily divided by the knife, as in the sound state. This change is probably connected with chronic inflammation. But where the muscular fibres of the gullet or stomach are thickened, they retain their usual colour, and sometimes assume a deeper red hue than in the sound state.

OF THE INFLAMMATION AND SUPPURATION OF MUSCLES.

The chronic inflammation of muscles is much more frequent than the acute; and that of the muscles of the extremities is much more frequent than that of the internal viscera. This disease sometimes extends from its primary seat to the neighbouring tissues, as from the pericardium to the substance of the heart; or it is translated from the external to the internal parts, as has been shewn by different authors, and particularly by the late Sir David Dundas, who wrote a very valuable essay on rheumatism of the heart.

I have seen many instances in which rheumatism was translated from the extremities to the muscular substance of the heart. I have frequently seen large patches of lymph upon the surface of the heart, so that the adhesion between that organ and its capsule was nearly equal in size to that of a crown piece. I have also seen three or four examples of complete adhesion between the heart and pericardium, and, upon cutting through the muscular substance of the organ, it was of a deep mahogany colour, and the fibres were at the same time soft.

The muscular fibres of the stomach and intestines are frequently the seat of inflammation. The acute very often ends in chronic inflammation of the muscular coat of the stomach and intestines. The muscular coat of the stomach and intestines be-

comes, on some occasions, inflamed, in consequence of an inflammation, which had begun in the mucous or peritoneal coat, being propagated to the muscular coat, the fibres of which become hard and white; this state of the fibres is often combined with a degree of contraction, which is permanent, owing to the effusion of coagulable lymph.

In this case, the muscular coat has a morbid degree of sensibility, or is thrown into violent contraction, by the fæces passing along it; hence persons with this inflammation are very liable to colic, or they have an evacuation very soon after meals.

The effects of this inflammation in the extremities of the body are very obvious; they become of a redder colour, as may be readily seen, by applying any irritating substance to the intestines of a fowl, or to the muscles of the extremities of frogs.

The colour of an inflamed muscle is not uniform. The muscles of the extremities acquire somewhat of a brown colour, or even a dirty yellow colour, and a good deal of serum is lodged in their interstices, but those of the intestines become white.

The fibres of an inflamed muscle become softer and are more easily torn: at the same time they lose, to a certain degree, their contractile power; and in the more acute instances, pus is formed within the substance of the muscle. The inflammation is generally limited to a few of the muscles, but there are exceptions to this remark. I have preserved a specimen of the biceps flexor cubiti, containing an abscess, and it is remarkable that a similar abscess was found in the greater number of the muscles of the body of the individual.

Abscesses of the substance of the heart are described by various authors, as by Massa, Fanton, and Laennec; and Morgagni * and Laennec describe abscesses on the inner surface of that organ. The latter author has stated, that one abscess was an inch long, half an inch broad, and more than four lines in depth in its middle. A specimen of a large abscess of the septum of the heart is preserved in the Museum of our University: it communicates with the left ventricle.

* Epist. xxiv. art. 17. Medico-Chir. Trans. vol. vii. p. 323.

I have endeavoured to determine whether the pus is lodged in the cellular substance between the muscular fibres, or in the muscular fibre itself, and I am inclined to adopt the former of these opinions, which receives support from the circumstance of muscles of the extremities being frequently detached from each other, by suppuration in the cellular substance around them, in the same manner as the coats of the intestines are, on some occasions, detached from each other, in consequence of inflammation having given rise to the formation of a good deal of pus, which is effused between their coats.

It has been already observed, that, when suppuration takes place within the muscles, generally the pus is formed more frequently in the cellular substance uniting the muscular fasciculi, than in the substance of the muscular fibre. But it must also be admitted that there are instances of the complete destruction of some muscles by suppuration, as in the disease called Psoas abscess. In that case we often meet with a large abscess, and scarcely a vestige of the great psoas muscle. Further, the fasciculi of the muscular fibres are in some instances discharged at the upper and inner part of the thigh, along with purulent matter.

OF GANGRENE OF MUSCLES.

Gangrene of muscles is by no means common, and is, I believe, often confounded with effusion of venous blood between the fasciculi of the muscle, and that softening of the muscles which is the effect of inflammation. Gangrene of the muscular coats of the intestines is by no means an uncommon result of very acute inflammation of the intestines, and is sometimes observed in strangulated herniæ.

OF MUSCLES CONVERTED INTO MEMBRANE.

By disuse, the muscles lose their healthy size, as in diseases accompanied by great debility. This is very remarkable when

one side of the body becomes paralytic, and also in some cases of unreduced dislocation, and of palsy from the poison of lead. The tendons and ligaments are also changed in their texture; and are converted into a substance resembling cellular substance.

OF MUSCLES CONVERTED INTO A FATTY OR CARTILAGINOUS SUBSTANCE.

When the muscular substance of a dead animal is exposed for a long time to a stream of water, it is converted into a matter like to spermaceti.

A change somewhat similar has been observed to take place in the living body, by Louis, Maugre, Vic d'Azyr, Adams, and by other authors.

Lænnec and Adams have described the human heart as having been converted into a substance of a pale yellow colour. The muscles of sheep, according to Vaughan, undergo a similar change.

In some cases the muscular substance does not entirely disappear, but is intermixed with a quantity of a lardaceous matter.

The muscular substance is sometimes absorbed, and cartilage or bone is deposited in its stead. Of this change I have seen many instances, and I have in my possession a most remarkable specimen, in which the whole of the heart, with the exception of the posterior auricle, has been converted into a mass of bone. A very remarkable instance of the conversion of the muscular substance of the intestines into a cartilaginous-like matter, occurred to my learned colleague Dr Home, last winter. The following is a brief sketch of that very remarkable case, as extracted from the Journal of the Clinical Ward of the Hospital at Edinburgh.

"The patient, J. R., æt. 35, was admitted into the clinical ward 16th December 1828. There is distinct hard tumour in the situation of the spleen, extending into the umbilical region, and

downwards to the edge of the ilium. Pulsation is felt on the inner margin of the tumour, close to the umbilicus, at which part pressure causes pain, and likewise hard labour, or exercise.

" Since the appearance of the tumour, he has had constant dyspnœa, which is much aggravated after meals; and he thinks that his urine is rather diminished in quantity. Bowels generally regular, but at present they are rather constipated. Pulse 106, firm; tongue clean, moist; appetite good; has occasional sudden starting from his sleep during the night.

" States that, about two months ago, he had acute pain in left lumbar region; and three weeks subsequently he first perceived a small tumour in the region of the left kidney, which has gradually increased in size, and approaches more towards the anterior part of abdomen.

" Ascribes his complaints to having caught cold whilst attending his three children, who each successively had fever.

" Has been leeched and blistered without relief.

" 22d.—Abdominal affection the same, but has felt for some days weaker; appetite impaired; more irritable; constipation; pulse 104; has had cough since admission; hæmorrhoids in shape of small external tumours.

" *24th.*—Much heat and thirst during the night; at present, pulse 120; tongue white, much thirst; erysipelatous affection of right side; leech-bites of right side inflamed.

" *25th.*—A better night; countenance very pale; erysipelas rather less; much thirst; pulse 112, and very weak.

" *26th.*—Slept better; medicine operated; erysipelas rather less; abdomen less painful; some dysuria felt this morning for first time; pulse 108, small; feels better; cough easier.

" *Hor. 8va.*—Erysipelas increasing, with tendency to suppuration.

" *28th.*—About 9 o'clock P. M. was seized with violent pain of left side; pulse 140; great debility; severe dyspnœa; a draught of ether and laudanum gave much relief. The same pain occurred twice during the night, not eased by the draught; delirious; sank gradually, and died at nine this morning.

" *Dissection.*—Extensive adhesions were observed between

the intestines and parietes of the abdomen, and also between the intestines themselves."

On attempting to remove the intestines the colon was found adhering, in all its course, to the neighbouring parts, viz. to the gall-bladder, the stomach, and lower part of the liver; the small intestines were attached to the parietes of the abdomen; and also to the urinary bladder.

The colon having been separated from its adhesions, the small intestines were found to be thickened in their tunics; which had also taken place, even to a greater degree, in the mesentery.

The adhering intestines attached to the left side, and which formed the tumour that was felt during life, were removed; they formed one great mass larger than a child's head, and were found thickened in their coats to an extraordinary degree, generally to about an inch in thickness; and altogether they formed such a heterogeneous mass that it was impossible to say what portion of the intestine partook most of the disease, as one could not be distinguished from another. The peritoneal coat was of a dense uniform structure, quite different in its appearance from the middle coat, in which there were distinct transverse fibres running between the peritoneal and inner coat. The valvulæ conniventes were much enlarged.

In the centre of this mass was found a hard tumour, about the size of a large orange, which seemed to consist of the glands of the mesentery, much indurated, and enlarged to about the size of hazel-nuts, imbedded in a semicartilaginous substance of a greyish colour.

The spleen was smaller than usual; the liver appeared sound, and the gall-bladder was filled with healthy bile.

OF SOFTENING OF THE MUSCULAR SUBSTANCE.

This is a common consequence of inflammation, and of all low fevers. The softening is not peculiar to any one muscle, but to the whole muscular substance of the body.

To this morbid state the heart is often reduced by fevers, ac-

companied with debility, and it probably arises from imperfect nutrition.

Dr J. Davy states, that in the bodies of some men who had died suddenly in Ceylon, from cholera, "there was a flaccidity of all the muscular parts, as in animals killed by electricity or hunted to death."

The muscular flesh is sometimes so very soft and tender, that it is ruptured readily. The most remarkable instance of this kind which I have met with, occurred in the heart of a man who had destroyed himself by jumping out of a window. In this case, the muscular fibres were of a brown colour, and so very flabby as to be torn when slightly handled. The muscles of the extremities of the body are more frequently torn partially than completely. The laceration of the outer stratum of muscular fibres is more frequent than that of the inner.

It is difficult to explain, in a satisfactory manner, the partial laceration of a muscle; it has been imputed to the violent contraction of one portion of the muscle, whilst the other portion is at rest. The gullet and stomach have sometimes been lacerated during the effort of vomiting, or from cramp in the stomach.

OF RUPTURE OF A PART OF THE ALIMENTARY CANAL.

There are several cases upon record of rupture of the gullet. I have a preparation in which the gullet of a child has been ruptured to a considerable extent, in a longitudinal direction.

But sometimes the rupture of the gullet is transverse, as in he case related by Boerhaave. The patient, upon the rupture taking place, suffered very acute pain, his face became pale, his pulse small, his extremities cold, and his body bedewed by a cold sweat. In eighteen hours, after having suffered extreme agony, he died.

Mr Dryden * has related the case of an officer whose gullet

* Vide Edin. Med. Comment. vol. xii.

was ruptured from the action of vomiting. The patient felt something give way internally, and experienced very acute pain, and a sensation as if a liquid had escaped into the cavity of the chest, which, upon dissection, was found to be the case.

A similar case was communicated to me by Dr Carmichael Smyth.

Boerhaave makes mention of the case of Admiral Wassenaer, who died in attempting to vomit. Upon dissection, it was found that the lower part of the gullet had given way, in consequence of which the food he had taken got into the cavity of the thorax.

The rupture of the stomach is still more frequent than that of the gullet.

The stomach of quadrupeds has been ruptured from over-distention by food, or from air generated from the food, even when its coats have been perfectly sound.

Many instances of rupture of the heart have been recorded by Morgagni *, Haller †, Portal ‡. I have seen several examples of it ||.

The coats of the intestines have been frequently ruptured in consequence of external violence; and, where there was no previous disease in their coats, I have met with two cases of rupture of the duodenum from the above cause. One of the patients was crushed by the wheel of a cart against a post, and died on the following day. On dissection, five pounds of fluid blood were found within the abdomen, and the liver was also lacerated. The second case was that of a groom who received a kick from a horse. It occasioned excruciating pain in the belly, which was increased on pressure; vomiting followed, and remarkable collapse of features. The pulse was slow and very feeble. He died in forty-two hours after the receipt of the injury. When the body was examined, there were no marks of external violence upon any part of the integuments, or in the cellular substance, but internally there appeared peritoneal inflammation,

* Epist. 27. and 64. † Element. Phys.

‡ Mem. de l'Acad. des Scien. 1784

|| There is an *excellent* case in the Edinburgh Anatomical Museum.

and a small circular aperture in the jejunum. Opposite to the place where the injury had been received, there was also an effusion of a considerable quantity of a dirty-coloured serum into the cavity of the abdomen.

The coats of the intestines have also been still more frequently destroyed by ulceration, or they have given way in consequence of a mechanical obstruction to the progress of their contents from alvine concretions, organic strictures, &c. As soon as the rupture of the stomach or intestines takes place, syncope follows, and the patient sinks rapidly,—excepting when the stomach or intestines adhere to the parietes of the abdomen, as often happens in strangulated hernia. In such circumstances, the contents of the bowels are, in some instances, discharged through the aperture for a time, and afterwards resume their former route. The pathognomonic symptoms of rupture of a part of the intestinal tube, by external violence, are, a remarkable degree of collapse, and prostration of strength, coldness, paleness, and sinking of the pulse consequent to the injury.

The symptoms above mentioned exist only in cases of rupture of the intestines, where there is also great effusion of blood into the abdomen. There is also fæcal effusion, very acute pain, and the want of passage in the bowels, denoting acute peritonitis.

July 2. 1811, I visited, along with the late Dr Graham of Dalkeith, a lady who was reduced to a very miserable state, in consequence of a fistulous orifice at the right side of the navel, through which part of her food, air, a proportion of the fæces, bile, and purulent matter passed. The bowels were rather torpid, and the stools had not the usual colour. Her belly, though much swelled, was not painful, even when rudely pressed, and there was no peculiar hardness perceptible in any part of it, or in the region of the liver. Her appetite was pretty good, and the pulse about ninety-six in the minute, and equal.

In November following, she was seized with acute pain in the stomach, which was much increased on pressure, and attended with constant nausea and sickness, followed by an intolerable pain

and swelling in her right side, which was painful on pressure, and extended towards the navel. She continued in this state for several months. At length the tumour became discoloured, and an obscure fluctuation was perceived; a poultice was therefore applied, and the matter pointed at the right side of the navel, which induced Dr GRAHAM to make a small puncture with a lancet into the most prominent part of the tumour, with the view of preventing the matter from getting into the cavity of the abdomen, upon which a quantity of well-conditioned pus was discharged.

The pain in the right side still continued.

In the course of a week, matter escaped at two other orifices; one in the navel, and the other on the right side, and through these also the bile and food passed. About eighteen months afterwards, she had acute pain, especially in the region of the liver, which stretched towards the navel, where a dark-coloured tumour, about the size of a chesnut, presented itself; a poultice was applied, and soon afterwards a biliary calculus, of a large size, was discharged through one of the orifices above described: and in the course of nine days afterwards, two concretions, in all respects similar to the former, were discharged; these concretions, before their escape, created the most excruciating agony.

As soon as the biliary calculi had passed, the pain subsided, the patient's health began to improve, and the orifice of the sinus became much less, and now would admit only a common sized probe. The bile, and a part of the food, still continued to pass through the false passages.

Though foreign to the present subject, it may not be improper to add, that this lady, eighteen months ago, after having had the sensation of insects moving within the bladder, discharged, along with her urine, the larvæ of insects alive, such as have been described and represented in the Edinburgh Medical and Surgical Journal, vol. vii.

There is still another way in which life has been protracted, even though a portion of the intestinal canal has been ruptured, viz. by a layer of coagulable lymph surrounding the ruptured orifice.

I subjoin a remarkable case of the above kind, which happened to a young man, whom I attended along with Dr Forbes of London. This patient suffered much from pain around the navel, and tension of the belly, and passed at different times involuntarily several green stools; and what he vomited was of the same colour. His pulse increased to 140 in a minute, and his tongue was white.

Ten ounces of blood were immediately taken from the arm; he was put into a warm bath, six grains of calomel were administered, and a large blister was applied to the abdomen.

Notwithstanding the above remedies, his pulse did not fall below 100 in the minute, and his tongue continued white and dry. In the course of a few days, a considerable quantity of well formed pus issued from the navel, through which a probe could be passed downwards for three or four inches. The abdomen was extremely hard, and did not yield to pressure. Hectic fever followed, and the pulse was commonly upwards of 140 in a minute, and weak. The stools were fœtid, and involuntary (which they had indeed been during the greater part of his illness), attended with most excruciating pain as they passed per anum. The pulse was less frequent, and his appetite began to improve, as the purulent matter continued to discharge. He became weaker every day, his breathing became laborious, and he at last was convulsed, and perfectly insensible, before death.

Upon dissection, the peritoneum lining the abdominal muscles was found to be much thicker than usual, and to have formed adhesions with the omentum. The convolutions of the ileum were of a leaden colour.

On raising the peritoneum, a preternatural passage was discovered, which readily admitted the point of the fore-finger, and was filled by a quantity of a yellowish fluid, very much resembling bile. It stretched upwards over the left psoas muscle, and over the left kidney.

When the largest and uppermost end of this preternatural canal was fully exposed to view, it was found that the jejunum opened into it; and in the jejunum there was precisely the same kind of matter as in the under part of the preternatural canal.

There were two separate bands of coagulable lymph, which, extending across the ruptured end of the jejunum, divided its orifice into three distinct though unequal parts.

The whole of the intestines was of a leaden colour, and bore evident marks of peritoneal inflammation, the convolutions of the ileum being very firmly united to each other by short and numerous adhesions.

The sigmoid flexure of the colon and the rectum were considerably contracted, and their coats felt thicker and more fleshy than usual; whereas the great arch of the colon was much distended by air, and had attained a preternatural size.

Upon opening the intestines, it was ascertained that the inflammation had not been confined to the peritoneal coat, for, in several places, there were spots, of the size of a shilling, of a dark red colour, on the villous coat, which colour was owing to the small branches of bloodvessels distributed upon that coat being gorged with blood.

The preceding case affords a striking example of inflammation of the intestines, followed by suppuration and rupture of the intestine.

In consequence of the ruptured jejunum being surrounded by a sheath of coagulable lymph, life was not extinguished so soon as the rupture took place.

Serous cysts are sometimes imbedded in the muscular substance.

The solitary *hydatid* (Cysticercus cellulosa) has been found in muscles, of which Bremser *, Werner, and Rudolphi have made particular mention.

Lastly, Bone has been often found in the substance of muscle. I have frequently seen it in the substance of the heart, but I have never met with bony substance in the muscular coat of any part of the alimentary canal.

* Traité Zoologique, xi. p. 280.

CHAPTER II.

OF THE ORGANIC DERANGEMENT OF THE MUCOUS COAT OF THE ALIMENTARY CANAL.

An inquiry into the various organic derangements of the mucous coat of the alimentary canal constitutes a very important, extensive, and difficult discussion, on account of the different causes from which they proceed, and the varied effects they produce.

It is proposed to treat of the different organic derangements of the mucous coat of the alimentary canal in the following order :—

1. Of acute inflammation.
2. Of thickening of the mucous coat, and of stricture.
3. Of effusion of coagulable lymph.
4. Of chronic inflammation, ulceration, erosion, and cicatrization of the mucous coat.
5. Of hemorrhage from the mucous coat.
6. Of gangrene of the mucous membrane
7. Of diseased secretions from the mucous membrane, without any organic lesion.
8. Of small-pox pustules, melanosis, polypi, fatty tumours, milt-like tumour, fungus hæmatodes, medullary sarcoma, and of cartilaginous and bony tumours.
9. Of bony deposition upon the mucous coat.
10. Of the hemorrhoids.

SECTION I.

OF ACUTE INFLAMMATION OF THE MUCOUS MEMBRANE OF THE ALIMENTARY CANAL.

This kind of inflammation of the alimentary canal is not unfrequent: it is generally limited to a certain portion, and sometimes even to one of the coats, from which it generally extends to all the others.

Before proceeding to details, it is necessary to premise a few remarks upon the healthy colour, texture, and consistence of the mucous membrane, and upon those causes which occasion such a deviation from the natural state, as may be mistaken for the effects of disease.

All accurate anatomists are agreed that the mucous membrane of every part of the alimentary canal is not of the same texture or colour; but the morbid states of the mucous membrane have not yet been investigated with the degree of minuteness which their importance demands. An acquaintance with these states, may, in the case of suspicion of poison having been administered, lead to the detection of the guilty; and it may also lead to an improved method of treating the diseases of this membrane.

During an examination of the state of the mucous membranes, several circumstances should be kept in view.

1*st*, That, during the process of digestion of the food in the stomach, the mucous membrane of that organ assumes a red colour,—an observation which also is applicable to the mucous membrane of the uterus and vagina, at the period of menstruation.

2*d*, The mucous membrane of the stomach, from congestion of blood, assumes, in the feeble as well as the more robust, on some occasions, a red colour, which is discriminated from that of inflammation with great difficulty, even by an experienced observer. This is owing to the capillary vessels being full of blood, and when they are dilated, there is a tendency in the blood to coagulation; hence the mucous membrane is at first red, and afterwards assumes a brownish or purplish hue.

3d, In cases of sudden death, the mucous membrane of the stomach and intestines frequently is of a red colour, especially if immediately before they have been in good condition. An examination of the stomachs of persons who have been killed by hanging, cannot be considered as a criterion upon which a judgment should be formed as to the colour or texture of the mucous membrane in its sound state.

I have had occasion to examine the bodies of several of those who have forfeited their lives to the violated laws of their country, but have not observed a uniformity of appearance in the mucous membrane. The stomach was generally of that colour which has been called by Mr P. SYME *Tile Red.*

According to Dr YELLOWLY, who has also devoted much attention to this subject, "the mucous membrane of the stomach of five executed criminals was of a *red or crimson hue*, and this colour was most marked on the first day, and soon afterwards, but at irregular intervals, became very obscure."

It has been stated by some eminent authors, that when death is sudden, the mucous coat of the stomach is afterwards partially dissolved; but in the majority of instances which I have examined, it was not acted upon in the slightest manner.

Further, even in the most healthy stomach, the capillary vessels of some portions of the mucous membrane are found to be partially distended, which gives rise to those red spots which are sometimes observed, and this is owing to the coats of the blood-vessels retaining their power after the action of the heart has ceased.

4th, The peculiar position of the body has also an effect upon the colour of the mucous membranes of the stomach and intestines, as the blood accumulates in the vessels of the most dependent part, or it even transudes in a few cases.

5th, An examination of the mucous membrane of an inverted womb or rectum, does not convey a correct idea of the colour. The displaced parts being irritated, the blood is determined to those parts, whilst at the same time the return of the blood is more or less resisted through the veins, which being more or less distended, give the coats of the displaced portion a purplish colour. If the prolapsus be of long duration, the mucous

membrane of the inverted bowel assumes the colour and consistence of the skin.

6th, Irritation from intestinal worms gives rise to redness of the mucous membrane, and also to the secretion of a red jelly, which may be mistaken for the effects of inflammation, though the redness does not originate from such a cause, but from an uncommon determination of blood to the irritated part.

7th, The innermost coat of the stomach has sometimes acquired a red colour, in diseases connected with debility, when these have shewn no previous symptoms of inflammation. I observed this red appearance in a very striking manner in the body of a young woman who died from diabetes, whose body I examined at the request of my late worthy colleague Dr DUNCAN, and who published it in his Annals of Medicine, vol. viii. p. 392. Since that period, I have observed similar appearances in the bodies of persons who had died from other diseases, and where there was no reason to suspect inflammation to be the cause of the redness.

8th, In the former edition of this work, I have described the case of a lady, who discharged by the anus, at different periods of her life, considerable quantities of coagulable lymph. The effusion of coagulable lymph has been stated by some authors to be one of the most certain indications of acute inflammation; but, in this case, the pulse was not accelerated, nor had she pain of the abdomen, or any other of the usual concomitant symptoms of inflammation of the intestine.

9th, A certain degree of putrefaction also communicates a reddish colour to the mucous membrane of the stomach and intestines, which may be mistaken for the effects of inflammation. This circumstance gave rise to the suspicion, that Prince CHARLES of Sweden, the predecessor of BERNADOTTE, had been poisoned by a slow vegetable poison, similar to the *aqua tofana*. The prince had been seized, after having partaken of a pie at an inn, with violent vomiting, loss of appetite, and frequent colic. But, upon reflecting on the history of the case, it was evident that he had died from apoplexy. He had suffered much from acute headache and giddiness, and fell from his horse during a

review of his troops, some days before his death. His body had not been examined with care, and not until the lapse of some time; and I am persuaded that the reddish colour of the mucous membrane of the stomach was to be imputed to the effect of incipient putrefaction.

It may often be difficult to distinguish the spots produced by putrefaction from those which are frequently observed in the healthy stomach. MAHON has furnished a criterion. He states, that, if the stomach shall retain its natural colour, and the spots on it are marked with red, whilst the borders of the ulcers are livid pale, putrefaction is the cause of the change of colour.

It may be also remarked, that an infusion of red poppy, or tincture of cardamom, gives a red tinge to the mucous membrane of the stomach, which may be mistaken for the effect of inflammation.

FODERE informs us, that a person at Chalon, soon after his recovery from a severe indisposition, died very suddenly, after the operation of a gentle laxative. A rumour spread abroad of his having been poisoned by his apothecary.

His body was carefully examined after death, and the gullet and inner membrane of the stomach were found red, and in some places livid.

Dr VARNER entertained doubts as to the supposed cause of this person's death; and, having learned that the deceased had been in the habit of drinking considerable quantities of the infusion of the red poppy, made several experiments with that infusion upon dogs, from which he was convinced that the red colour of the mucous membrane of the stomach in this person was to be imputed to the effect of the infusion upon the stomach. The infusion of the red poppy communicates a deep red colour to the mucous membrane of the stomach of a dog.

The numerous observations of my late pupil Mr SWAN, have proved, in the clearest manner, that the insertion of a piece of gamboge, or the oxyde of arsenic, or the rubbing mercurial ointment on the back of a dog, after shaving off the hair, communicates a red colour to the mucous membrane of the stomach and intestines, and that the mercury occasions an inflammation of the great sympathetic nerves.

There is a more difficult case, which deserves notice. If a corrosive substance be injected into the anus, well marked inflammation is excited.

Orfila made several experiments in order to determine the effect of injecting poisons into the anus. 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 was found *of a rose colour*, but, immediately above, the rectum was of its natural colour, so that there *was a distinct line of demarcation* between the parts to which the sublimate had been applied, and those which had not been in contact with it.

On the same experiment having been performed upon a living dog, an intense redness was observed, 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 corrosion on the rectum of the dead dog, while it ulcerated the living parts. The sulphuric and nitric acids produced no other effect than their chemical one. Dr Tartra found that he could produce on the dead, as well as on the living body, that yellow orange colour which is the characteristic of nitric acid. *Lastly*, Orfila ascertained, that, when these poisons were introduced into the alimentary canal, twenty four hours after death, they *did not induce redness or inflammation.*

10*th*, The want of a proper test by which inflammation may be discriminated from the natural or accidental conditions of mucous membranes, has tended to throw considerable obscurity and doubt over this branch of the subject. A nomenclature of colours, illustrated by suitable examples, was a great desideratum in the description of morbid appearances; because an object has been by one author described as being of a certain colour, which has been mistaken by another for a different tint; and the names of colours has been frequently misapplied, or indiscriminately given, which has led to much disputation.

These circumstances have thrown much ambiguity over the description of morbid appearances, which is very much to be regretted, as disease gives a peculiar colour to the mucous membrane of the alimentary canal. Within these few years, this great obstacle to improvement has been removed by that distinguished artist Mr P. SYME, by the publication of his accurate illustrations of the Wernerian System of the colours of minerals. I have availed myself of Mr SYME's book, and, by carrying it with me when the bodies of persons who have died from different diseases, or from external injury, have been examined, I arrived at a much more intimate acquaintance with the colour of the mucous membrane of the stomach and intestines in different diseases, than could otherwise have been obtained.

For the sake of brevity, the various appearances of the mucous membrane, discovered upon dissection, have been arranged in a tabular form.

In the subjoined table, notice has been given of the colour of the mucous membrane of the cardiac and pyloric portions of the stomach, and of the colour of the mucous membrane of the larger and smaller intestines, in those diseases which occasion the most remarkable deviations from the healthy colour of the mucous membrane, as inflammation, both the common and the dysenteric. The colour of the mucous membrane of the alimentary canal has also been described in phthisis pulmonalis, fever, &c. To point out more clearly the colour of the healthy mucous membrane of the alimentary canal, the table contains a description of its colour in different caes in which death has been occasioned by external violence. The sex, age, and interval between death and the *post-mortem* examination has also been given, as these different circumstances may influence the colour of the membrane.

It also merits remark, that the greater number of the dissections were made during the months of winter and spring, when the temperature of the atmosphere did not generally exceed 50° Fahr., and when there was no reason to suppose that putrefaction had produced an alteration of colour in the mucous membrane.

Age.	Sex.	How long after death body examined.	Colour of mucous membrane cardiac extremity of stomach.	Colour of mucus of pyloric extremity of stomach.	Colour of mucous membrane of smaller intestines.	Colour of mucous membrane of larger intestines.	Disease which proved fatal.
45	Male	18 hours	Yellowish-grey	Duck-green, from bile	Ash-grey	Purplish-red, from effused blood	A cart passed over his abdomen; ribs broken.
03	Female	36 do.	Yellowish-grey	Ditto	Ditto	Ditto	Tabes mesenterica; ulcers of intestines.
24	Female	24 do.	Purplish-red, from wine	Ash-grey	Ditto	Of various colours, from the effects of dysentery	Dysentery.
45	Male	36 do.	Greenish-grey	Yellowish-grey	Ditto	Pearl-grey in some places, where not ulcerated	Compound fracture; dysentery.
44	Male	24 do.	Yellowish-grey	Pearl-grey	Yellowish-grey	Of various colours, from dysentery	Dysentery.
25	Female	24 do.	Ash-grey	Ditto	Ditto	Ditto	Tubercles and abscesses of lungs.
35	Female	48 do.	Peach-grey	Ash-grey	Ash grey	Bluish-grey	Phthisis.
60	Male	36 do.	Purplish-red, from wine	Ditto	Ditto	Ditto	Fever.
72	Female	24 do.	Ash-grey	Ditto	Ditto	Ditto	Erythema of leg.

60	Male	48 hours	Yellowish-grey	Ditto	Ditto	Ditto	Consumption.
60	Male	48 do.	Ditt	Ditto	Ditto	Diseased from dysentery	Dysentery.
09	Male	42 do.	Greenish-white, with chocolate arborescences	Greenish-white	Greenish-white, slightly vascular at some places	As smaller	Hydrocephalus.
18	Male	37 do.	Ash-grey	Dull ash-grey, with vascularity.	Yellowish-grey, slightly vascular	Ditto	Typhus fever; ulceration of stomach; thickening of lower part of ileum.
36	Female	48 do.	Between arterial and vermillion red	Yellowish-grey.	Yellowish-grey, vascular at lower part of ileum.	Yellowish-grey, with red points	Inflammation of stomach; cardiac extremity soft and very vascular.
65	Female	28 do.	Dirty cream colour	Dirty cream colour, tinged at some parts with bile	Dirty cream colour.	Dirty cream colour, slightly vascular	Pneumonia.
			Yellowish-grey, slightly tinged with bile	Ash-grey	Very light yellowish-grey	Ash-grey	Dropsy.
36	Female	48 do.	Between arterial and vermilion red	Yellowish-grey	Yellowish-grey, vascular at lower end of ileum	Yellowish-grey, with red points	Inflammation of stomach; mucous membrane softened.
50	Male	48 do.	Yellowish-grey, slightly tinged with bile	Ash-grey	Very light yellowish-grey	Ash-grey	Dropsy; diseased liver.
42	Male	36 do.	Between yellow and light ash-grey	Aurora red, with chocolate arborescences.	Yellowish-grey	Yellowish-grey	Burn of trunk and extremities.

Age.	Sex.	How long after death body examined.	Colour of mucous membrane cardiac extremity of stomach.	Colour of mucus of pyloric extremity of stomach.	Colour of mucous membrane of smaller intestines.	Colour of mucous membrane of larger intestines.	Disease which proved fatal.
40	Female	32 hours	Yellowish-white	Yellowish-white	Yellowish-white	Yellowish-white	Fever.
52	Male	65 do.	Tinged with bile	Scirrhous ulceration of pylorus, yellowish-grey	Dirty yellowish-grey	Dirty yellowish-grey	Schirrhous pylorus.
35	Male	26 do.	Light ash grey, with a large patch of purplish red	Light ash-grey, with small spots of purplish-red	Much thickened, yellowish-grey, between valvulæ conniventes valvulæ tinged with bile	Very thin—Ash-grey	Sero-purulent effusion into chest, and cartilaginous deposition between mucous and muscular coats of smaller intestines.
23	Female	35 do.	Ash-grey	Ash-grey	Ash grey	Ash-grey	Bronchitis.
21	Male	33 do.	Reddish cream-colour	Reddish cream-colour.	Ditto	Ditto	Morbus cordis.
52	Female	24 do.	Yellowish-white	Yellowish-white	Ditto	Ditto	Schirrhous disease of ilio-cotic valve.
32	Female	48 do.	Yellowish ash-grey	Yellowish ash-grey	Light ash-grey	Light ash-grey	Phthisis.
26	Female	36 do.	Ash-grey	Ash-grey	Ash-grey	Blackish-grey, and ulcerated	Ditto.
24	Female	28 do.	Yellowish-white	Yellowish-white	Ash-grey, with a blush of red, ulcerated here and there	Ditto	Ditto.

35	Female	27	do.	Ash-grey	Ash-grey	Ash-grey, end of ileum vascular and ulcerated	Ash-grey	Schirrhus of uterus.
42	Female	28	do.	Ditto	Ditto	Ash-grey	Ditto	Fracture.
54	Male	36	do.	Ash-grey, vascular	Ditto	Ditto	Ditto	Phthisis.
50	Male	40	do.	Cream colour, with chocolate arborescences	Cream colour, with arterial red points, and here and there tinged with bile	Between ash and yellowish-grey	Ditto	Diabetes.
48	Male	47	do.	Pale cream colour	Pale cream-colour	Ash-grey	Ditto	Dropsy; diseased heart.
48	Male	34	do.	Light ash-grey	Light ash-grey	Ditto	Ditto	Tumour in brain.
26	Female	38	do.	Dirty cream colour	Ditto, rather vascular	Ditto	Ditto	Fracture.
68	Female	26	do.	Dirty cream colour, with vascularity	Dirty cream, with ulcerous coloured vascularity	Ditto	Ditto	Bronchitis.
28	Female	37	do.	Ash grey, with slight vascularity	Ash-grey, not vascular	Mottled of various hues, also extensively ulcerated	Ditto	Phthisis.
36	Male	27	do.	Ash-grey	Yellowish-grey, slightly tinged with bile	Bluish-grey	Ash-grey, with vascularity	Fever.
44	Female	30	do.	Tinged with bile	Yellowish-grey, with vascularity	Ye llowish-gre y	Yellowish-grey	Jaundice.

From these tables it may be inferred, that the healthy mucous membrane of the stomach and intestines is of the colour called by Mr Syme *Ash-grey*. The mucous membrane which lines the gullet is covered by a thin layer of cuticle, which I have particularly described, and represented by an engraving, in my thesis De Dysphagia, but I have never been able to trace this cuticular lining beyond the cardiac orifice of the stomach,—an observation which has been confirmed by the subsequent dissections of Sir E. Home and Beclard.

In the stomach and intestinal tube there are a number of villi, concerning the size and form of which many discordant opinions have been published, and which I believe to be different in form in different parts of the human intestinal tube.

The late Beclard has compared the form of these villi to leaflets or minute plates, which are pellucid to a certain degree, and placed so immediately in contact, as to resemble a tufted pile. He describes the breadth of those of the duodenum as exceeding their length, those of the jejunum as being long and narrow, and those at the end of the ileum as laminated. The villi of the larger intestines are by no means so prominent as those of the smaller.

There are also a number of mucous glands of an oval or spheroidal form in the stomach, and also in the whole of the intestinal tube. These are most abundant and largest in the duodenum, termination of the ileum, and caput cœcum coli.

By inflammation these glands are much enlarged.

The fluid secreted by these glands varies somewhat in the gullet, stomach and intestines.

The mucous membrane of the alimentary canal is largely supplied with bloodvessels, which form a very intimate network upon the mucous membrane, and enter the villi.

OF THE COLOUR OF AN INFLAMED MUCOUS MEMBRANE.

It was an old but incorrect opinion, that a mucous membrane, when in a state of inflammation, is necessarily of a red colour.

I have endeavoured to controvert this opinion, in the first edition of this book, and have enumerated cases of inflammation

in which lymph was effused upon parts, that were green in one place, and of a deep lake colour in another.

A mucous membrane, when inflamed, is, no doubt, *frequently red, but not invariably so.* The redness is in some places more intense, and forms small points, patches or streaks, which is produced by extravasated blood, or it assumes an arborescent appearance.

If the inflammation be intense, the mucous membrane looks like a piece of red velvet, and has a rugous surface, from the enlargement of the mucous glands. The redness does not go off on pressure; there are red circles around the bases of the mucous glands, and in the centre of these there are little cavities, which are also red.

In order to see these appearances distinctly, it is requisite to wash off the vitiated mucus, or coagulable lymph, which covers the inflamed mucous membrane, and to make use of a good magnifying glass.

The veins under inflamed membrane are also conspicuous.

If the mucous membrane of the gullet be the seat of inflammation, the cuticular lining is raised into little blisters, or aphthæ, and, upon removing these, the surface is found to be abraded.

It is not unusual to observe the mucous membrane of the stomach of the phthisical studded over, towards its pyloric extremity, with a great number of small mucous glands of different sizes.

The mucous membrane is at the same time softened, thicker than usual, and of the *buff-orange colour* of Mr P. Syme, intermixed with *tile-red* and a *slight shade* of *lake-red.*

The inflamed mucous membrane may be readily separated from the subjoined membrane, owing partly to the softening of the cellular membrane, and partly to the effusion of serum; hence the swelling or œdema of the affected part.

By the more acute inflammation of the mucous membrane, it is reduced to a state like mucus, and is sometimes cast off, leaving the muscular fibres quite bare.

The inflammation generally spreads from the mucous to the

other coats of the affected part, which may be readily separated from each other, owing to the serum which is effused between them. The muscular fibres appear, in consequence of inflammation, like fine striæ.

By chronic inflammation, the mucous membrane of the stomach acquires a partial reddish colour, inclining to yellow: it is tougher than during health, and rougher on its surface, which may be readily distinguished by drawing the finger along it; and a part of it assumes somewhat of a fungous appearance.

The redness induced by inflammation has sometimes gone off after the lapse of twenty or thirty hours. This is not the remark of a superficial but of an acute observer, Professor Horner of Philadelphia, who has directed much attention to this very important inquiry. He observes, "The traces of acute inflammation are in many cases very fugitive, and entirely disappear upon death, because the local irritation which attracted the blood and accumulated it, having ceased, the blood abandons that part, and retires towards the centre of the circulation. We can seldom tell by the appearances, twenty-four hours after death, the quantity of blood which has penetrated an inflamed membrane, as the peritoneum, the pleura, the cellular and mucous membranes, the skin, &c. The eruption of measles and the redness of sore throat disappear on the death of the patient. We are not, however, to infer from these circumstances that the mere afflux of blood to a part constitutes inflammation; on the contrary, it is attended with a dilated condition of the vessels, independent of this afflux, for, if death occur during the height of the measles, the eruptions may be made to re-appear by injecting the vessels. Bichat has very properly observed, that in inflammation we should distinguish between acute and chronic affections, because, though the blood readily vanishes from the former, yet it will remain in the latter, because it has combined with the diseased organ. Hence, induration, suppuration, and vitiated secretions are satisfactory signs of inflammation of a part."

Bichat has added, that if the inflammation be chronic, the appearance of inflammation does not go off, as the blood continues within the vessels.

This inflammation does not extend along the surface of the membrane, but penetrates deep into the cellular coat, and is speedily followed by ulcers of an oval or rounded form; the edges of which look as if they had been gnawed by an animal; an appearance produced by the absorption of a portion of the subjacent cellular substance.

The membrane intervening between the ulcers looks healthy.

Ulceration is often observed in the smaller intestines of the phthisical, and, if the disease be of long duration, the larger intestines also partake of the disease.

Ulceration also sometimes affects the mucous follicles; and, in consequence of the progress of the ulceration, which will be more fully described in a subsequent chapter, an aperture is formed through the muscular and peritoneal coats.

It may in this place be added, that these ulcers sometimes cicatrise.

Lastly, the mucous membrane of the stomach may be in a state of chronic inflammation, *without presenting a different appearance from the sound stomach* *.

In short there is a danger of mistaking ordinary vascularity of the stomach for the indications of slight inflammation.

There exists in some constitutions a great predisposition to inflammation of the mucous membranes, and it is excited by very slight causes, as variations in the temperature of the weather. This predisposition is hereditary, descending from father to son, and even to the grandson.

I have been consulted by the different members of a family in whom such a predisposition existed in a most striking manner. The father had long been liable to obstinate cough; several of the children had croup in early life in a very severe form, and, at more advanced periods, the females suffered much from leucorrhœa, and the males from repeated and very obstinate attacks of gonorrhœa.

The inflammation of the mucous membrane of the alimentary canal is more frequently partial and symptomatic than idiopa-

* Vide Table.

thic and general: sometimes it is acute, and at other times chronic.

OF INFLAMMATION OF THE MUCOUS MEMBRANE OF THE GULLET.

Though the mucous membrane of the gullet be more exposed to some of the exciting causes of inflammation, it is not so frequently inflamed as that proper to the intestinal tube.

By inflammation, the mucous membrane of the gullet assumes a red hue, is somewhat thickened, and its cuticular lining is raised into vesications.

The gullet is liable to inflammation, not only from the general causes exciting this disease in every sensible part of the body, but also from its situation and function.

Various animal, vegetable, or mineral poisons, and other extraneous bodies, lodged within the gullet, occasion inflammation of that tube. Inflammation is also occasionally communicated to the gullet by diseases of the mouth, the larynx, trachea, bronchial glands, and aorta.

Inflammation of the gullet varies as to degree and extent, so that it occupies a part, or the greater share, of it; and it is often combined with extravasation of blood, constriction, ulceration, gangrene, or perforation of some part of the canal.

In the typhus fever, croup, scarlet fever, small-pox, and measles, the gullet is frequently inflamed; and, in the croup, I have seen it lined by a coagulable lymph.

Inflammation of the gullet sometimes comes on in the progress of fever; it occasions great pain and difficulty in swallowing.

In a case of this kind which fell under my notice, the mucous membrane was found inflamed, especially in its lower third part, and covered by a partial layer of soft coagulable lymph. The inflammation stopped at the cardia abruptly; but towards the pylorus, the mucous membrane was thickened, soft, and inflamed.

Climate may be stated not only as an exciting but as a modifying cause of inflammation of the mucous membrane of the larynx, trachea, and intestinal tube: hence the frequency of croup in spring in this country, during the prevalence of the east wind, and hence the peculiarities of the dysentery of tropical climates.

In the disease called by the French *Dipherite*, which is sometimes epidemic in this country among children, the mucous membrane of the fauces and gullet is primarily affected, and the disease sometimes extends to the stomach or to the larynx. Dr CHEYNE informs us, that, in a disease very similar to this, the mucous membrane of the gullet was of a deep red colour, and highly vascular *.

This very fatal disease is different from croup or scarlet fever: it is distinguished from the latter, by the absence of ulceration, and from the former, by the absence of pure idiopathic inflammation.

In this disease, there is little general fever, but great loss of strength, and disposition in the blistered parts to run on to gangrene.

When the disease extends to the stomach, it occasions great tenderness in the region of that organ; vomiting, and, in some cases, diarrhœa, and even excoriation of the anus.

The disease begins by redness of the tonsils, without swelling or ulceration; they are covered by white aphthous crusts, which often drop off spontaneously, and these crusts are rapidly reproduced. There is often sponginess and bleeding of the gums.

The disease often proves fatal, by extending to the larynx.

Mr MACKENZIE of Glasgow has given a good account of this disease: an excellent history of it has been given by Professor HAMILTON; also by Dr ABERCROMBIE, and by BRETONNEAU, in his book entitled, Des Inflammations Speciales du Tissu Muqueux.

By inflammation, and also by ulceration, mucous membranes acquire a morbid sensibility which occasions spasmodic contraction of the neighbouring muscles, and the most alarming consequences. If the mucous membrane of the larynx be the seat

* Vide Dublin Hospital Reports, vol. iv.

of inflammation, owing to the thickening of the secreted membrane, and the contraction of the muscles, life is in imminent danger, and an opening into the windpipe becomes necessary for the continuance of life.

The extreme case is that of hydrophobia, the spasms in the throat and larynx being excited by the application of the mildest fluids, and, it would seem, even from the contact of the air.

The duration of spasm, excited by irritation applied to the mucous membranes, is no less remarkable than its intensity, varying from a few hours to many days, months, or years, and at length, in some cases, subsiding without an obvious cause, or laying the foundation of permanent obstruction.

The symptoms of inflammation of the gullet are, acute pain in the seat of the gullet, extending upwards to the ears, and downwards to the stomach.

The patient suffers very acute pain whilst attempting to swallow, accompanied by the rejection of the food and the contents of the stomach, a very profuse discharge of vitiated mucus, and saliva, and, in some cases, a discharge of pus.

The patient has also a sense of a ball and stoppage in the throat.

There have been instances in which the sensibility of the gullet has been so great, that convulsions have been excited by swallowing the saliva, so that the patient was under the necessity of sitting up in bed, with his head inclined forwards, in order that his saliva, which is secreted in larger quantities than usual, might flow out at the corner of the mouth.

The inflammation is rapidly communicated to the other coats of the gullet, by which they adhere to each other; this proves an additional obstacle to deglutition, as, in the healthy state, the internal coat is loosely connected to the muscular coat, by which the mucous coat may be considerably extended, which tends to facilitate deglutition. Besides, in consequence of the continuance of the inflammation, an adhesion occasionally takes place between the gullet and neighbouring parts. This has sometimes been followed by erosion. Thus an aneurism of the arch of the aorta sometimes has burst into the gullet, or pus has passed from the gullet into the windpipe.

OF THE EFFECTS OF SWALLOWING THE SULPHURIC AND NITRIC ACIDS.

It is foreign to the object of a work of this kind, to enter into detail concerning the effects of various poisons. I propose, therefore, to confine my observations within very narrow limits, and to enumerate only the effects of a few of those articles which have been sometimes swallowed by accident, or taken with the view of committing suicide.

Notwithstanding the very disagreeable taste, and very corrosive nature of the sulphuric and nitric acids, they have sometimes been swallowed by accident, and also very frequently been employed with the view of self-destruction.

I have in my possession the greater part of the gullet of a young woman, who swallowed a quantity of the sulphuric acid. The gullet was discharged *in a black gangrenous state, fourteen days after the poison had been swallowed.*

This acid has sometimes proved fatal in a few hours. After death, the stomach is found prodigiously inflamed, gangrenous in some places, and eroded in others.

According to Orfila, this acid produces, in the first place, excessive vomiting, then convulsive agitation of the face and lips, burning sensation in the throat, gullet and stomach, extreme coldness all over the body, small and irregular pulse, and extreme mental depression.

Mr Orfila forced a dog to swallow a liquor, consisting of concentrated sulphuric acid and indigo. Immediately afterwards, the animal seemed to suffer excruciating pain. At the end of ten minutes he vomited some stringy matter covered with blue, and mixed with black blood, partly coagulated, and he died in the course of twelve hours. Upon dissection, the mucous membrane of the mouth, the tongue and œsophagus were of a deep green colour, the pharynx was of a cherry-red, as also the inferior surface of the epiglottis and larynx. The interior surface of the stomach was black though-

out its whole extent, excepting a few points near the cardia, where it exhibited a greenish or yellowish tinge. There were a few spots of a very bright red on the muscular coat.

The nitric acid also produces sudden death. It communicates to the lips, throat, and a considerable portion of the alimentary canal an orange colour. There is a coating of a yellow substance on the surface of the œsophagus, which is greasy to the touch, and seems to be formed of concrete albumen and the mucous membrane. The stomach towards the pylorus is more or less inflamed, and there is a net-work of vessels upon it, covered with black and clotted blood. Perforations are sometimes observed in the stomach, and the pylorus is much contracted. The duodenum and jejunum are spotted with yellow. The peritoneum is often thickened, and a yellow fluid is diffused into the *abdomen.*

Orfila has given a very interesting case, illustrating the effects of sulphuric acid upon the human stomach.

OF THE EFFECTS OF SWALLOWING THE CAUSTIC ALKALI.

The caustic alkali in solution has sometimes been taken instead of aërated alkaline water.

I had occasion to visit a gentleman who had sipped a small quantity of the aqua potassæ; it created at the moment a burning sensation in the lips and mouth, which was immediately followed by violent inflammation, and very considerable swelling of the lips, tongue and arches of the palate, so that he could scarcely speak or swallow for three or four hours.

When the caustic alkali is swallowed, it creates violent vomiting, of a bloody alkaline matter, which renders the syrup of violets green, and effervesces with acids. This is followed by very acute pain in the region of the stomach, and gripes: if the potass be taken in a considerable quantity, it occasions death in a short time. A dog that had swallowed two drachms of the subcarbonate of potass, died, according to Mr Orfila,

in twenty-five minutes after taking the alkali. The mucous membrane of the stomach was found of a deep-red colour through its whole extent.

Dr Mollison was so polite as to permit me to examine the gullet of a young woman who had died from taking the aqua potassæ. At the time the alkali was swallowed, the patient suffered very excruciating pain in her throat and stomach, which gradually subsided, and was followed by some degree of difficulty in swallowing, which increased until she died, after the lapse of ten months. In this instance the parietes of the gullet were very much thickened and indurated, and the gullet itself was lined by a dense layer of coagulable lymph, which extended as low down as the cardiac orifice of the stomach, and had almost completely closed the gullet, so that, three months before death, even liquids did not pass through it. The patient, during that time, was supported by nutritious clysters.

OF THE EFFECTS OF SWALLOWING ARSENIC AND ITS OXIDES.

This subject has engaged the attention of many distinguished writers upon medical jurisprudence. I shall therefore confine myself chiefly to the statement of the results of a few experiments, which I made some time ago upon animals with arsenic, and its different oxides, and to those effects upon the human gullet and stomach which I have seen.

The effects of arsenic, when taken in its metallic state, or as an oxide, are extremely different; the latter being highly poisonous.

We are well acquainted with the effects of some of the oxides of arsenic, but not with those of the metal itself*, or with those

* Mr Renault did not make experiments with the metallic arsenic, because, he observes, "Ce n'est pas qu'il soit difficile d'obtenir l'arsenic pur et complètement dépouillé d'oxigène; tout la difficulté gît dans la promptitude avec laquelle il enlève ce principe à l'atmosphère, ce qui rend extrêmement incertaines les expériences que l'on tente avec ce métal sur les animaux vivans.—Vid. Experiences sur les contre-Poisons de l'Arsenic.

of the artificial sulphurets of arsenic. I was therefore induced to make the following experiments with arsenic in its metallic state, and also with the artificial sulphuret.

I was fully aware of the rapidity with which the metal is converted into an oxide by exposure to the air. I therefore endeavoured to provide against that in making my experiments, by breaking down large pieces of the metallic arsenic (which Professor BRIGGS of St Andrew's prepared for me, by sublimation from the white oxide of the metal), and immediately mixing it with the extract of gentian; and, as soon as the mixture was made, giving it to the animals.

Experiment 1.—I gave a dog, which I had kept fasting for twelve hours, two grains of the metallic arsenic in fine powder, mixed with the extract of gentian. The only effects of it were a slight purging, of a slate-coloured matter, and the discharge of a great deal of urine.

Experiment 2.—Four grains of the metallic arsenic, mixed with the extract of gentian, were given to a dog that had been kept without food for twelve hours, involved in a piece of boiled beef.

In the course of two hours, the dog vomited a quantity of a dark slate-coloured matter, which, being hungry, he licked up again and swallowed.

Five hours after the metallic arsenic had been taken, I saw the dog; he then seemed quite well.

About an hour afterwards, he became very sick, and vomited up a good deal of bilious-looking fluid, and had also a slight bilious purging; after which he ate a quantity of boiled beef.

Dr DUNCAN jun. was so polite as to examine the metallic arsenic I had used in this experiment, and was of opinion that it was very slightly oxydated. I therefore repeated the above experiment; and, for the purpose, selected several large pieces of the metallic arsenic; reduced these into a fine powder, and immediately gave four grains to a dog. The arsenic produced no other sensible effect, excepting occasioning a very considerable discharge of urine.

Experiment 3.—Six grains of metallic arsenic, in powder, were given to a dog; but they produced no obvious effect.

From the above experiments, it follows, that the metallic arsenic may be taken by a dog with impunity, to the extent of several grains.

Experiment 4.—Ten grains of metallic arsenic were given to a middle-sized dog, mixed with the extract of gentian, at three o'clock P. M. At five o'clock the animal seemed but little affected.

At seven o'clock P. M. severe vomiting and purging of a bilious fluid had come on, which continued for several hours.

He passed a great deal of urine; the pulse became extremely quick and feeble.

Next day, at one o'clock P. M., I saw the dog; his pulse was so very quick that I could not count it, and also very feeble.

He seemed extremely weak, and refused every kind of food; and I thought he would have died; but on the following day he took food, and on the next day seemed quite well.

EXPERIMENTS WITH THE BLACK OXIDE OF ARSENIC.

THIS oxide is prepared by exposing the arsenic, in its metallic state, when broken into very small pieces, to the air for some time.

Mr RENAULT's experiments upon this oxide have proved the very poisonous effects of it.

It is certainly very remarkable, that this substance should be so extremely poisonous to animals, even when the quantity of oxygen it has gained is so trifling as hardly to add to its weight.

I requested Mr GRAHAM to repeat Mr RENAULT's experiments with this oxide, and to attend particularly to the state of the pulse, and to its effects upon the digestive and urinary organs.

He favoured me with the following report, which I subjoin in his own words.

" Having procured two dogs, I gave to one of them two grains, and to the other one grain of the black oxide of arsenic; and having confined them in separate apartments at eight o'clock in the morning, I did not examine them again till twelve. Their natural pulse was in the former seventy-six, in the latter eighty-two.

" At twelve I found that vomiting and purging had now come on in the former of these, the nature of which appeared to me to consist principally of bile, often mixed with blood; indeed the latter was voided almost pure; frequent frothing at the mouth, of a bloody hue.

" Pulse 130, small, hard, and very irregular; shiverings in a short time began to affect the animal, which continued, with very little abatement, till death, accompanied with frequent moaning: the eyes were inflamed, but very much sunk. At this time I observed an increased secretion of urine, rendered evident by an incessant discharge from the bladder, of a dark colour, and emitting a very offensive odour.

" At two, I found the animal nearly in the same state. The vomiting and purging had increased both in severity and in frequency; it expressed the greatest anxiety; respiration was performed with difficulty; pulse 140, or upwards, small, thready, and often intermitting.

" At four o'clock I again saw it: The limbs were now affected with tremors and cramps; the vomiting and purging had now almost ceased; low delirium and insensibility had supervened. Pulse scarcely perceptible. The increased discharge of urine still continued, which seemed to be involuntary. In a short time after the dog expired.

" Upon dissection, the following phenomena were observed:

" The pharynx, and superior part of the œsophagus were inflamed, much corroded, and covered with a viscid, glairy mucus *. The gall-bladder was enormously distended with re-

* Mr Graham sent me the stomach and intestines of the dog, which I examined with care, and found quite empty, and prodigiously contracted.

cent bile. The kidneys exhibited appearances of inflammation. The bladder of urine I found containing an immense quantity of urine, of a dark colour, and of a very offensive smell. None of the thoracic viscera were affected, nor was the brain.

" One grain of this oxide seemed at first to have very little effect upon the other dog. Natural pulse, at the beginning of the experiment, eighty-two, full and strong.

" At twelve, pulse 100. A teasing nausea tormented it, which was generally alleviated by a discharge of bile. Purging, though it was seldom, appeared to be chiefly of mucus and bile. No shiverings were produced, but considerable moaning. In this animal, too, the discharge of urine was increased to an astonishing degree, but of a darkish hue, and disagreeable smell. At two, many of these phenomena had disappeared. Pulse eighty-four, weak ; purging almost gone, as was the nausea ; but the discharge of urine still continued to be preternaturally augmented, though it was now of a more natural colour and odour. At this time, I presented him some food, which he devoured with avidity, and seemed to be much relieved, as at four o'clock there did not seem to be any unnatural symptom, debility excepted."

These experiments shew the very highly stimulating properties of this oxide of arsenic upon the gullet and secretory organs.

OF THE SYMPTOMS OCCASIONED BY THE WHITE OXIDE OF ARSENIC BEING SWALLOWED.

The white oxide of arsenic is more commonly employed as a poison ; and it proves fatal even in small doses.

It has been proved by repeated observation, that two grains of this oxide prove fatal to man in a short time.

When taken in any considerable quantity, it produces the most violent inflammation of the inner coat of the gullet and

There were no marks of inflammation in the mucous coat of the stomach or intestines, which was covered with a very tenacious mucus.

stomach: this is rapidly followed by gangrene, which, as two preparations in the Museum of Edinburgh shew, is not limited to the internal surface of the stomach, but extends to all the coats of that organ.

Upon opening the stomach, we sometimes meet with the poison adhering to the villous coat of the stomach, and the arsenic is found in its metallic state.

According to Dr BAILLIE, the stomach is sometimes lined by coagulable lymph.

In some cases the stomach has been eroded; and these erosions differ materially from those occasioned by the gastric juice, or by most species of ulceration; for they resemble the perforations made by a pointed instrument, and are surrounded by inflammation.

The villous coat of the small intestines has been, in some cases, found inflamed and thickened.

When a considerable quantity of this poison is taken, the tongue swells, and a sensation of burning extends along the gullet: this is followed by a sense of constriction in that canal, acute pain in the stomach and bowels, which is aggravated by pressure, and by vomiting and purging of a very viscid ropy mucus, in many instances tinged by blood, and which continues, in many cases, for several hours.

The pulse is quick and irregular, and in a few hours becomes still quicker and more irregular.

The breathing is also much affected; it is laborious, and the pulse now becomes slow. Convulsive twitchings of the muscles of the limbs, faintings, and cold sweats follow, which are the precursors of death; this, in some cases, has taken place in four or five hours after the poison has been swallowed.

WEPFER * has described the case of a boy who died in two hours †.

* Vid. Cicut. Aq. Hist. c. xxi.

† As a striking proof of the small quantity of the white oxide of arsenic by which some constitutions are affected, it may not be improper to add, that I lately visited a gentleman who had mixed up with his pen-knife some of the white oxide, as a poison for rats. He had not wiped the blade of the

There is, however, much variety as to the time in which arsenic proves fatal, as that depends upon the quantity of the poison which has been taken, upon the poison being in the metallic state, or oxydized, and also upon the age and constitution of the individual.

In general, twenty-four or thirty hours elapse before it proves fatal, as vomiting generally takes place; and from thirst, and heat in the gullet and stomach, the patient drinks largely, which dilutes the poison.

In short, the symptoms occasioned by this mineral are similar to those of very acute inflammation of the stomach and intestines, which is very rapidly followed by gangrene.

In other instances, arsenic produces a great degree of spasmodic contraction in the cardia, which prevents the patient from vomiting, though he is harassed by an excessive sickness. The stomach thereby becomes so much distended by air, as in some instances to be in great danger of bursting; and when an intrument is introduced, in order to drain off the air, it rushes out with a loud sound.

Arsenic, when given in a dose not sufficient to destroy life, generally produces effects that render death desirable; such as constant pain in the stomach and bowels, and tremors, which terminate in palsy and lingering hectic *.

Some patients who have survived the taking arsenic, are afflicted with ill-conditioned ulcers.

Even the fumes of this mineral are deleterious †. Arsenic produces, in manufactories in which the labourers are exposed to its fumes for many years, the greatest degree of emaciation.

knife with so much care as to remove the arsenic from the groove in the blade, which is left for assisting us in opening the knife. The same day, after dinner, he cut an orange with the same knife; in the evening he became extremely sick, and continued so during the whole night; he was also thrown into a violent sweat.

* Vide a very instructive case drawn up by Du Haen, Ratio Medend. vol. iii. p. 113.

† Vid. Van Swieten, Comment. vol. ii. p. 715.

Copper produces nearly the same effects as the white oxide of arsenic, as we sometimes have occasion to observe, when food is prepared in copper vessels that are imperfectly coated with tin *.

The external application of the white oxide of arsenic is not unattended with danger; for, when applied to an extensive cancerous sore, in the form of ointment or solution, it occasions acute lancinating pain, attended by giddiness, great thirst, quickness of pulse, cough, general anxiety, and difficult breathing †.

Mr RENAULT found that, when applied to the skin of a dog which had been divided, it sometimes proves fatal ‡.

In the Museum of the University, a specimen is preserved of a stomach containing mucus and king's yellow, portions of which adhered to the mucous membrane, which was of a bright red colour; in several spots ecchymosed, and slightly abrased. The patient, when in a depressed state of mind, swallowed two ounces of king's yellow in small beer. Symptoms:—Intolerable heat of abdomen, thirst, vomiting, and coldness. He died eighteen hours after taking the poison.

ON THE EFFECTS OF OPIUM.

THE frequent and often salutary use of opium as a medicine, has rendered us familiar with it, and well acquainted with its operation on the animal economy.

Different opinions have been entertained respecting its mode of action; but as this subject is foreign to the present inquiry, I shall content myself with stating, that, according to Dr WHYTTE, it affects the body by the medium of the nerves only; but, according to FONTANA, by the medium of the blood.

* Vid. BLANE's Diseases of Seamen, p. 298. PERCIVAL, Med. Trans. vol. iii. p. 80.

† Dr MEAD, in his Treatise on Poisons, has made mention of a case in which the external application of arsenic proved fatal.

‡ Vide also CRANTZ, Mat. Med. tom. iii. p. 25. In the Leipsic Com. for 1793, vol. xxxv. p. 242, there is a case mentioned, where arsenic, applied to the vagina, created almost immediate sickness, and produced death in twenty-four hours.

My Father's numerous experiments upon opium have led him to a different conclusion. He supposes that opium not only affects the nerves to which it is primarily applied, but is also absorbed; and being then mixed with the blood, proves fatal, by its sedative powers upon the nerves of the heart and blood-vessels, and on the whole nervous system.*

In the case of a young woman who had destroyed herself by drinking a wine-glassful of laudanum, I observed a number of small red spots upon the villous coat of the stomach.

Beck, in his Elements of Medical Jurisprudence, which contains a large store of very important information on the effects of various poisons, has observed, "Although the cases of death by this poison (opium) are numerous, yet the examinations have been few and imperfect."

In these circumstances, I subjoin the history of a case which fell under my own notice.

The patient, as far as could be learned, had swallowed about 3 vj. of laudanum. In the course of four hours she died, after having been for some time in a state of coma; although Reid's stomach pump had been employed, by which a considerable portion of the contents of the stomach had been evacuated.

The body was examined about thirty-six hours after death. The countenance was livid and swollen, probably, in part, owing to position. The blood was quite fluid. The vessels of the brain were a little more turgid than usual. The stomach was distended by air, and, upon being opened, a good deal of vitiated, brownish coloured, viscid mucus was found adhering to the villous coat. The contents of the stomach had a sweetish smell, and there were several lumps of a white substance like coagulated milk.

The stomach was then put into a large bottle half full of water, and well washed, to be preserved for a more minute examination.

The mucous membrane of the cardiac portion of the stomach was of the *tile-red* of Mr P. Syme, and the colour became gra-

* *Vide* Edinb. Med. and Phys. Essays, vol. iii. p. 292.

dually paler towards the pyloric orifice, where it was nearly of the healthy hue. Upon the cardiac portion of the stomach there were a number of dark-like coloured spots, about the size of a pin's head, of the colour called by Mr SYME arterial red, and here and there large blotches of a similar colour.

In a case described by Mr STANLEY, in the Transactions of the London College of Physicians, vol. 6th, the stomach was not inflamed.

Mr REID, assistant to Dr HOPE, made a number of experiments upon the contents of the stomach, and informed me that he could not detect the laudanum, by the nicest tests, in the contents of the stomach. This is a fact worthy of particular notice, because there could be no doubt that this person's death had been occasioned by the quantity of laudanum she had swallowed, —and it had been so completely extracted from the stomach by REID's apparatus, that it could not be detected.

The subjoined is Mr REID's own statement of the experiments he made upon the contents of the stomach:—

"About six ounces of fluid were obtained after collecting the remaining contents of the stomach, and washing it with rather more than four ounces of water. I suspected from its odour and appearance that opium had been taken, though not aware at the time of the nature of the poison that had been swallowed, the smell being very similar to what I had previously observed in a case of poisoning by laudanum, that I had been called to examine some months ago. In this instance, however, the odour resembling that of opium was so exceedingly faint, and so weak, compared with that of the other contents of the stomach, that I did not feel satisfied that there was any present. Decomposition, indeed, had already commenced, and in a few hours after the liquid had been filtered, the putrefactive smell was so strong that nothing else could be perceived.

"After filtration, the fluid was quite transparent, but had a slight tinge of red, and similar in appearance to water tinged with a small quantity of the colouring matter of the blood. It was slightly alkaline, and a stream of sulphuretted hydrogen, passed through a small portion of it with the usual precautions, gave no indications of the presence of any metallic salt.

" The rest of the liquid was divided into three parts; to the first a variety of reagents were added, which indicated the presence of albumen; corrosive sublimate producing a copious precipitate, and sulphuric acid, when added in sufficient quantity, causing the characteristic colour, pointed out by Dr HOPE, which it gives with albumen, and similar to what it produced with a dilute solution of albumen in a comparative experiment. Nitrate of silver gave a copious precipitate, as was to have been expected, but nothing more of any moment was observed in the experiments performed with this portion of the liquid.

" The test that I depended on principally for ascertaining if any opium were present, was the red sulphate of iron, which produces so deep a colour with meconic acid; and Dr HARE affirms, that in this manner he has detected the presence of opium in solution, when only ten drops of laudanum had been added to half a gallon of water *. To apply this test, acetate of lead (in solution) was added cautiously to the second portion of the fluid, as long as any precipitate took place, and sulphuric acid added to it afterwards, to decompose any meconiate of lead that might have been formed, and disengage the meconic acid; a solution of the red sulphate was then dropped upon it, but no change took place, indicating the absence of meconic acid, and consequently of opium.

" The third portion was evaporated to dryness by a very gentle heat (not exceeding 100° of Fahrenheit), and about four grains of a solid residuum obtained, part of which was dissolved by digestion in alcohol, and appeared to be osmazome, the remainder being albumen.

" I ought to have mentioned, that, after the liquid had been filtered, part of it was shaken in a flask with some animal charcoal, to remove the colouring matter, and filtered a second time; it was acted on in the same manner as the rest by the different reagents."

Mr COOKE, in his edition of Morgagni, has made mention of so great turgescence of vessels upon the mucous coat of the

* Quarterly Journal, New Series, vol. ii.

stomach, in a case in which death had been occasioned by opium, "that blood exuded upon the handle of the scalpel by the slightest touch," vol. ii. p. 17.

SECTION II.

OF THE ACUTE INFLAMMATION OF THE MUCOUS MEMBRANE OF THE STOMACH.

Considering the varied nature of our food, the acrimonies with which it is occasionally mixed, the length of time it is applied to the mucous membrane of the stomach, and that cold water, and even ice, is often taken, when the body has been very much overheated, it might be supposed that this disease would be very frequent; experience, however, proves the contrary, this inflammation being extremely rare, unless when excited by arsenic, sulphuric acid, &c. or by fever. This acute inflammation is often combined with gangrene, when boiling water from a kettle, or acrid poisons have been swallowed.

The colour of the mucous membrane, in cases of acute gastritis, whether occasioned by caustic, acrid poisons, or other causes, is various in degree. In the milder cases slight redness only is seen. It is of a red, or dark-brown, or black colour, and may be easily detached in patches from the subjacent membranes. There is a little serum effused under the mucous coat, which is soft and pulpy; and, very frequently, it is detached, and leaves more or less extensive ulceration, which occasionally extends to the other coats, and is sometimes combined with gangrene, in the form of spots or patches. This inflammation is apt to become chronic, in which case the membrane is less red; it is thickened, more tenacious, and sometimes ulcerated, and the edges of the ulcers are tumid and everted.

Inflammation of mucous membranes, according to Dr Carmichael Smyth, often continues, "without much increase, for a long time; so long indeed, that the disease becomes a

chronic, more properly than an acute one; and, in many cases even where the principal inflammatory symptoms have been removed, a sponginess, redness, and increased sensibility remain, with the discharge of a thin discoloured mucus; and, in every instance where any of these membranes have been violently inflamed, the part continues long weak, and liable to be again affected from the slightest cause*."

Inflammation has the effect of debilitating the mucous membrane, so that it is apt to be renewed by a slight cause. Thus, those who have been repeatedly afflicted by dysentery, after having recovered from the original and more dangerous inflammation, if exposed to cold and moisture, discharge by the anus a white clear liquid.

Over-excitement is also apt to occasion a discharge from a mucous membrane that had been previously weakened by repeated inflammation. Thus, those who have repeatedly had gonorrhœa, are subject to discharges from the urethra a day or two after matrimony, which leads to ill-founded suspicions. The husband, conscious of not having had for some time connexion with a woman of a suspicious character, suspects the fidelity of his wife, and she, on the other hand, is apt to suspect her husband. Both parties are thrown into a state of great anxiety and alarm, which is very groundless; for the discharge does not possess a virulent quality, being merely the consequence of over excitement of a membrane, weakened by previous repeated inflammation.

What is remarkable, some patients are subject to such discharges at particular times; in others it appears at very distant periods.

Thus, a man who has had repeated gonorrhœa in youth, is subject, even in old age, to an occasional discharge from the urethra.

There is another circumstance in the history of inflammation of mucous membranes, which well merits attention, viz. that it is often difficult to distinguish the primary from the secondary disease.

* Medical Communications of London, vol. ii. p. 209.

Thus, a stone in the bladder gives rise to the same kind of discharge as a gonorrhœa; or a leucorrhœa occasions the same discharge as a gonorrhœa; or a stone in the bladder, or the scirrho-contracted rectum, produces symptoms somewhat similar to those of diarrhœa mucosa, or dysentery.

OF THE SYMPTOMS OF THE ACUTE INFLAMMATION OF THE MUCOUS MEMBRANE OF THE STOMACH.

In the present section it is proposed to describe the symptoms of inflammation of the mucous membrane, when it does not originate from a specific contagion, as from that of fever. This disease is very rare in its acute and idiopathic form, but not unfrequent, as an effect of swallowing poisons; and hence the symptoms of the genuine idiopathic disease are somewhat different from those occasioned by acrid poisons.

The severity of the symptoms is generally characteristic of the degree of the inflammation; and hence are most severe when an acrid poison, such as the white oxide of arsenic, or the sulphuric acid, or boiling water, has been swallowed.

The symptoms occasioned by taking the white oxide of arsenic have been already enumerated. It seems necessary to add, that, if the patient survives for a day or two, he suffers much from a sense of heat in his throat, thirst, vomiting, colic, great feebleness, and lassitude, followed by palsy; and also, that when Fowler's solution of arsenic is used as a medicine, it should not be taken upon an empty stomach, as it produces considerable uneasiness, and sense of heat at the præcordia. Corrosive sublimate also occasions violent vomiting and purging, and very violent pain in the stomach; and, according to Mr Brodie, proves fatal, by acting chemically on the mucous membrane of the stomach so as to destroy its texture, and by the organs more immediately necessary to life being affected in consequence of their sympathy with the stomach.

Death is sometimes occasioned by drinking cold water, when the body had been much overheated by dancing. I was ac-

quainted with a lady who died three days after she had drank cold water, when much overheated, after having had the symptoms of gastritis.

HALLER has described a similar instance. His patient was immediately seized with acute pain in the stomach, accompanied by fever; he became delirious, and died in fifteen days. Upon dissection the stomach was found inflamed, ulcerated, and gangrenous in some places. The usual symptoms of inflammation of the stomach, which has not been occasioned by an acrid poison, are considerable fever, burning pain in the region of the stomach and throat, vomiting, upon taking even the mildest food; and the bowels are generally loose. These symptoms are in some cases accompanied by some degree of difficulty of breathing and cough.

When the acute inflammation of the mucous membrane of the stomach does not originate from so obvious a cause, it is usually accompanied by redness of the lips, and edges of the tongue, acute pain in the region of the stomach, accompanied by a sensation of heat in that organ, by a great desire for cold drinks, nausea, retching or vomiting, by a small, quick and compressible pulse, and sometimes by hurried breathing. If the disease does not prove fatal in a short time, great emaciation follows, as in the subjoined case, which lately occurred, and which might readily have been mistaken for inflammation of the stomach.

The patient, six days prior to his death, while sweating, had drank largely of cold beer; and, in a short time, was seized with swelling and acute pain in his belly, which, on the following day, were succeeded by constant vomiting. Pulse 80, small and weak; respiration quick and laborious. His bowels could not be moved at first. At length a purgative clyster was administered, which occasioned bloody stools. The vomiting continued until death. The stomach was sound. The smaller intestines were of a dark livid colour, and adhered to each other. An irregular ulcer, about an inch in breadth, which had destroyed the mucous membrane, was found about two inches from the ileo-colic valve. The larger intestines were sound.

The following case is a good illustration of the nature of the combination of this disease with inflammation of the mucous membrane of the intestines:—The patient, a man of fifty-five years of age, had a dry and furred tongue, little or no appetite, much thirst, and his pulse was about 96, and feeble. He had tenesmus and occasional bloody stools. He died in the course of six weeks. The mucous membrane of the great left sac of the stomach was found of a deep-blue or blackish colour, and considerably thickened; and, upon being minutely examined, the black colour was observed to consist of an aggregation of black spots, which assumed an arborescent figure. The submucous cellular tissue was filled with blood. The spleen was large and hard, and there was melanotic matter in its substance. The mucous membrane of the caput coli was in the same state as that of the stomach, and it was ulcerated.

The ulcers were of various forms and shapes; some were as large as a shilling, and others were as small as a pin head, and these were surrounded by a dark vascular areola.

By a reference to the works of Morgagni, Lieutaud, Stork, and other distinguished writers, it appears that the symptoms of this disease are by no means uniform. They vary much in degree, amounting, in some instances, merely to anxiety and sense of fulness in the stomach, with frequent vomiting of a brown fluid; but, in others, great thirst, and a burning sensation in the region of the stomach, together with hiccup and difficult breathing, have occurred; and, on the other hand, according to Frank and De Haen, inflammation of the stomach is not characterised by any of the usual symptoms.

May it not be inferred from the latter observation, that the red spots which frequently occur on the healthy mucous membrane of the stomach have been mistaken for the effects of inflammation of that membrane?

According to Broussais, gastritis, combined with inflammation of the mucous membrane of the intestines, is the cause of all fevers,—an opinion adverse to the appearances exhibited by post-mortem examination, as the mucous membrane is not always inflamed in febrile disorders.

Besides, many fevers have terminated favourably under the use of stimulants; and such an opinion had led its author to condemn the use of emetics and purgatives as remedies for fever, the former of which have frequently cut short fever in its beginning, and the latter have rendered the symptoms which occur in the progress of fever, much milder.

SECTION III.

OF THE ACUTE INFLAMMATION OF THE MUCOUS MEMBRANE OF THE INTESTINAL TUBE.

This acute inflammation is either idiopathic or symptomatic. It sometimes appears at the commencement, or in the progress of fevers: it is occasionally the sequel of measles; and some other disorders, as diarrhœa, are the most striking characteristics of this inflammation. It also is very often connected with bad digestion, improper food, and vitiated state of the secretion of the stomach and intestines, and with various other causes of irritation; hence the difficulty of discriminating between the symptoms occasioned by different acrimonies within the intestinal tube, and those proceeding from a disease of the mucous membrane, which is a matter of much moment, as the former does not prove dangerous to life like the latter.

According to Dr Abercrombie, the disease is different, when seated in the mucous membrane itself, or in the mucous follicles, or when "involving both structures at once."

If the diarrhœa be accompanied by pain in the abdomen, painful tenesmus, scanty discharges of bloody mucus, or pure blood, of a watery fluid, or muco-purulent fluid, peculiar irritability of the bowels, thirst, slight degree of fever, and by heat after taking food, and very frequent calls to go to stool, there is reason to suppose the inflammation of the mucous membrane to be the cause of the diarrhœa.

If the inflammation be limited to the lower part of the larger intestines, the healthy fæces are retained for a time, and discharged in the form of small balls.

Of this inflammation there are various degrees, and great variety as to the symptoms; and hence, upon dissection, healthy hardened fæces may be found in one portion of the intestine; whilst the contiguous part of the tube contains fluid fæces. In some cases, little else than a bloody mucous fluid is discharged; but, when the inflammation has been seated only in the smaller intestines, the evacuations are healthy.

This inflammation sometimes subsides, sometimes it proves fatal in its inflammatory stage; or it terminates in ulceration or gangrene, or is propagated to the peritoneal coat, and occasions peritonitis, occasionally in consequence of perforation of the coats of the intestines.

It has been already observed that the spasmodic contraction of the intestinal tube is frequently followed by inflammation of the mucous membrane of the intestine.

Those who are subject to such spasmodic affections are liable to occasional constipation, colic pains, and occasional nausea.

When inflammation follows the spasmodic attack, the patient is suddenly seized with tenesmus and acute pain in his belly, followed by thirst and vomiting, and the pulse is quick and small. But the pain is not much increased on pressure, nor is the abdomen tense, as in the peritonitis. In the progress of the disease, repeated vomiting occurs, and death ensues in the course of two or three days.

Upon dissection, a part of the intestine is found to be much contracted, and the mucous coat is at that place inflamed; and, what is remarkable, though the obstruction be in the smaller intestine, yet inflammation occasionally occurs in the mucous membrane of the stomach, in consequence of the obstruction in the intestines.

Inflammation of the intestine is also often combined with stricture, and sometimes does not extend far beyond the seat of the stricture; but, on other occasions, it is propagated to the whole of the intestinal tube above the stricture.

SECTION IV.

OF THICKENING OF THE MUCOUS MEMBRANE OF THE ALIMENTARY CANAL.

Having described the nature of the acute inflammation of the mucous membrane of the alimentary canal, we shall now proceed to consider some of its consequences.

One of the most common consequences of inflammation of the mucous membrane, is thickening, which is various in degree and extent, being on some occasions slight and limited to a small portion of the alimentary canal; but, in other instances, the part affected is much straitened, and a considerable portion of the canal is constricted. The thickened mucous coat is generally softer, but is sometimes harder, than the sound membrane. This thickening occasions what has been called *the Inflammatory Stricture*. The degree of stricture varies. —In the mildest form of the disease, the inflammation is limited to the mucous coat. The parietes acquire greater thickness, and the obstruction to the canal is more considerable; and when the inflammation not only affects the mucous membrane, but also the subjacent cellular coat, the cells are filled up by coagulable lymph. Thus it acquires a morbid degree of density, and thus the caliber of the affected part is still more diminished, to which the thickening and contraction of the muscular and peritoneal coats very much contribute; and these, owing to the contraction of the muscular coat, look as if impressed by a small cord which had been very firmly tied around them.

The peritoneal coat possesses no degree of contractile power, but the muscular coat, to which it firmly adheres, in consequence of inflammation, being partially contracted, draws inwards the peritoneal coat; so that the place of the stricture may be readily detected without opening the intestine; for it looks as if it had been impressed by a cord very rapidly drawn around it. The inflammatory stricture may be frequently traced to an obvious cause. It proceeds from external violence, from acrid sub-

stances that have been swallowed, from worms or concretions within the stomach or intestines, from dysentery, hæmorrhoids, from operations performed upon the rectum for the cure of hæmorrhoids or fistula ani, and from diseases of the bladder and womb; in the same manner as strictures of the urethra are often occasioned by repeated gonorrhœa, or urinary calculi; and those of the biliary ducts, by biliary calculi impacted within them.

Strictures generally take place in such parts of the gullet, stomach, or intestines, as are naturally of small diameter; hence stricture of the gullet takes place at the commencement of that tube, or its termination in the stomach; at the cardiac and pyloric orifices of the stomach, more frequently than in the middle of that organ; at the termination of the intestinum ileum, or in the rectum.

It has been already observed, that the effusion of coagulable lymph is one of the most common effects of inflammation of the mucous coat, where the inflammation has run high; and it adds considerably to the thickness of this membrane, so as to diminish the diameter of the canal.

The quantity of coagulable lymph effused is very different; sometimes it is as thin as a wafer, on other occasions in such a quantity as to fill the greater part of the affected bowel.

In some cases, it forms only a thin lining to the villous coat, or appears in the form of tattered shreds; in other cases, it fills up the spaces between the valvulæ conniventes; in others, it covers these, and sometimes assumes the form of small conical tubercles, which have been minutely described by my uncle Dr Donald Monro, by Sir John Pringle, and Sir George Baker, as having been often found in the bodies of persons who have died from dysentery.

I have also seen a number of small cylindrical bodies, projecting from the villous coat of the intestines, which seemed to be chiefly composed of masses of coagulable lymph.

A very large quantity of coagulable lymph has in some instances, as in the following case which I attended, been discharged by stool:—

The patient, a lady between thirty and forty, suffered much from pain under the ribs of the right side, which was increased by pressure, and from headaches attended by great dejection of spirits, drowsiness, obstinate costiveness, and a diseased secretion from the internal surface of the intestines.

The complaint in her bowels, and the diseased secretion from the surface of some part of the intestinal canal, seemed to originate from a strong purgative medicine which had been given to allay a febrile attack with which she was seized after lying in; it succeeded in removing the fever, but the secretion of her milk, which had been previously abundant, also ceased.

Her bowels were then attacked; and, for three or four years, at the interval of two or three weeks (sometimes more frequently), she passed by stool, after considerable griping, pain, and straining, attended by a sense of weight and pressure in the rectum, a kind of whitish very viscid jelly, mixed with shreds of coagulable lymph, and in such quantity as nearly to fill the half of a common-sized chamber-pot.

After the evacuation, which could only be produced by the aid of considerable doses of castor oil, she felt much relieved.

In the course of eight or ten days, she was generally again seized with pain in her bowels, which was succeeded by very violent headache, often by nausea and vomiting.

In consequence of these very severe attacks, she suffered greatly in her health, having frequent cold fits, similar to the attacks of an ague, terminating in a hot fit and perspiration, but without much alteration in the pulse, or other febrile symptoms.

Her bowels were always costive. There was nothing peculiar in the feculent matter, excepting the jelly above mentioned.

I have seen the greater part of a portion of the intestinal canal, which had filled the sac of a crural hernia, filled up with coagulable lymph *.

In the collection of the late Mr A. Burns of Glasgow, there was a specimen taken from a child, where the same kind of ge-

* Vide Plate XIV. fig. 2. of my Essay on the Morbid Anatomy of the Gullet, Stomach and Intestine.

latinous substance, mixed with coagulable lymph, adhered very intimately to the villous coat of the sigmoid flexure of the colon and the rectum; above the sigmoid flexure, the intestine had given way, and the ruptured part was covered by the same kind of jelly.

In this case the rectum was considerably constricted for the space of four inches.

In some herniæ, coagulable lymph nearly fills up the protruded portion of the intestine. Coagulable lymph has sometimes been discharged in the form of cylindrical tubes; or it bears some resemblance, in form, to the ramifications of the bloodvessels, and has been mistaken for worms. But, in other instances, the coagulable lymph which fills up the intestines is not discharged: it continues to plug up the intestinal canal, and proves the cause of death, as in the following case, for which I am indebted to the late Dr Walter Graham of Dalkeith:

"*Dalkeith, May* 24. 1808.

"In the beginning of January last, I was requested to visit James Young, eleven years of age, on account of a swelling of his belly.

"Upon examination, the abdomen was found tense, considerably swelled, and an evident fluctuation was to be felt. He complained of a fixed pain in the left side, aggravated by the slightest motion, as stooping, or making a full inspiration, &c.; was troubled also with occasional headache; pulse, for the most part, quick, but weak, belly bound, tongue dry, and he complained much of thirst; urine very scanty. He ascribed these symptoms to a fall upon his left side, from the height of about six feet, which happened seven or eight weeks before; after which he always complained of a pain in that side, and the abdomen was observed gradually to increase in size. He was ordered digitalis with calomel; after a continuance of which, for about the space of a month, the fluctuation disappeared, and the swelling gradually diminished, but, with the pain, still continued in a degree. A peculiar hardness was now to be felt all over the abdomen; his appetite failed, which before had been keen,

and he was much troubled with nausea and vomiting. In this state he passed ten or eleven weeks, at the end of which he was much emaciated. The umbilicus, and about an inch of the integuments around it, became painful, slightly elevated and inflamed. A solution of the acetate of lead was applied, but the inflammation still continued to increase for about six weeks, when the pain became so severe that I deemed it expedient to apply a poultice. In ten days the tumour burst externally, and from the opening, a large quantity of a yellow, thickish, and fœtid fluid escaped; and from it the fæces, or rather the unchanged alimentary mass, continued to be discharged during life.

"From the first appearance of the inflammation, his stomach was observed to swell very much; and his belly was so bound that a stool could never be procured but by the administration of very large doses of calomel, or some other purgative; and for several days immediately preceding the bursting of the tumour, the constipation continued so obstinate as to resist the action of repeated *enemata purgantia*, and very large doses of calomel by the mouth.

"The emaciation and debility increased to an extreme degree, until his death, which happened on the 7th instant.

"Having obtained permission to open the body, the following were the appearances on dissection:—

"Upon cutting into the abdomen, a large quantity of a disagreeable fœtid gas escaped, and a quantity of a yellow fœtid fluid was found floating among the viscera. The omentum was very much thickened, inflamed, and ulcerated. The liver and spleen were greatly diminished in size, the former not exceeding that of a natural kidney, and as hard as a piece of turnip. The gall-bladder was very much thickened, and contained little or no bile; the pancreas was very much diseased; the stomach was also much inflamed, thickened, and ulcerated. About an inch below the pylorus there was a small hole, out of which the fæces, or rather, as before stated, the indigested aliment passed; as after eating or drinking, upon motion or coughing, it was discharged by the umbilicus very little changed. *The remainder*

of the intestinal canal, not an inch of which could be traced below the opening, was converted into a hard fatty substance, which, along with the other parts, was much diseased, and adhering firmly to the omentum and peritoneum. The mesenteric glands were very much enlarged and hardened; the kidneys seemed of the natural size, but were of a very dark colour, and extremely hard consistence. The bladder had ascended to the left hypochondriac region, of which it occupied a very considerable part, being much distended with urine, and its coats pretty much thickened. Yours ever,

"W. GRAHAM."

OF THE INFLAMMATORY STRICTURE OF THE GULLET.

IT has been already observed, that the villous coat of the gullet sometimes attains so unnatural a degree of thickness, as to impede deglutition.

It is of moment to distinguish this from the other organic diseases which obstruct the gullet, and especially from that which originates from an enlargement of the glands in the vicinity of this organ.

"On distinguera (says RICHERAND) le retrécissement dépendant de l'épaississement des parois de l'œsophage, de celui qui résulte de la compression qu'exercent les glandes voisines, à la facilité qu'on éprouve, dans ce dernier cas, à faire pénétrer la sonde. La maladie est cependant alors bien plus fâcheuse, car elle est ordinairement incurable; tandis que, par l'usage prolongé des sondes, on peut dilater l'œsophage comme l'urèthre, et dissiper l'engorgement de ses parois *."

But I doubt much the accuracy of the above observation, and more especially after having received a drawing from Sir ASTLEY COOPER, from a preparation which is preserved in the Museum at Guy's Hospital, in which the œsophagus, by a circle of indurated and enlarged glands, is so much compressed and

* Vid. Nosog. Chir. tom. iii. p. 314.

diverted from its usual course, and at the same time so much contracted, as only to be capable of receiving a common writing pen; besides, it is prodigiously enlarged above the seat of the obstruction.

It may not be improper to suggest the necessity of great caution in passing the bougie, when the sides of the gullet have been contracted, as the instrument may otherwise be forced through the gullet, which circumstance may prove fatal.

The bougie may also inadvertantlybe forced into the windpipe: it should not be introduced quickly, when the tongue is pushed out, for thus the epiglottis is raised, and the bougie may pass into the windpipe; the patient should be directed to imitate the action of swallowing, to draw back the tongue, by which the epiglottis is pushed down; the point of the instrument is then to be directed towards the back of the pharynx.

OF THE SYMPTOMS OF THE PERMANENT ORGANIC STRICTURE OF THE GULLET.

Strictures occasion various local and also constitutional symptoms.

The former class of symptoms are pain, soreness, sense of tightness in the part affected, and the discharge of a ropy and very tenacious mucus, which may be drawn out for some feet.

The latter class of symptoms are, great anxiety, despondency, impaired digestion, costiveness, fever, quick pulse, sometimes hysteria and epilepsy.

The organic or permanent stricture is generally complicated with the temporary or spasmodic stricture; hence the sudden and temporary aggravation of the symptoms, from exposure to cold, or from the stricture being irritated.

The following cases convey a good idea of the symptoms of stricture of the gullet.

The two first of them are extracted from my Father's notes.

"Mr M——, aged 61 years, strong built, has lived freely; upwards of four months ago, he began to perceive a difficulty of swallowing solid substances, which has by degrees increased. He

now feels a degree of pain, and when he takes food, a sensation as if it were stopped at the lower part of the gullet. If he tries to overcome the resistance, by taking down a second and third morsel, all are brought up again with violence. He lives chiefly on milk, with bread softened in it, and this passes pretty easily down into the stomach; and, after getting down, is well digested: he is rather costive, and has lost his flesh and strength, but has no other complaint."

1798, Jan. 15.—My Father imputed the above symptoms to stricture, and thickening, in lower end of the gullet.

He therefore prescribed mercury, extract of cicuta, and occasional purgatives, together with low diet. By the above remedies the patient was considerably relieved.

Oct. 1. 1789.—Mr M—— twenty years of age, has from infancy had difficulty of swallowing, especially solids. Repeatedly he has had an inability of swallowing. No tumour is discoverable, although the stricture is just under the cricoid cartilage. Two years ago, he suffered acute pains in his abdomen, like colic. Looks pale. Pulse 84.

Dr William Cullen, and my Father, supposed that this gentleman laboured under an original straitness of gullet, with uncommon irritability, and at times spasm of the canal.

Cicuta was recommended, with the occasional use of purgatives, opiate clysters, and frictions with anodyne balsam.

I saw the following case along with the late Dr Gregory and my Father, and at the time wrote the subsequent history of it.

"August 26. 1805.—Reverend Mr G——, aged 58 years. Since March last has had constant difficulty in swallowing, which has gradually increased to such a pitch, as to prevent him from swallowing solids without the utmost difficulty.

"He complains of a dull pain at the under end of the breast-bone, which is much increased by swallowing even liquids, and when he attempts to swallow solids, the pain becomes very acute.

"I saw him attempt to swallow a glassful of wine and water; the fluid lay for two or three minutes in the under part of his gullet; then a part of it passed down with a gurgling sound, like that of water passing through a straitened canal. After his food has got into the stomach, it is never rejected.

" Sometimes a part comes up before it passes through the constricted part of the gullet, and coughing is excited.

" When he attempts to swallow any thing solid, it lies for several minutes in the under part of the gullet, then passes down, and he says, while passing, it gives him the same sensations as when any solid body is forcibly thrust through a very narrow passage.

" He has occasionally thrown up from the gullet, a small quantity of a gelatinous fluid."

" His appetite is much impaired, and he has lost much of his flesh and strength.

" Never has had lues venerea in any form."

Mr W. R—— has, during eight months, laboured under a degree of difficulty in swallowing. Solids pass down more readily than fluids.

The obstruction is opposite to the cricoid cartilage of the larynx.

In consequence of having taken mercury, he thinks he now can swallow liquids and soft food more easily than formerly; but still he cannot swallow a solid bolus. He gradually lost his flesh and strength, and died at length, much emaciated.

Upon examining his body, a stricture was discovered opposite to the uppermost piece of the breast-bone. The coats of that part of the gullet were half-an-inch thick. The gullet was considerably enlarged above the stricture.

The neighbouring lymphatic glands were considerably enlarged.

On opening the windpipe, the constricted part of the gullet was found to communicate with it by a small oblique passage, which began near to the top of the stricture, and terminated at the back part of the windpipe, opposite to the fourth cartilaginous ring.

The permanent stricture is of slow growth, and the constriction becomes greater and greater, from the gradual approximation of the opposite sides of the canal, nor is there any remission of the symptoms: whereas the stricture from spasm sometimes comes on and goes off suddenly, and is generally but of short duration; and its course may be arrested by proper remedies.

From what has been stated in the preceding cases, it follows, that some of those who have been afflicted by organic stricture, have generally what they call a narrow swallow from their birth, which increases to such a pitch as to create difficult deglutition.

The attempt to swallow proves a source of much irritation; the patient has what he calls fits of choking, especially when he does not swallow with great caution, and perceives even fluids stop at a certain part of the gullet; a gurgling noise is then heard, like water passing through a very narrow channel, and a part of the fluid, after being detained for two or three minutes, gets down; the remainder is rejected, and escapes through the nose and mouth, or passes into the windpipe, and occasions violent coughing.

A very great exertion is required to swallow solids, and, during the effort, many patients suffer from difficult breathing, and some even are convulsed.

Any irritation adds very much to the difficulty of swallowing, which is probably owing to spasm in the muscles of the gullet being induced.

The small quantity of food which passes the constriction of the gullet, being inadequate to the nourishment of the patient; he becomes extremely thin, weak, and very irritable; and the constriction becoming daily greater, he at length dies from inanition.

It sometimes happens, that the progress of the stricture is arrested by pregnancy. I had occasion to attend a woman with a stricture in her gullet, who became pregnant, and suffered much less from her disease during the months of her pregnancy than she had done before that period; but after delivery, she swallowed with greater difficulty; at length the obstruction in the gullet became so considerable, that very little of her food reached the stomach, and she died in a few months from inanition.

The nature of the disease can only be ascertained by the introduction of the probang *.

* Sir E. Home has observed, "This part of the œsophagus (viz. that part immediately behind the cricoid cartilage of the larynx), is liable to two other

CONSEQUENCES OF THE PERMANENT ORGANIC STRICTURE OF THE GULLET.

These are various:

1*st*, The part of the gullet immediately above the stricture is, in most cases, prodigiously enlarged and ulcerated.

A remarkable instance of this enlargement above the stricture was sent to me by Dr MELVILLE of St Andrew's, with the history of the case. He observes, "that the enlargement above the stricture was so great, that the patient could retain nearly a pint of nutritious liquid, composed of eggs, milk, and sugar, for ten minutes, conversing with his friends during that time." The stricture is, in this stage of the disease, incurable; for, up-

diseases, which produce nearly the same symptoms; and therefore, when the cases are not accurately examined, may be mistaken for stricture.

"One of these is a thickening of the coats of the œsophagus, which extends to the surrounding parts, and in the end generally becomes cancerous, or, in other words, an incurable disease; the other is an ulcer on the lining of the œsophagus: this last is commonly a little below the seat of stricture, and is upon the posterior part which lies upon the vertebræ of the neck. Both of these produce a difficulty in swallowing, and in their early stages are only to be distinguished from stricture by an examination of the bougie; when the disease is more advanced, the other symptoms which arise sufficiently explain the nature of the disease.

"When a bougie is passed, with a view to determine the nature of the complaint, and it passes down to the distance of eight inches, measuring from the cutting edge of the front teeth in the upper jaw, the surgeon may be satisfied that it has gone beyond the usual state of stricture; and if it is brought back without any resistance, he may conclude that the aperture of the œsophagus considerably exceeds the size of the bougie which had been used. But if the bougie stops at the distance of 6½ inches, or even lower, he is to retain it there with an uniform steady pressure for half a minute, so as to receive on its point an impression of the surface to which it was opposed. If the end of the bougie retain its natural form, or nearly so, and there is an indentation like the mark of a chord on its side, whether all round or only partially, he may decide that the disease is a stricture; but if, on the other hand, the bougie passes without any difficulty to the distance of 7½ inches, and, when brought back, the point has an irregular jagged surface, it is equally clear that the disease is an ulcer on the posterior surface of the œsophagus." Vid. Sir E. HOME's Pract. Obs. on Strictures, vol. ii. p. 397.

on the introduction of an instrument, it passes more readily into the sac than against the stricture: hence there is no chance of dilating it.

Upon dissection, it was found that a common probe could scarcely be passed through the constricted part of the gullet.

When the stricture is seated near the cardia, and when there has been considerable dilatation of the gullet above the stricture, the disease has been mistaken for an organic derangement of the stomach, as the patient suffers pain in the region of the stomach, and what is taken, is rejected.

2d, Ulceration below the stricture sometimes, according to Sir E. Home, takes place, and, by extending upwards, sometimes destroys the stricture, and this he imputes to the efforts of retching, which frequently comes on. A bougie, introduced in such circumstances, will in general have its point entangled in the ulcer; and, where so skilfully directed as to go down into the gullet, it will meet with a difficulty whilst it is passing the commencement of the ulcerated part of the œsophagus, and another impediment where it leaves the ulcer, and enters the sound portion of the œsophagus below.

3d, From the continuance of the ulceration of the gullet, an aperture is formed, and the matter getting into the trachea, proves fatal in a very short time, as in the following case:—

I attended, for three years, a person who laboured under a stricture of the middle of the gullet, during the whole of which time he was incapable of taking as much food as was sufficient to allay his hunger.

The patient was a letter-carrier, and therefore had been exposed to the inclemency of the weather.

The disease began like a common sore-throat: he had a slight pain in the part, and swallowed with difficulty.

He had frequent hawking and spitting, probably owing to the neighbouring parts being in an irritable state, and secreting an unusual quantity of mucus. The soreness soon went off, but his voice became much weaker, and the difficulty of swallowing gradually increased.

He also breathed with difficulty, especially upon attempting to swallow, and a part of his food was commonly returned.

From the continuance of the disease, he became much emaciated, and his pulse was small and quick.

Notwithstanding a long protracted course of mercury, cicuta and hyoscyamus, the disease increased; and after having laboured under it for three years, he died very suddenly.

Upon examining the body, a stricture was found in the middle part of the gullet, about half an inch in extent.

The œsophagus internally, immediately above the stricture, was in a state of ulceration, and there was an oblique canal through which a probe could be passed into the trachea.

The sudden death of the patient seemed to have been owing to the purulent matter getting into the trachea.

OF THE INFLAMMATORY CONSTRICTION OF THE STOMACH.

The thickening and induration of the mucous membrane of the stomach, and more especially of that portion which is situated at its pyloric orifice, impedes the free exit of the contents of that organ, deranges the functions of the stomach, and induces a loss of power in the muscular coat of the organ, which is essential to the process of digestion.

The stomach has sometimes been found much contracted when the pylorus is thickened. This happened in the case of the late Mr Royston. This gentleman had an inordinate appetite. The cause of his disease seemed to have been the having taken ice when he was over-heated. The stomach was found small and empty, contracted in the middle, of a dark reddish hue, and the pylorus was much thickened.

In consequence of inflammation, muscles lose their contractile power; hence, the loss of tone of the stomach consequent to distention, probably also depends upon a degree of inflammation of the muscular coats of the stomach.

This opinion receives support from what takes place in respect to the intestines, in a case of strangulated hernia.

One of the most common causes of inflammation of the intestinal tube, is stricture, as often takes place from a strangulated

hernia. This stricture occasions inflammation, which destroys, according to Mr Travers, the contractile power of the coats of the intestines; hence, even when the strangulated portion of intestine has been set free by the skill of the surgeon, and has been returned into the abdomen, it does not resume its healthy functions; the bowels continue torpid, and death follows in a short time *. Morgagni gives a case of sudden death from gastrodynia. In one, the patient died in three hours. The stomach was found distended to an extreme degree, and somewhat inflamed.

Before concluding this department of the subject, it may not be improper to observe, that organic diseases of the neighbouring organs have sometimes created acute pain and heat in the stomach, which may be supposed to be connected with that organ. This observation is illustrated by the following cases in the Museum of the University :—

A man, after an attack of fever, was seized with pain in his left side, and afterwards by nausea and vomiting; and he could not bear pressure upon the epigastric region. He had also occasional diarrhœa, but generally was costive. In this state he lived for four months. Upon dissection, the serous membranes of the thorax and abdomen were found much thickened and tuberculated, as also the greater part of the smaller intestines.

In the second case, a man, fifty-two years of age, had laboured for about a month under bad appetite, pain and heat in his stomach, which were not increased on pressure, and frequent vomiting after meals. He had also frequent calls to make water, which was mixed with blood and pus, and it became necessary to draw off his urine by the catheter. A tumour lodged within the bladder could be distinguished from the rectum.

Upon dissection, a number of soft white tumours, resembling medullary sarcoma, were found attached to the peritoneum and omentum. Water was found within the belly, and the bladder was much diseased.

* Vide an Inquiry into the Process of Nature in Repairing Injuries of the Intestines, p. 221. London, 1812.

OF STRICTURE OF THE INTESTINES.

Strictures of the intestines bear an exact resemblance to those of the gullet, which have already been described, with the exception that they are sometimes of greater length. I have seen the ileum contracted for seven inches.

Strictures are more frequently met with in the colon and rectum than in the smaller intestines; I have seen the natural caliber of the colon so much reduced by this disease that it would give passage to a goose quill only.

In consequence of stricture, the parietes of the abdomen are so much distended, that the recti muscles are separated for some distance from each other, and this separation is obvious during life, of which the subjoined case is a good example:—

" M. L., æt. 52.—Abdomen very much distended, and resonant on percussion; the patient always suffers acute pain, which is increased somewhat by pressure; bowels much confined; urine high coloured, and passed with pain. Says that she sometimes swells up suddenly, and that the distention gives her acute pain. When the abdomen is in this state, the direction and size of the large intestine is easily and exactly traced through the extremely thin parietes of the abdomen. Recti muscles felt apart from each other to the distance of six inches; pulse 112, small and weak; cannot sleep, and has scarcely any appetite; is much emaciated. The present symptoms occurred first nine months ago, since which time the catamenia have never appeared.

" (Jan. 8th) One stool, dark coloured and scanty, from a purgative and enema given yesterday; swelling and pain of enema continue; feels very weak.

" (9th), Died in the course of three days.

" *Inspection 24 hours after death.*—Abdomen was more distended than during life, and the linea alba was much widened towards the centre of the abdomen. The recti muscles were fully three inches apart. At the pubes, the linea alba was of its usual size, but the sternal extremity was about an inch in breadth. The recti muscles were thin, and much expanded

before opening the abdomen. The small intestines were found distended to a very great degree, and contained a large quantity of semifluid fecal matter. The valve of the colon was in an indurated state, and the passage through it could only admit the little finger. The large intestines were collapsed and empty."

Above the stricture, the coats of the intestines are frequently inflamed and ulcerated.

In the cancerous stricture of the intestinal canal, there is not only a very great degree of thickening of the coat, but also tumours of different sizes, of a malignant nature, which tend still farther to lessen the aperture through the stricture.

The appearance of stricture in the rectum has been so faithfully described by Dr GREGORY, (see p. 16. of this volume,) as to supersede the necessity of further description.

Stricture in the intestines gives rise, in its earlier stages, to colic pains, to costiveness, alternating with bilious diarrhœa. After some time, solid fæces are very rarely passed, and only after a great effort; and these are by no means of the natural size, being generally not thicker than a common sized writing-quill. A purgative affords but temporary relief.

The stricture, in some cases, occasions an inflammation of the intestines.

Rupture of the intestines above the stricture sometimes takes place; and, when this has happened, the patient is suddenly seized with very acute pain in his bowels, like that occasioned by a strangulated hernia, followed by the sudden sinking of the pulse, by cold sweats, syncope, and in four or five hours death.

The following are examples of this disease.

In the first case there was a complete stricture of the ileum near to its termination, where it was so much contracted that even water would not pass through the constricted part.

In the second case, the left side of the colon was found to be indurated and contracted, so that the little finger could scarcely be passed through it. The cavity of the abdomen was filled with feculent matter, which had escaped through an aperture in the intestine immediately above the stricture.

The third is a still more remarkable case.

Tartra, in his Treatise upon Poisoning by the Nitric Acid, has described the case of an individual who died three months after having taken the acid. The alimentary canal was reduced to a small volume, its coats were shrivelled, and indurated, and its calibre, through its whole extent, was not greater than that of a common sized writing quill, a sufficient proof that the several coats had been contracted and indurated in consequence of the violent stimulus which had been applied.

Stricture is more common in the larger than in the smaller intestines, and is most common near to the rectum.

In a case, preserved in the museum of our University, there was extensive thickening and contraction of arch of colon. Several ulcerated openings communicated with small sacs situated on the exterior of the intestine, which terminated in the cavity of the abdomen.

In another case, there occurred ulceration and contraction of colon, following a blow on the belly. The patient was a female.

And, in a third case, stricture and ulceration of the left colon gave rise to symptoms of ileus; and the colon was much dilated above the stricture.

In all cases of stricture, the fæces are long retained. Fermentation comes on, air is generated, and the intestines become much distended. The stricture is on some occasions so complete, that fluid fæces only can be passed.

Stricture in the course of the smaller intestines or colon may be distinguished, with probability, by the pain and swelling at the seat of the disease, and by the noise which matter produces in passing through the straitened part. If the stricture be in the colon, the place constricted may perhaps be detected by observing how much fluid can be thrown up by a clyster, and by consulting the feelings of the patient whilst it is thrown up.

The following case affords a striking illustration of stricture,

which was situated an inch and a half from the verge of the anus. There was an ulcer above the stricture, which penetrated the coats of the intestines, and the fæces had got into the cavity of the abdomen.

The patient, a soldier, had long laboured under diarrhœa, particularly during the night, accompanied with violent tenesmus. The patient formerly laboured under dysentery, and had still diarrhœa and tenesmus. Nine hours before his death, he was seized with violent pain on the lower part of the abdomen while at stool. He continued in this state, shrieking with the agony he experienced, and gradually becoming faint and more faint until eleven o'clock in the forenoon, he expired.

Dissection, twenty-four hours after death.—The body was not emaciated; abdomen tympanitic. On opening the abdomen, a quantity of thin feculent matter was found in the intestines. On further examination, a large ulcer in the rectum was discovered opening into the abdominal cavity; *beneath it the intestine was so contracted, and its coats so thickened, that the point of the little finger could but with difficulty be admitted.* Above this ruptured portion of the gut there were several ulcerated points on its internal surface, where the mucous membrane was destroyed, and its other coats greatly thickened.

The great intestines were very much inflamed, more especially the caput cœcum coli. The outer surface of this last portion of the alimentary canal was very vascular, but there was no effusion of lymph here, nor on any other part of the peritoneum. There was likewise great vascularity evident in the omentum.

The symptoms of stricture of the rectum are in some instances equivocal.

Very different opinions were entertained as to the nature of the disease, and the cause of the nausea, vomiting, great tenderness of the abdomen, and obstinate constipation, under which that great actor TALMA for some time laboured before death. He frequently went in great haste to the water-closet, expecting a copious stool, but on making the attempt, nothing but air and very liquid fæces were discharged.

It had been imputed by the partisans of BROUSSAIS to chro-

nic *gastro-enterite*, and by others to an *organic obstruction*. Dissection proved the latter opinion to be correct. A stricture was discovered about six inches from the extremity of the rectum, by which the cavity of that portion of intestine had been obliterated; and, above the stricture, the rectum and colon were very much distended, and in some places sphacelated and perforated, so that the fæces passed into the cavity of the pelvis. Traces of inflammation were discovered in various parts of the intestines.

Stricture of the rectum is often confounded with other disorders, such as chronic diarrhœa, dysentery, hæmorrhoids, and with excrescences produced by the protrusion of the inner coat of the rectum; which excrescences are painful to the touch, and discharge a conconsiderable quantity of fœtid mucus. Such excrescences are external, or they become so when the patient goes to stool; but the cancer does not protrude. When the finger or instrument is passed between the excrescences and the skin, the instestine is found smooth. The rectum is clear, and free from disease above.

When the stricture is owing to cancer of the rectum, the patient suffers not only acute pain at the time of voiding the fæces, but also a constant sense of heat and burning pain in the rectum.

A total retention of fæces follows; the belly is much swelled; the air is distinctly heard passing from one convolution to another; there is acute pain in the belly; the stomach is affected, and vomiting follows. In other cases the patients seem to die exhausted by acute pain they suffer, and from mere debility.

Another consequence of stricture of the intestine is gangrene of the intestine, as in the three following cases:—

In the first, the cavity of the ileum was enormously dilated, till within three feet of the caput cæcum coli, where the canal was considerably contracted; and, about a foot farther down, it was again contracted, so as scarcely to admit a goose quill. The portion of the intestine between the two strictures was gangrenous, and contained hardened fæces.

In the second case, the intestines were much distended and thickened. The ileum, near to its termination, for the space of five inches, was surrounded by the omentum, which was twisted like a cord, its superior extremity being attached in its usual situation, while the inferior was attached to the mesocolon, near to the cœcum. The strangulated portion of the intestine was of a dull red colour, and in a state of gangrene. Above the stricture there was some appearance of slight ulceration, and the mucous membrane was covered by a fluid, like pus.

In the third case, gangrene had taken place, to a very great extent. The omentum was destitute of fat, black, and gangrenous. The *whole intestinal canal was completely mortified*, especially the great intestines, which were much distended. There was a large aperture in the ileum at its commencement, apparently from that portion of intestine having been in a complete state of sphacelus. The ileum, *at its termination, was impervious ;* and the intestine immediately above this was enormously distended.

It may not be improper to remark, that it not unfrequently happens that there are the most violent symptoms, indicating very serious inflammation of the intestines, whilst, on dissection, very little morbid is perceptible. Thus, a male patient was afflicted with the most violent enteritic symptoms, and subsequently with vomiting of stercoraceous matter, indicating that either stricture or intus-susception had occurred. He died greatly exhausted ; and the only morbid appearances which presented themselves were enormous *dilatation* of the small intestines ; and the termination of the ileum and the cœcum were found of a green colour, with several dark spots on their external surface.

There are seven other kinds of stricture, one of which is occasioned by the elongation of the mucous membrane, so that it is thickened, stretched across the gullet, or some other part of the alimentary canal. There is no concomitant disease in the coats. Dr Baillie has described this disease, and informs us, " that it is slow in its progress, for the person in whom it took place had been for many years affected with a difficulty in

swallowing, and could only swallow substances of an extremely small size."

The second kind of stricture is occasioned by a pouch, formed in consequence of an extraneous body having lodged within the pharynx. This pouch compresses the gullet, and occasions difficult deglutition.

The third kind of stricture is occasioned by a wound of the intestines. It has been described by Baron LARREY. He observes, that at the assault of Cairo, in 1799, a man was struck by a bullet, which divided the muscular parietes of the abdomen and a part of the ileum. The two ends of the bowel protruded, were separated from each other, and very much distended. The upper end was erected, its contracted edge strangulating the intestinal tube, as the prepuce does the penis in paraphymosis. The progress of the contents of the bowels was thus obstructed, and they accumulated above the constriction.*

The fourth kind of stricture is occasioned by the scirrhous contraction of some part of the alimentary canal; the fifth by tumours within that tube; the sixth by pressure occasioned by the increased bulk of the neighbouring parts; and the seventh by prolapse of the rectum, which, on account of inflammation and adhesion, cannot be returned. Thus the fæces cannot be passed, and a pouch is formed above the stricture. Mortification of the rectum generally follows.

I shall subjoin a few remarks on the mode of cure, and on the mechanical means which may be employed for the relief of inflammatory strictures of the gullet, and rectum.

According to BOYER, dysphagia proceeding from organic disease is incurable, as also that connected with an enlarged state of the neighbouring glands. RUYSCH † and HALLER ‡ entertain a very different opinion, and have stated cases in which dysphagia, originating from an enlargement of the lym-

* Vide S. COOPER's Surgery, vol. i. p. 683. 4th Edit.

† RUYSCH, Adver. Anat. Med. Chir. Dec. i.

‡ HALLERI Opus Pathol. Obs. 71.

phatic glands of the neck, has been removed by mercurial friction, as by pills composed of camphor, aloes, and calomel.

Boyer entertains doubts as to these cures, on the ground that even external swellings of the glands of the neck have seldom been resolved. From what I have seen, I have no doubt as to the occasional resolution even of chronic swellings of the lymphatic glands of the neck, providing that very powerful remedy, iodine, be judiciously employed.

From the great analogy between strictures of the urethra and those of the gullet, these diseases should be treated upon the same principles, by bougies, or by the elastic gum catheter.

An attempt has been made to dilate a stricture of the gullet, by desiring the patient to attempt to swallow an ivory ball, in form like an olive, to which a string is fixed for the purpose of withdrawing it. But it does not suffice for the purpose. The bougie is a preferable instrument, and has often been used with success, when employed before the stricture has much increased, in consequence of a thickening and alteration of structure of the coats of the affected part; it then becomes necessary to employ the kali purum, or nitrate of silver.

Sir E. Home observes, "Whenever consulted in cases of stricture of the œsophagus, recourse has been had to the use of the bougie, and if that mode of treatment failed, to the application of the caustic. In some instances the use of the bougie has answered, in others it has failed*."

I have already had occasion to make mention of the operation which had been proposed by my father, for the extraction of intestinal concretions (vide page 48). A modification of that operation has been adopted by Mr Freer of Birmingham and Mr Pring of Bath, for the relief of strictures of the colon.

"An artificial anus is formed just above the sigmoid flexure of the colon, in cases of absolute obstruction of the intestinal canal below this seat. This operation has been performed by Mr Pring of Bath, on an adult woman, with complete success; and by Mr Freer of Birmingham, on a man, where the failure of it to preserve life appears very clearly to have been owing to

* *Vide* Observations on Stricture, page 549. 3d Edition.

the state of disease which existed previous to the operation having become irremediable by this having been, from the reluctance of the patient to undergo it, too long deferred. Mr Freer has also practised the same measure on a child born without an anus *, in whom it was found impossible, by means of a trocar, to reach the rectum. The child lived for three weeks afterwards: it sucked and slept well, and seemed free from suffering; the fæces passed freely at the wound: but it died apparently of marasmus. The wounded gut adhered firmly to the wound of the parietes of the abdomen, and there was no appearance of inflammation of the bowels or other viscera. Mr Pring's patient was sixty-four years of age, and had suffered occasionally, for about a year, at different periods, a dysenteric affection: for six months she had been known to have a stricture of the intestine, at about the distance of seven inches from the rectum, which increased during the period last mentioned, until the obstruction became complete, and resisted all the means resorted to for its removal. The operation in question, suggested to Mr Pring by the analogy afforded by what sometimes succeeds to a strangulated hernia, seemed to him the only means capable of averting immediate death; and, accompanied by Mr George Norman and Mr George Skinner, he performed it in the following manner:—"I made an incision," Mr Pring says, "on the left side of the abdomen, beginning about two inches above, and one inch on the inside, of the anterior superior spinous process of the ileum. This incision was extended obliquely downwards and inwards to within three-quarters of an inch of the edge of Poupart's ligament: the fascia covering the abdominal muscles was thus exposed to the extent of between three and four inches. An opening was then made through the external and internal oblique, and the transversalis, muscles; which opening was enlarged, with a bistoury conducted

* Such an operation, it is proper to remark, for the sake of historical accuracy, had been already performed, successfully, by Mr Duret, a surgeon at Brest; but Mr Freer resorted to it from being prompted by analogy, not being aware of there being on record such a precedent.

by my finger, to the extent of the external incision. The peritoneum being now laid bare, a small opening was made in this membrane, which was enlarged to the extent of between two and three inches. The patient being greatly agitated, and the diaphragm and abdominal muscles thrown into violent action, a considerable protrusion occurred at this time of the small intestines from the superior part of the wound: these were, however readily replaced. The colon was thus freely exposed a little above its sigmoid flexure, at which place I made an incision into it of about an inch and a-half in length: this incision was made on the left side of the gut, in order to avoid some small branches of the inferior mesenteric artery, which were distributed on the right. The contents of the bowels were immediately expelled with great force to a considerable distance: as the fæces escaped, the gut collapsed, and began to subside from its place: a ligature was therefore passed through it at the lower part of the opening, the apposition of which to the external wound was then preserved until the bowels were copiously evacuated. The obstruction could not be felt by the finger, introduced through the wound: no attempt was therefore made to overcome it in this direction. The opening in the gut was attached to the external wound by four sutures, one on its superior and inferior margins, and one on each side; and the wound of the integument was closed by two sutures above, and one below, the opening of the intestine: it was then dressed with sticking-plaster above and below the opening into the gut, and this latter place was covered by a light compress; the patient was then put into bed."

It is necessary to refer to the original account * for that part of the history of the case which relates to it immediately subsequent to the operation. Nothing, however, very remarkable occurred: the most serious symptom was erysipelatous inflammation of the skin of the abdomen, which might, it seems probable, be attributed in a great measure to the agency of the fæces, which were particularly noxious, from having been re-

* Published in the London Medical and Physical Journal, for Jan. 1821.

tained in the bowels for a long time previous to the operation.

The artificial opening has not shewn lately any disposition to contract. It had, when the history of it was published, been established between five and six months. "The object of the operation has been completely attained. The patient's general health is apparently good, and she has had no return of the dysenteric symptoms before mentioned. Her pulse is commonly about 70; her tongue clean, her complexion florid; her digestion is good, and so well disposed to make the most of her food, that her plan of diet is still directed to be one of rather strict abstinence. She has recovered her flesh in a great degree. She is able to sit up, or walk about the house: the latter, however, is an experiment which she has not ventured often. She has generally one or two stools a day; and she does not, upon the whole, experience so much inconvenience from the manner of the evacuation as might have been expected. The bowel, when she is upright, has a great disposition to project: this would not have been the case if the skin covering it had not unluckily sloughed. The projection of the bowel does not amount to a considerable prolapsus: it is merely a distention of the portion which is exposed. It is expected that this disposition to prolapsus will be restrained when use has made her contrivances a little more perfect. She has a truss, somewhat similar to that for exomphalos, constructed with a circular spring, and a large pad containing a weak spiral spring, which is preserved in its place by means of straps: this contrivance has not, however, yet answered so well as a compress, confined by a band, pinned tightly around her."

From what has been stated, it appears to me that this operation, in certain cases, merits repetition.

SECTION V.

OF SYMPTOMS OF ULCERATION OF THE MUCOUS COAT OF THE GULLET.

The pharynx, gullet, and trachea have been sometimes ulcerated from putrid sore-throat.

The symptoms which denote ulceration of the mucous coat of the gullet are, slight hot and cold fits; hectic flushing of the face; pain in the part affected becoming less acute, and detumefaction of the belly; pulse fuller and slower, often irregular.

When an ulcer exists in the gullet, it creates painful and difficult deglutition, which is accompanied by a sense of suffocation, expectoration of pus, or of a large quantity of saliva *, disposition to vomit; retching, which is attended with cough, so that every kind of food, whether it be solid or fluid, is rejected by vomiting.

Ulcers in the gullet are very seldom cured; they are kept up, and often extend to a great degree, from the perpetual irritation of the gullet in swallowing; and they sometimes burst into the lungs.

From the continuance of the disorder, the difficulty of swallowing becomes greater and more painful: solids, and even liquids, do not pass down, unless the latter be taken in considerable quantity; the liquid passes through the ulcerated surface merely by its gravity, the muscular fibres being destroyed; and hence a small quantity of a fluid cannot be swallowed.

The patient becomes very thin, very weak, and also very costive, hot, thirsty, and feverish: the pulse is small and very quick: in this state, he languishes for a few months; at length he is affected by stupor and delirium, and dies completely exhausted.

The ulceration sometimes extends from the mucous to the other coats of the gullet, and to the neighbouring parts, as in a

* Vide London Med. Commun. vol. i.

case related by Dr GARTSHORE*; but the ulceration generally follows the opposite course.

SECTION VI.

OF CHRONIC INFLAMMATION AND ULCERATION OF THE MUCOUS MEMBRANE OF THE STOMACH.

THIS department of the subject merits peculiar attention, on account of the frequency of chronic inflammation and ulceration of the mucous membrane; the difficulty of detecting the disease in its origin and progress, and its fatal tendency if it be not arrested.

It is also to be taken into account, that this, like other derangements of the functions of the stomach, leads to a derangement of the functions of other viscera of the body, and that the inflammation frequently extends from its primary seat, the mucous membrane, to the other coats of the stomach.

Acute inflammation of the mucous membrane of the intestinal canal is more frequent than the same disease in the stomach; whereas, it has been asserted by BROUSSAIS, that chronic inflammation of the mucous coat of the stomach is equally frequent, and perhaps more so, than that of the mucous membrane of the intestinal tube.

There is as remarkable a degree of sympathy between the mucous membrane of the alimentary tube, as between that of the skin and the mucous membrane which lines the bronchi.

* The body, in this case, was examined by Mr HUNTER, whose interesting account of the dissection is subjoined.

"On laying bare the œsophagus through its whole course, I found, that, where it passes below the division of the trachea, the surrounding parts were thickened or diseased; and I there found an abscess which led into the cavity of the œsophagus. I then cut out a considerable portion of the œsophagus, both below and above this diseased part, with a part of the trachea, and also a portion of the descending aorta. I could easily pass one finger downwards, and another upwards, till they met; so that there was no stricture or closing of the œsophagus, although I could plainly feel an irregularity on the inside at this part, where the disease appeared externally."

Certain kinds of food occasion cutaneous eruptions; and if these eruptions be suddenly repelled, the functions of the alimentary canal, and the general health, are much impaired. According to Mr Plumbe, porrigo, scrophulus, urticaria, herpes, thrush and boils, are symptomatic of deranged digestive organs; and Alibert has also remarked, that inflammation of the different internal organs is frequently the sequel of repelled *dartre squameux* of long duration.

It is important to keep these facts in view in the treatment of dyspepsia, diarrhœa and dysentery.

Although chronic be a consequence of the more acute inflammation, there is every reason to conclude that the mucous membrane of the alimentary canal has occasionally fallen into a chronic state of inflammation, when the more acute form of the disease has not preceded it.

Chronic inflammation has sometimes given rise to considerable thickening of the rugæ of the stomach.

There are many causes which may induce this chronic inflammation of the mucous membrane, as acrid food, or food of difficult digestion; and the less acrid poisons, or concretions, or other extraneous bodies lodged within the alimentary canal.

Fever has also occasionally induced this low state of inflammation of the mucous membrane of the stomach, or more frequently of the mucous glands of the intestines.

Scrofula, cancer, polypi and other tumours, which grow occasionally from the mucous membrane, may also give rise to a low degree of inflammation of the mucous coat.

Morgagni has very ably described the chronic inflammation of mucous membranes, and its usual consequences. He states, "that the intestines have become sphacelated, independent of preceding inflammation *."

Upon dissection, the capillary vessels of the mucous membrane are not distinctly seen filled by arterial blood, as in the more acute inflammation. It is universally of a red colour, or spotted with red patches, and there are frequently minute extravasated portions of blood beneath it.

* Vid. Cooke's Morgagni, vol. ii. p. 67.

The mucous membrane is found to be softer than usual, studded over to a greater or less extent with red or slate-coloured patches, which are sensibly elevated above the surface of the mucous membrane, and have a fungous appearance.

The veins which pass through the subjacent cellular substance are generally enlarged.

A quantity of fluid, like the white of an egg, is usually found within the stomach, or, on some occasions, the fluid is of a brown colour, and not unlike to coffee grounds.

OF THE SYMPTOMS OF CHRONIC INFLAMMATION OF THE MUCOUS MEMBRANE OF THE STOMACH.

The disease is obscure in its origin, insidious, often slow, and varied as to its symptoms, which are generally the following:—tongue red at its point, loss of appetite, sense of tightness and pain in the region of the stomach after meals, which is somewhat increased by pressure, and distention of the stomach.

Nausea and vomiting often occur, and do not go off until the contents of the stomach have been discharged. These symptoms are frequently accompanied by a slight fever, and a discharge of a fluid from the stomach, like the white of an egg.

The bowels are irregular, seldom constipated, but generally in the opposite state; and if the diarrhœa be checked, the uneasiness in the stomach is increased, so that diarrhœa and vomiting frequently alternate with each other.

The urine is frequently high coloured and scanty, and in the progress of the disease, the bodily strength is very much reduced, and very considerable emaciation ensues.

The patient is invariably most easy when the stomach is empty. In short, the symptoms of this disease are so similar to those of dyspepsia, that the one disease is often mistaken for the other.

It also merits particular notice, that this disorder has sometimes proceeded so far, as to be beyond the chance of relief be-

fore it has excited much alarm on the part of the patient, or of his medical attendant.

The disease has also occasionally been very much aggravated by improper treatment. If the disease be mistaken for dyspepsia, wine, spirits and aromatics are prescribed, to promote digestion; but if the symptoms originate from chronic inflammation of the stomach, they increase the patient's sufferings, and have occasionally converted the chronic into the acute inflammation: This is mitigated by the application of leeches, or a blister to the region of the stomach, and by the strictest antiphlogistic regimen.

In short, where there is loss of appetite combined with nausea, acidity, and other dyspeptic symptoms, pain at the pit of the stomach, followed by thirst, red tongue, and quick pulse, it is probable that these symptoms originate from inflammation of the mucous membrane of the stomach.

According to Dr Broussais, "Most cases of dyspepsia, gastrodynia, pyrosis, cardialgia and bulimia, are the effects of chronic gastro-enteritis. Bulimia is the effect of a chronic gastro-enteritis, with predominance of irritation in the stomach and duodenum. This phlegmasia may exist in a degree that permits the assimilation of a quantity of aliment far greater than is necessary for the wants of the system. Hence result plethoras, obesity, and, sooner or later, the establishment of a great irritation in the brain, the joints, the kidneys of the heart, or, in short, on any point where accidental stimulation is more than commonly applied."

But I cannot adopt the sentiments of Broussais. *Some* of the cases of dyspepsia, gastrodynia, and pyrosis, are the effects of chronic gastritis; and in favour of such an opinion, it may be added, that the greater number of stomach complaints are removed by stimulants.

It seems to me to be extremely probable, that the very peculiar symptoms which accompany many of the derangements of the functions of the viscera, are to be imputed to a morbid action of the great sympathetic nerve; but, on account of the very limited and imperfect state of our knowledge of the na-

ture of the nervous influence in general, and of the functions of this nerve in particular, and its effects, these symptoms cannot be explained in a satisfactory manner.

The observations of LOBSTEIN and of Mr SWAN upon the inflamed state of the sympathetic nerve, in tetanus, chlonic convulsions, and in cases of very obstinate vomiting, and the effects of various medicines upon this remarkable nerve, render such an opinion probable.

OF THE SYMPTOMS OF ULCERATION OF THE MUCOUS MEMBRANE OF THE STOMACH.

The mucous membrane of the alimentary canal is more frequently found ulcerated than other membranes of a similar description, and this ulceration takes place rapidly, even when we have occasion to believe that no very powerful mechanical or chemical stimulus has been applied.

It also merits notice, that all parts of the mucous membrane of the alimentary tube are not equally liable to fall into a state of ulceration; that of the gullet and stomach being much more rare than the ulceration of the intestinal tube.

Ulcers of the stomach exhibit different appearances, and are various as to extent.

Common ulcers of the mucous membrane of the stomach have usually smooth edges, and present the appearance as if a portion of the mucous membrane had been cut by a knife; whereas cancerous ulcers have retorted edges; and when the disease has made great progress, the edges of the ulcer become very irregular, and fungi of a malign aspect shoot up.

Ulcers of the stomach sometimes communicate with the cavity of the abdomen.

There is a remarkable specimen preserved in the Museum of the University, in which the mucous membrane of the stomach was ulcerated, and there were various melanotic depositions.

There was a large irregular opening communicating with the

centre of a medullary sarcomatous tumour of considerable size, which occupied the whole of the smaller curvature of the stomach.

According to some authors, the seat of the inflammation and ulceration may be detected by the symptoms; thus, indigestion is said to characterise the disease in the mucous membrane of the stomach and duodenum, liquid fæces in the smaller intestines, and indurated fæces, or fæces passed in the form of scybula, the inflammation of the larger intestines.

But it does not appear to me that we have as yet arrived at such perfection in the diagnosis.

A very short time ago I met with an instance, which, in combination with other instances, warrant such a conclusion. A man to all appearance in perfect health, drank largely of cold beer whilst he was in a profuse perspiration.

In the evening of the same day he was seized with acute pain in the bowels, after which his belly became much distended; to relieve which he took a dose of salts and senna; but without relief; they did not even procure a passage. On the following day the pain became more acute, and he had occasional vomiting.

On the next day the symptoms were still more urgent, and he had as yet no stool. A purgative clyster was administered, which occasioned several copious bloody evacuations.

Next day the purgative clyster was repeated, which caused tenesmus, with frequent discharge of blood, but no fæculent matter. Pulse 80, small and weak. Tongue foul.

The distention of the belly, vomiting, and constipation continued, and could not be removed by any means.

His breathing became quick and laborious; and he died on the 5th day from the attack.

Upon dissection, no morbid appearance could be discovered in the stomach.

The smaller intestines were of a dark livid colour, adhered in many places to each other, and were much distended by fluid fæces, within about two inches from the ileo-colic valve, where there was a large irregular ulcer, which occupied its whole circumference, and had destroyed the muscular and mucous coats.

SECTION VII.

OF CHRONIC INFLAMMATION AND ULCERATION OF THE MUCOUS MEMBRANE OF THE INTESTINAL TUBE.

The chronic inflammation of the mucous membrane of the intestines is generally a consequence of the acute inflammation; or, like a similar disease in the mucous membrane of the stomach, it comes on in a chronic form.

Chronic inflammation of the mucous membrane of the intestines assumes the same appearance as the same disease in the mucous membrane of the stomach.

This chronic inflammation is occasionally the sequel of ileus, a disease which has sometimes proved fatal on account of the distention of the intestinal canal.

The inflammation may be confined to the smaller intestines. Hence purgative enemata occasion a discharge of fæces, which may lead the inattentive physician to give a favourable prognostic, whilst the disease may be in its progress to a fatal termination.

This inflammation is generally combined with ulceration of the colon.

It has been much disputed whether ulceration be more common in the mucous membrane of the smaller or of the larger intestines. According to the statements of Dr D. Monro, Sir J. Pringle and Sir G. Baker, the ulceration, the consequence of dysentery, seldom extended beyond the larger intestines.

Ulcers of the various parts of the alimentary canal are very various as to their size, and form and extent.

The ulcers are, on some occasions, not larger than a pin's head.

The ulceration varies in degree; in one portion of intestine there are only small depressions in the mucous membrane, with a slight elevation and thickening of the surrounding portion of the membrane. In some this appearance may be observed to extend over a considerable extent of surface.

In another portion the mucous membrane is greatly thick-

ened, and also rendered very irregular, by numerous deep depressions, surrounded by considerably elevated margins.

The ulcers are generally found encircled by areolæ of a dark-red colour, and many of them are found cicatrised.

In some cases, there is so little thickening of parts, that the villous coat seems as if it had been removed by a knife; but in other cases there is very considerable thickening, and the edges of the ulcer assume a ragged appearance.

The valvulæ conniventes are destroyed, from the continuance of the ulceration.

In some instances of ulceration of the intestines, the disease extends to the mesenteric glands.

Thickening and ulceration of the mucous coat also occur in dysentery.

In a case of that description, which my learned colleague Dr Alison sent to the Museum, the patient, after having been much exposed to cold, was seized with tenesmus and tormina, his stools were liquid, and frequent, and occasionally bloody, and his abdomen became gradually swollen and tense.

After having laboured under these symptoms for a month, he died.

Upon dissection, the mucous membrane of the colon was found to be of a dark colour, and firm texture, thickened and ulcerated in different places. The ulcers were surrounded by dark coloured areolæ, and some of them seemed to be cicatrising.

Several of the ulcers extended through the mucous membrane.

The ulceration seems, in some instances, to begin in the mucous glands, and to extend to the mucous membrane.

There are several good illustrations of this disease in the Anatomical Museum of the University. The patients had laboured for several weeks under typhus fever, accompanied by diarrhœa.

The ulceration was limited to the mucous membrane of the smaller intestines.

In another preparation of ulceration of the smaller intestines, the ulcers were studded with tubercles, some of which had sup-

purated. The lungs, liver and mesenteric glands were also tuberculated.

The patient had been afflicted, during two years, with occasional pain in his belly, diarrhœa, and ultimately by hiccup and vomiting; and, in the progress of the disease, became very much emaciated.

Ulceration of the intestinal tube, with tubercular deposition, is not unfrequent in phthisis pulmonalis; and, what is very remarkable, in a case preserved in the Museum of the University, there was extensive destruction and cicatrization of the mucous membrane of the caput coli, notwithstanding which *the patient had not laboured under diarrhœa for a year previous to death.*

When ulceration is combined with stricture of the intestinal tube, before death the patient has sometimes the usual symptoms of ileus.

Inflammation of the mucous membrane of the intestines is frequently accompanied by stricture. One of the most striking instances of this description occurs in the Nouvelle Bibliotheque Medicale.

A young woman had not passed fæces for more than six months. The belly swelled, especially at the navel; she suffered very excruciating pain, which extended upwards to the seat of the stomach. The pain became still more acute for eight days before death.

On opening the body, the intestines, no longer retained by the abdominal parietes, burst, and gave issue to fæcal matter, that was projected with considerable force. The liver adhered to the arch of the colon; the stomach and small intestines were completely empty, and their bloodvessels injected; the large intestines were enormously distended, and included from thirty to forty pounds of a matter resembling dry mud; the rectum was inflamed and thickened, and its cavity was interrupted, about three inches above the anus, by a kind of transverse fold, pierced in the centre by an orifice, into which the end of the little finger could scarcely be introduced.

When there is considerable inflammation, a part of the mucous coat is detached and passed by stool.

It merits peculiar notice, that when even a thin band of the mucous membrane has been destroyed, so that the muscular fibres are exposed, obstinate costiveness follows.

Dr DUNCAN had lately an instance of this description under his charge in the Clinical Ward of our hospital. His patient had all the symptoms of ileus, and his death seemed to have been occasioned by that cause. Upon dissection, a complete circle of a portion of the ileum, the breadth of which, of the breadth of two fingers, was found denuded of its mucous coat, and the muscular fibres of that portion were as apparent as if they had been exposed by careful dissection. It was remarkable, that the contents of the intestines, above and below this portion of the ileum, were different from each other in colour, smell and consistence.

The ulceration of the mucous coat is sometimes observed to be combined with the formation of tubercles under the peritoneal coat.

I had occasion to see an instance of this kind. The patient had been much exposed to cold and hunger, and had suffered very severely from nausea and vomiting. He had had frequent watery stools, and fever accompanied by delirium.*

In a preparation in the Museum there was extensive thickening and contraction of arch of colon. The mucous membrane was of a dark colour and firm texture. Several ulcerated openings communicated with small sacs on the exterior of the intestine, which terminated in the cavity of the abdomen. The patient had laboured under tenesmus and tormina, and had frequent liquid stools, tinged occasionally by blood.

When the mucous membrane is ulcerated, the mesenteric glands are always swollen.

My learned colleague Dr ALISON, who has devoted great attention to the morbid appearances which are discovered in cases of fever, informed me, that when a patient labouring under fever dies with an affection of the bowels, some of the mesenteric glands of the intestines are generally ulcerated, but the cor-

* Vide Catalogue of the Anatomical Museum of Edinburgh, No. 61.

responding mucous glands are only inflamed. But if the patient recovers from the fever, and dies afterwards with colliquative diarrhœa, the mucous membrane is often more extensively ulcerated, and the mesenteric glands are tuberculated.

Dr Alison sent a valuable specimen to the Museum, of the thickening and chronic ulceration of the mucous membrane of the descending colon and rectum. Some of the mesenteric glands were filled with a white fluid like milk. There were also several ulcerated cavities in the upper lobes of both lungs, chiefly in the right, with much condensation by tubercular infiltration, and general œdema of the lungs. The patient had diarrhœa for several months, at first unattended, subsequently attended, with pain and tenderness, which again somewhat abated; and, for some weeks before death, his stools were generally copious, but light coloured, and passed with tenesmus. He had for some years been subject to cough and shortness of breath, since the receipt of a severe injury of the chest. Latterly the breathing became difficult, expectoration copious and purulent, pulse quick and feeble.

When the ulceration is in the rectum, the patient has a constant degree of tenesmus, voiding at the same time very scanty stools, which chiefly consist of a pituitous matter; he has frequent calls to make water, and several other symptoms, which are very similar to those of stone in the bladder of urine.

Together with ulceration of the mucous membrane of the intestines, we sometimes meet with tubercles.

Dr J. Hunter informs us, that he very frequently met with these tubercles in the intestines of persons who died in Jamaica from dysentery.

He describes them as pustules, though they contain no pus. Each pustule was at first small and gradually enlarged, until it attained the diameter of one-fourth of an inch, after which they burst, and discharged a cheesy substance.

In short, chronic inflammation of the mucous membrane of the stomach is a dangerous disorder; some sink gradually, ap-

parently from great debility; in others, the chronic assumes the acute form; and, it sometimes happens, that patients afflicted by this disorder die of diseases of the brain, consequent to the original disease.

Ulceration of the mucous membrane is to be considered as a very dangerous disorder; for, though it may not prove immediately fatal, it proves gradually so, and without inducing ileus: this happens from the gradual exhaustion occasioned by the derangement in the functions of the alimentary canal. The food is imperfectly digested, or passed unchanged. The intestines are reduced to a very irritable state, and there are frequent evacuations of the fæces, or, combined with this state, there is a considerable discharge of vitiated mucus, mixed with blood or pus.

It may be difficult to distinguish these admixtures with the fæces, when the disease is seated in the smaller intestines, the fæces being mixed with ill-digested food.

Lastly, The inflammation of the mucous membrane is often of considerable duration before the peritoneal coat is affected, but many patients at length die from extensive peritonitis, or from erosion of the coats of the intestine.

Ulceration is sometimes propagated to a greater or less extent, to the subjacent cellular coat; also to the muscular and peritoneal coat, and occasioning perforation. If the adhesive process has preceded, preternatural communications are established between neighbouring parts, as between the gullet and windpipe, between the gullet and lungs, between the gullet and thoracic aorta, between the stomach and parietes of the abdomen, between the stomach and great arch of the colon, between the stomach, diaphragm, and cavity of the chest, between the stomach and colon, and between the different turns of the smaller intestines.

Perforation generally extends outwards, the mucous coat being in the first instance eroded; but sometimes it takes an opposite course, the peritoneal coat being in the first place perforated. This takes place occasionally from collections of pus on the

outer side of the intestines. A specimen is preserved in the Museum, in which seven pounds of pus were accumulated between the peritoneum and muscular fibres of the left crus of the diaphragm and psoas muscle. The pus found its way into the colon and peritoneum. The small intestines were intimately united by coagulable lymph, a considerable quantity of sero-purulent fluid was found in cavity of abdomen, and several calculi in the gall bladder. Patient an old woman. *Symptoms:* —Fluctuating tumour occupied the whole of left side of abdomen; it was not painful on pressure; and appeared suddenly after an attack of pain and rigors, about two months before death.

Pus accumulated in the iliac region has sometimes found its way into the colon.

SECTION VIII.

OF GANGRENE OF THE MUCOUS COAT OF THE ALIMENTARY CANAL.

Gangrene is sometimes limited to the mucous coat, but generally pervades all the coats of the alimentary canal. When the mucous coat is gangrenous, it sometimes has been discharged by the anus; and even several inches of the alimentary tube have been passed in cases of intus-susceptio, without loss of life. I have in my possession fifteen inches of the ileum that was passed by stool, and the patient lived many years afterwards. By acrid poisons, the gullet and stomach have frequently been reduced to a state of gangrene, and the extent of the gangrene is various, probably depending upon the acrimony of the poison. Gangrene frequently occurs in cases of strangulated hernia. The practitioner should be on his guard lest he mistake that dark purple or brown colour, occasioned by blood accumulated within the veins of the displaced portion of intestine, for gangrene. It may be in general observed, that

the slate-colour of the protruded intestine, together with the loss of the shining and semitransparent appearance of the surface, is more to be dreaded than the dark colour, excepting when it is conjoined with the disorganization of texture, fœtid smell, and other unequivocal symptoms of gangrene.

It is by no means my intention to enter into the history of fecal fistulæ, which often are consequent to strangulated hernia, and by which an unnatural anus is established. I shall content myself by stating, that the unnatural anus is sometimes congenital, or the consequence of wounds with loss of substance, of inflammation, abscess, and strangulated hernia. When an artificial anus has been established, it is necessary that it should be opposite to that part of the abdominal parietes through which the contents of the intestines are to pass; that the intestines should admit of being kept in that situation; that it be fixed in the opening, and that a free communication be kept between this aperture and that in the bowels. Lastly, it is requisite that an adhesion be formed to the neighbouring parts. *

Gangrene occasionally very speedily follows an inflammation of the mucous membrane.

Mr Watson, surgeon, sent to me lately a very remarkable instance of the above fact, together with the annexed history.

Thomas Alexander, æt. 43—April 3. 1829. Complained of severe and constant pain of abdomen, increased by pressure, and accompanied with diarrhœa and tenesmus. Pulse 120, weak, —has the appearance of being much exhausted. About four months previously he had been ill of fever in Queensberry House, since which he has been in a weak state, and unable to walk without crutches. Has long been addicted to the free use of spirits.

A blister to the abdomen, some castor-oil, and a diaphoretic mixture with opium, were ordered.

This treatment was persevered in, and the symptoms, par-

* *Vide* an ingenious method of curing an unnatural anus in Dr Dorsey's *Elements of Surgery.*

ticularly the pain in the belly and diarrhœa, became much relieved. Notwithstanding remonstrances to the contrary, he continued to drink freely of strong liquors. The symptoms of fever increased; the pain left him; he then began to sink rapidly, and died on the 10th, having been ill two weeks.

Dissection. The viscera of the abdomen appeared, externally, to be in a healthy state, with the exception of the colon, which was agglutinated to the parts in contact with it. Upon attempting to separate these adhesions, the colon was easily torn. When laid open, the whole of the mucous membrane lining it was found separated from the muscular coat, and in a gangrenous state. The gangrenous membrane was completely disorganized, soft, pulpy, and was for the most part in shreds, with only a few points of attachment remaining, which retained it in the gut. The muscular coat, in many parts, appeared also to be destroyed, and the parietes of the bowel thinned so as to consist only of the peritoneal coat. The peritoneal, and what remained of the muscular coats, were of a healthy colour. The disease extended through the whole of the colon and rectum.

In a former chapter the usual symptoms of gangrene have been enumerated. It may be proper to add, that the sudden cessation of pain in the bowels, and sinking, are not necessary indications of internal gangrene. These symptoms occasionally exist in recent inflammation, and the patient recovers; and there are also instances of extensive gangrene, in which the pain continued violent until the last moment of life.

SECTION IX.

OF DYSENTERY.

In this country, the most usual appearances, in cases that are quickly fatal, are merely irregular thickening of the mucous coat, with deposites of reddish lymph either on its substance or on its

surface. In these thickened portions, ulceration follows, if the patient lives long enough.

Where the patient is not very speedily cut off by the disease, the inflamed portions of the mucous membrane are covered by fibrine, and the farther effusion of this substance is preceded by an inflamed areola: in some instances, the whole colon is sometimes lined by a layer of fibrine.

The affected part is at the same time thickened and irregularly contracted, and frequently slight traces of inflammation may be observed on the peritoneal surface.

In a short time the mucous membrane under the fibrine becomes ulcerated to a greater or less extent. Its villi having been destroyed, the fibrine is frequently detached, and discharged by the anus. The ulcers gradually increase in depth and extent of surface; so that, in many places, the whole of the mucous membrane is destroyed. The ulcers are surrounded by dark coloured elevated areolæ, and some of these occasionally appear as in a state of cicatrization, the intervening portions of the mucous membrane forming irregular vascular prominences.

The diseased intestines generally contain a good deal of mucus, or a muco-purulent fluid, mixed with blood. In those cases in which blood has not been passed for some time previously, the mucous membrane is found much thickened, of a dark colour, and of a firm texture.

In severe and protracted cases of dysentery, all the coats of the intestine are destroyed, so that their contents escape into the cavity of the abdomen. Where the inflammation has extended to the muscular and peritoneal coats, lymph is effused on the latter, and the convolutions of the intestines are agglutinated to each other. Sphacelated portions of the intestines are rarely observed. Although the disease is generally confined to the larger intestines, the smaller are sometimes involved, and particularly the termination of the ileum.

The mucous follicles are usually enlarged, and especially those of the rectum, which sometimes form small vesicles.

Lastly, in the debilitated, and in those whose health has been

bad previous to the attack of dysentery, fibrine is frequently deposited in a tubercular form, beneath the peritoneal coat.

According to Dr D. Monro, when the disease has proved fatal in a short time, the stomach, and the great and small intestines, have been frequently found with a greater or less degree of inflammation: in old cases, when the patient has been attacked with a sharp pain in the belly before death, I have seen the rectum, colon, and stomach with black gangrenous spots.

On an accurate examination, these black spots were found to be owing to black blood diffused through the cellular membrane, situated between the fine internal villous and the muscular coats of the intestines; and in the middle of these black spots there was generally more or less of an erosion of the villous coat.

On raising the villous coat which covered these black spots, it appeared fine and transparent, though the cellular membrane below was black; and on dissecting away this black cellular membrane, the muscular fibres of the gut appeared of their natural colour.

From what Dr D. Monro remarks, of black and livid spots appearing on the internal surface of the great intestines, of black or bloody fluids being diffused through the cellular membrane, and of the villous coat appearing transparent, when raised from this black cellular membrane in places where it had not been eroded, I think there is no doubt but that the erosions of the villous coat are occasioned by suppuration of these inflamed parts of the cellular membrane, or by a kind of gangrene or ulcer in it.

There may be observed, in some cases, on the inner side of the lower part of the colon, and upper part of the rectum, a number of little tubercles, or excrescences, which resemble the smallpox pustules at the height of the disorder, but differ from them in this, that they are of a firm consistence, and without any cavity.

These tubercles are sometimes cleft on their surface, and somewhat resemble small warts. This appearance is only observed in the camp dysentery.

Dr D. Monro, in his account of the diseases most frequent in the British Military Hospitals in Germany, has mentioned the case of a woman who died of the dysentery, where the intestines, and especially the colon and rectum, were inflamed, and the internal surface of the great intestines mortified, and contained little vesicles full of a putrid fœtid liquor, numbers of which she had evacuated by stool, some days before her death. An appearance somewhat similar to this he mentions in a patient who died of a violent diarrhœa in the beginning of the year 1766, in St George's Hospital. On examining the body, there was a great number of small prominences found on the internal side of the colon and rectum, with erosions of the villous coat in the middle.

On squeezing these prominences, a number of vesicles containing a mucous or gelatinous fluid, some of the size of millet-seeds, and others larger, came through the eroded parts of the villous coat.

Ulcers of the mucous membrane sometimes cicatrize. The steps of this process have been described by Dr D. Monro, by Petit, Serres, and Dr Bright. The first step of the process is the fixing down of the loose margin of the ulcerated surface to the muscular coat by fibrine, which forms a prominent ring, with a depressed surface corresponding to the centre of the ulcer; and the fibrine at length draws together the edges of the mucous membrane which had been ulcerated, and gives a puckered appearance to the peritoneal coat, through which the fibrine bloodvessels pass in different directions.

The canal of the intestines has been stated by Rhodius * to have been sometimes obliterated, in consequence of the adhesion of its opposite sides, when there has been an extensive ulceration from dysentery †.

Scirrhous tumours have been described by Meckel, as being sometimes found within the colon in cases of dysentery †.

* Vid. Rhodius, Miss. Cur. Obs. 508.

† I have observed the appendices epiploicæ of the colon and rectum much enlarged in cases of dysentery.

Before concluding this section, it may not be improper to add, that, in phthisis pulmonalis, where purging occurs, the ulceration of the mucous membrane of the intestines is perhaps caused by the formation of tubercles, which ultimately ulcerate.

Of the Symptoms of Dysentery.

Dysentery is a disease connected with the morbid appearances enumerated in the commencement of this section.

Dysentery is a disease which is not peculiar to the human race, but is propagated even to the inferior animals, when very prevalent among men, at particular seasons. It has been much disputed whether it be propagated by contagion or not. Dr D. Monro, Sir J. Pringle, and Dr Cullen, are of opinion that it is contagious,—while many modern Navy and Army Surgeons deny the existence of contagious dysentery. From what I have seen, I am disposed to consider dysentery to be occasionally contagious, more especially in crowded hospitals. Dysentery assumes various grades, being occasionally mild, and easily removed; but at other times, as during autumn 1828, in Edinburgh, it is very prevalent and fatal; and, upon dissection, the larger intestines, and sometimes even the smaller, are found in an inflamed and ulcerated state.

The severity of the symptoms depends upon the extent of the inflammation of the mucous membrane, which is very various; hence there is a great variety as to the severity of the symptoms of this disease. During infancy, it is generally milder than at a more advanced period of life. It is frequently consequent on diarrhœa and cholera.

In this country, the disease is often accompanied by little fever, and is easily removed; but, in other cases, it begins like typhus, which, in a short time, assumes the form of dysentery.

The disease commences by coldness, shivering alternating with hot fits, uneasy and often painful sensations in every mem-

* Vid. Meckel, extra Comment. Leipsick, tom. xv.

ber of the body, foul tongue, bitter taste in the mouth, nausea and vomiting.

These are succeeded by symptoms denoting a derangement in the functions of the intestines, as flatulence, diarrhœa with griping, followed by tenesmus, pain in the region of the colon, and the discharge of a white viscid ropy mucus, mixed with a suetty substance, or tinged or streaked with blood.

Very little fæculent matter passes off, and it comes away as hardened balls or scybala, mixed with blood, and with a painful descent of the bowels accompanying every evacuation; and, in some cases, the rectum is inverted.

There is often little or no fever at the commencement of the disorder, but in others the pulse is quick and full, and, in the young and plethoric, there is flushing of the face, and redness of the eyes, with acute headache and fever, as the disease advances.

In acute cases the fever is sometimes a synocha, skin hot and dry, but generally a well marked typhus; and sometimes an intermittent, which assumes the tertian type.

In the course of this form of the disease, which is of various duration, sometimes proving fatal in a few days, and at other times lasting for months, pure blood, portions of a cheesy-like substance, coagulable lymph, and even portions of the villous coat, have been discharged by stool.

In the most acute form, called the Malignant Dysentery, the earlier symptoms are tremors, great heat and anxiety, very acute headach, excessive thirst, dry scaly skin, acute pain in the abdomen, which is aggravated by pressure, with small hard pulse, tongue of a bright red colour, nausea and vomiting, and great prostration of strength, which often amounts to syncope.

Notwithstanding the constant desire to go to stool, very little is passed. This is generally green, in the earlier stages of the disease, and exhales a peculiar faint odour; but, in the more advanced stages, it becomes black, is streaked or tinged with blood, or pure blood is discharged, which is remarkably fœtid, and so acrid that the anus becomes inflamed, and even excoriated; and, in some cases, considerable masses of coagulated blood have been discharged.

The discharge of this matter affords a momentary relief.

The patient daily becomes weaker and weaker; his food passes through the alimentary canal unchanged; the breath becomes fœtid, the tongue black and dry, or covered with aphthæ; vibices and petechiæ appear, and what is passed is sanious, fœtid, and black: this state is the prelude of death, the bowels being then in a state of gangrene. In cases that are slow in their progress, and when the patient is much weakened, the stools, according to Dr ALISON, though liquid, often become nearly natural before death. Perforation sometimes takes place in consequence of dysentery, and in that case the disease proves speedily fatal, by leading to acute peritonitis.

There have been some epidemic dysenteries, as that described by MARQUET, which occurred at Nancy in 1734, in which the inflammation of the intestines has been still more strongly marked by violent pain in the stomach and intestines, which is much aggravated even by the slightest pressure, by a burning heat, extending from the throat to the anus, by redness and dryness of the tongue, by hard and contracted pulse, by vomiting, and the very rapid progress of the disease, which proved fatal in ten or twelve hours; and the mucous glands of the intestines are much enlarged and filled by a cheesy substance, or ulcerated.

According to Sir J. MACGRIGOR *, ANNESLEY, and others, who have more recently written on the Tropical Dysentery, there are two modifications of that disease. The former, or mild, is limited chiefly to the rectum and contiguous portion of the colon; but the latter, or more severe, extends not only through the larger, but also occasionally to the smaller intestines, as in the Epidemic Dysentery, which prevailed in autumn 1828 in Edinburgh; but it also assumes a chronic form, and, in India, is sometimes combined with a diseased liver, and hence has been called the Hepatic Dysentery; which, it may be added, was sometimes observed by Dr CHEYNE to be that which was so prevalent in Ireland in the year 1821.

In short, the peculiarities of dysentery are,—

* Medical Sketches of the Expedition to Egypt from India. Lond. 1804.

1*st*, That the disease is frequently contagious, and more especially in crowded hospitals.

2*d*, That the mucous membrane of the larger intestines is much more frequently inflamed than that of the smaller.

3*d*, That there are various grades of this disease during different epidemic dysenteries, and that its severity is generally proportioned to the extent of the inflammation, and does not invariably occasion ulceration of the mucous membrane; but that, in certain cases, ulceration of the mucous membrane takes place towards the conclusion of the disease.

4*th*, That dysentery is characterized by mucous, by mucopurulent, and frequently by bloody, stools.

5*th*, That the pulse is generally accelerated at the outset of the disease, and becomes more affected when the inflammation extends to the subjacent cellular substance, or when mortification ensues.

SECTION X.

OF THE CONVERSION OF THE MUCOUS COAT OF THE STOMACH OR INTESTINES INTO A VERY SOFT SUBSTANCE LIKE PULP.

In the former edition of this work, I described this morbid state of the mucous coat very particularly, and observed that, as far as I know, it has not been described by any writer upon pathology.

Since I published the first edition, Cruveilhier, and Dr Gairdner* of this city, have published upon the infantile species of this disease. Much information has been given, es-

* Dr Gairdner has produced a very elaborate essay upon this disease, and has cited all the authors who have written on it; and I have great satisfaction in referring to his very valuable essay.—Transactions of Medico-Chirurgical Society of Edinburgh, vol. i. and iii.

pecially by this latter named author, who relates many cases which fell under his notice; and from these, it appears that the perforation is not the result of an ulcerative process, but of the solvent power of the fluids.

This morbid derangement is sometimes limited to a part of the stomach; but, in other instances, it pervades the whole of the intestines. It is not peculiar to any period of life, and, as far as I know, is most frequent during infancy. I believe the disease to be more frequent in the intestines than in the stomach. The diseased organ is considerably enlarged, and its coats are thickened; they do not possess their usual firmness, but feel soft and pulpy; though not of a dark colour, they are not dilatable, emit a very peculiar sweetish smell, and are very easily torn.

A quantity of dark coloured and very offensive bile is lodged within the intestines.

The mesenteric glands are enlarged, and sometimes ulcerated.

In order to throw light on the nature of this rare organic derangement, I subjoin the following case:—

"8*th October* 1809.—A gentleman, æt. 48, who was much emaciated, and with a weak, though regular pulse, consulted my father, along with Dr Sanders, on account of uneasiness in his belly, accompanied by occasional heartburn and vomiting, and he had generally five or six liquid stools every day, after which he felt easier.

"His stools were sometimes slimy, and streaked with blood. The diarrhœa was succeeded by obstinate costiveness, and great oppression.

"There was no swelling nor tension in any part of his belly, though he suffered pain upon pressing it. He had been in the above state for the last twenty years of his life.

"About eighteen months ago, he became extremely costive, and continued so for nine days, notwithstanding the use of the most powerful purgatives, after which he was seized with a very copious diarrhœa, with heartburn, and occasional vomiting.

"By the use of camphor, combined with opium, his diarrhœa

was somewhat alleviated, and the stools acquired nearly the natural consistence, and his bowels became more regular.

" About a year before his death, a tumour was perceived opposite to the navel; when my father recommended to him to try the effect of hemlock, and by the use of this he was somewhat relieved.

" On the 26th of August of the following year, he was suddenly seized with shivering, universal paleness, and severe spasms of the legs, which were removed by the Tinct. Opii. Ammoniat.

" On the 2d October, his bowels were very much distended, his belly swelled, and a fluctuation could not only be easily felt, but was distinctly heard; and generally, a few minutes after handling the abdomen, the fluid moved with a gurgling noise, and, upon being pressed, passed to another part nearly opposite.

" The stools procured by calomel and rhubarb were of the appearance and consistence of thin tar, and the abdomen still tense. He became cold and feeble, pulse very feeble, quick and intermitting; his breathing scarcely perceptible; thirst urgent; urine loaded with white sediment, and scanty.

" He died on 10th of the month.

Appearances on the Examination of the Body *.

" Upon the abdomen being laid open by a crucial section, a great quantity of fœtid flatus escaped.

" The parietes below the umbilicus were much thickened, and adhered firmly to the omentum and viscera.

" The convolutions of the intestinal canal, which were much distended above the umbilicus, adhered firmly to one another.

" A little below the umbilicus, the ileum was of an enormous size and thickness, and for the length of at least twelve inches, of a light green colour. The mesentery was covered by a network of vessels, distended with red blood.

" The glands of the mesentery, immediately behind the navel,

* I am indebted to Dr SANDERS for the following account of the appearances on dissection, and also for the morbid parts.

were very much enlarged, where a congeries of them formed a mass nearly equal in size to an orange.

" A portion of the ileum, about a foot in length, was remarkably tender, and could hardly be touched without the finger injuring it. The inside of the gut was covered with indurations, tumours and ulcers."

The above disease seems to bear a strong resemblance to that peculiar organic derangement of the bladder of urine, which has been described by Dr GILCHRIST of Dumfries in the Edinburgh Physical and Literary Essays.

The coats of the intestines, according to Mr LOUIS, have been frequently reduced to a softened or pulpy state, in consequence of phthisis pulmonalis, and other chronic diseases.

In consequence of the thickened and frequently pulpy state of the mucous membrane, the valvulæ conniventes and villi are less apparent than in the sound intestine.

In the former edition of this book, I gave it as my opinion that this pulpy state of the coats of the alimentary canal is often connected with inflammation; and it may be added, that the observations of Dr ALISON, appended to Dr GAIRDNER's paper, which have been lately published, appear to afford complete evidence of the accuracy of the opinion.

OF THE SYMPTOMS.

The coats of the stomach or intestines have been found in this morbid state, without the existence of any well marked symptom; and also when the patient had died from some other disease, of which a most striking specimen is preserved in the Museum of the University.

There were " two large apertures in the stomach. The one next the pylorus encircled, at its margins, by a defined elevation of a scirrhous appearance. The other is recent, with ragged margins, and seems to have been formed by the action of the secretions of the organ. Around both, to a considerable extent, the mu-

cous and peritoneal coats are destroyed, exposing the submucous cellular membrane, in its natural state."

This disease, as it occurs in children, is marked by very slight symptoms of fever, which are accompanied by vomiting and diarrhœa.

Dr Burns, of Glasgow, has informed us, that, in one case, he found the stomach sound when the body was first examined, but upon a second inspection, two days afterwards, the stomach was found eroded.

SECTION XI.

OF SCROFULOUS ULCERATION OF THE ALIMENTARY CANAL.

For want of a better name, I have called this very remarkable species of ulceration of the alimentary canal, the Scrofulous, as it is most frequent in persons evidently of a scrofulous habit.

The attention of the medical profession was for many years directed to this very remarkable disease by Dr Carmichael Smyth.

The disease begins in the mucous coat of the stomach, which attains, before death, a very considerable thickness.

In justice to Dr Carmichael Smyth, I subjoin his own description of the disease *.

" A young lady, about fifteen years of age, and remarkably healthy until the preceding summer, when she occasionally complained of a pain in her stomach, but so trifling, that her family, imputing it to her particular time of life, paid little attention to it, was, in the beginning of March last, after having supped † in a very moderate manner, taken ill at going to bed with vio-

* Vide London Medical Communications, vol. ii.

† Her supper was a roasted potato, and a glass of jelly.

lent pain at the stomach, sickness, and vomiting, which symptoms continued great part of the night. Next morning, between eleven and twelve o'clock, I found her, though still in bed, cheerful, and neither complaining of sickness nor of pain; but her pulse was extremely quick, with considerable tension and tenderness of the præcordia and abdomen, which shewed that her illness was of a more serious nature than her relations apprehended; and determined me to call again in the evening. I ordered for the present an emollient glyster, the præcordia and abdomen to be fomented, and a camphorated saline draught, with the addition of about twenty grains of an absorbent powder, and three or four drops of the tinct. opii. to be given every four hours. But this, and every thing else she took, was immediately thrown up; yet she passed the day tolerably well, expressed great relief from the fomentation, and in the evening was in good spirits, until about nine o'clock when she became suddenly restless, and with uncommon eagerness and anxiety desired to be raised up in bed, spoke in a strong voice to one of her sisters who was assisting her, and instantly fell back without sense, motion, or the least appearance of life."

When the stomach or intestines become the seat of scrofula, all the coats of the affected part acquire an unnatural thickness. I have seen the coats of the stomach half an inch thick, and instead of being heavier and harder, and indurated, as from scirrhus, they become softer, and more of a spongy consistence. I have been able to trace the whole progress of the disease. An oval yellow spot appears in the mucous membrane; this is surrounded by a red ring, which consists of very minute blood-vessels.

The yellow spot, in the progress of the disease, is destroyed by ulceration, and afterwards the muscular coat.

The red ring becomes broader, and at length the peritoneal coat gives way, and the rent in it is about half the size of that in the mucous or muscular coats.

There is another peculiarity in this organic derangement which distinguishes it from cancer; it is not limited to the cardia or pylorus, but affects the whole of the stomach, and instead

of being limited to a certain portion of the intestines, affects the whole intestinal canal.

Upon making a section of the diseased intestines, we cut through a substance of an uniform consistence, which somewhat resembles the white part of the skin of an orange, and a great many bloodvessels are distributed through it.

The coats of the diseased part are rarely of an uniform thickness, being generally thicker towards the right side of the stomach, where I have seen them half an inch in thickness.

In some cases, we observe small conical swellings growing from the villous coat of the stomach; and upon the same coat there are generally patches of a florid red colour: the stomach always contains a quantity of a very viscid mucus.

Ulceration follows the unnatural thickening of the coats of the part affected, and is very peculiar.

The size of the ulcer varies from that of a sixpence to that of a crown-piece, its form commonly circular or oval.

The perforation, or opening through the peritoneal coat, is by much the smallest, and seems to be produced by sudden rupture. The edges of the ulcer are found well defined, somewhat thickened, rounded, and sometimes hard, a proof of its long standing. In the stomach, the disease is confined to the mucous and muscular coats, and the peritoneal is always free from disease.

The appearance of the ulcer is widely different from that of cancer, which has a ragged and uneven surface, and which is always accompanied with acute pain and other symptoms of alarm; whereas, in this case, there is no indication of the internal mischief, nor symptoms of uneasiness, nor any warning of approaching danger until the fatal catastrophe.

The bursting of the stomach is immediately followed, and may be distinguished, by the vomiting ceasing, whilst there is a considerable degree of distention of the abdomen, and by the entire failure of the pulse, the patient, making no complaint either of pain or sickness, but of lowness, anxiety and restlessness.

Mr Travers, in the 8th volume of the Medico-Chirurgical Transactions of London, has published cases of this description; and, according to him, the chief diagnostic symptoms are,

"1*st*, Sudden, most acute, peculiar, and unremitting pain, radiating from the pit of the stomach, or navel, to the circumference of the trunk, and even to the limbs."

"2*d*, Simultaneous rigidity of the abdomen."

"3*d*, A natural pulse for some hours, till the symptoms of peritonitis begin."

In a case lately very ably described by my late pupil Dr Elliotson, (Med. Chir. Trans. of London, Part I. vol. xiii), the patient suffered dreadful agony from the first, at the pit of the stomach, and during the progress of the disease.

"The pain did not remit until after the fifth dose of opium.

"The rigidity of the abdomen did not strike me. The pulse was 120 from the first."

It not unfrequently happens, that a portion of all the coats of the stomach and intestines is destroyed by ulceration, but the peritoneal coat to a much smaller extent than the others.

Several specimens of perforation of the stomach are in the Museum of the University of Edinburgh. A specimen is preserved in which there was an opening in its under surface of three inches in circumference, leading to a cavity bounded by adhesions between the stomach and pancreas, and a second opening from it into the cavity of the abdomen.

When a portion of the coats of the stomach has been destroyed by ulceration, the stomach, in some instances, communicates with an abscess of the liver. I am indebted to Mr Watson for a very important case of this description, which is subjoined, with his remarks on it:

"*Case of Ulceration of the Stomach from an Adhesion to an Abscess of the Liver.*

"*Aug.* 1824.—Mrs W., æt. 47., had laboured under symptoms of dyspepsia for several months. These symptoms became agravated with very frequent vomiting, pain in the re-

gion of the stomach, and a feeling of inability to swallow. She then felt, according to her own account, ‘ as if every thing went half-way down, and then came up again.’ Nothing would stay upon the stomach, not even an opiate pill. The bowels were always pretty regular. When I was absent from Edinburgh for a few days, diarrhœa suddenly came on, from which time the vomiting ceased. The diarrhœa gradually subsided, but the pain in the region of the stomach increased. The pain was pretty constant, and was greatly aggravated by taking any thing into the stomach. Opiates were administered without any relief. She became much exhausted from pain, want of sleep, &c., but died rather suddenly, after having fainted several times, and passed some blood from the rectum. Her illness altogether lasted for about six months.

“ *Inspection after death.*—The left lobe of the liver formed its largest half, and occupied the place of the stomach. The under surface of this lobe was found adhering to the stomach by a circular adhesion, about four inches in diameter. The stomach was easily detached from the liver, when it was found that the circular portion of it included in the adhesion formed an ulcerated opening, communicating with a large abscess of the liver. By this large communication, the abscess and stomach formed one cavity. A large quantity of grumous blood occupied the stomach and intestines.

“ *Remarks.*—The above case shews the difficulty of ascertaining the nature of organic abdominal disease before death ; and how well the symptoms are often explained by the appearances on dissection.

“ In this case, the vomiting, irritability, and deranged function of the stomach, at the commencement of the disease, are well accounted for, by the stomach having been compressed and inflamed, from the pressure and adhesion of the hepatic tumour. The diarrhœa must have been caused by the bursting of the abscess. After this, the compression of the stomach being removed, any thing swallowed was retained, but caused great pain

from the stomach and abscess having formed one cavity. The *sudden* death of the patient was occasioned by internal hæmorrhage from the parietes of the abscess."

Perforation of the intestinal canal, especially at the termination of the ileum, is more frequent than that of the stomach.

If the aperture or apertures be in the stomach, the contents of that organ occasionally escape into the cavity of the abdomen; in which case, peritoneal inflammation very speedily follows.

There are various causes which occasion perforation of the stomach or intestines.

The stomach or intestines have been perforated by sharp bodies swallowed, or by intestinal worms.

I have met with sixteen cases of erosion of the intestines. In one case, the transverse arch of the colon was found in a scirrhous state, and there were numerous deep ulcers in the mucous membrane, some of them communicating with the cavity of the abdomen, in which a large quantity of pus was found.

In another specimen, there are exactly the same morbid appearances. The patient imputed his disorder to a blow on the abdomen.

In a third case, in which there was a considerable quantity of fæces in the abdomen, there was an effusion of lymph on the peritoneum, and several gangrenous spots on the ileum; the mucous coat of the cœcum, colon, and rectum was thickened; and, in many places, the coats of the intestine were completely eroded.

In a fourth case, there were gangrenous spots on the termination of the ileum; and, at this place, the coats of the intestine were completely destroyed by ulceration. Serum was effused into the cavity of the abdomen.

In a fifth case, there was a small ulcerated aperture in the middle of the jejunum, and the mucous coat at the termination of the ileum was slightly ulcerated.

In the sixth case, there was a considerable quantity of liquid fæces in the abdomen.

In the seventh case, two large ulcerated apertures, each about

an inch in diameter, were found on the posterior part of the colon, communicating with the cavity of the abdomen. The contiguous coats of the gut were remarkably thin; the inner, and a portion of the middle coat, having probably been removed by ulceration. The only other morbid appearance observed in this case, was that of the intestines adhering to each other by means of lymph. The complete erosion of the intestine, and the consequent effusion of acrid feculent matter which excited this inflammation, had probably taken place a short time only before death. The general symptoms were of two months duration, whilst the more violent enteritic symptoms lasted only about two days.

In the eighth case, the erosion was in the rectum, four inches from the anus; and a large quantity of fæces and of a gaseous fluid, was found in the cavity of the abdomen.

In the ninth, there was very extensive effusion of lymph on the peritoneum; and there were several large ulcers on the mucous coat of the ileum, near its termination in the cœcum. At one point, the coats of the gut were completely eroded; and, at another, the peritoneal coat alone remained. In the cavity of the abdomen was found a sero-purulent fluid.

In the tenth case, feculent matter, and air, were found in the cavity of the abdomen; but neither lymph nor pus had been effused. There was a large ulcerated aperture in the rectum; and, above this, the coats of the intestines were much thickened, and the mucous membrane deeply ulcerated.

In three of these cases, extensive ulceration took place immediately above a *stricture* of the intestine. In the first case, the contraction might be termed the *remains* of a stricture; but, in the third and fourth, the coats were so thickened, and the canal so contracted, as scarcely to admit the point of the little finger. In the other case, there was no apparent stricture; but the intestines were completely *matted together* by lymph, and ulceration had occurred in the termination of the ileum, near the ileo-cœcal valve.

In the greater number of instances, ulceration begins in the mucous coat, and extends outwards, but in a few instances it follows the opposite course. Thus, I met with a case in which

an external abscess burst into the posterior part of the colon. This was followed by a copious discharge, by stool, of purulent matter; after which the patient soon recovered, though she had laboured for some time under inflammation of the bowels.

SECTION XII.

OF BLOOD DISCHARGED FROM THE MUCOUS MEMBRANE OF THE ALIMENTARY CANAL.

Discharge of blood from the mucous membrane of the stomach and intestines is by no means rare, and seems generally to depend on over excitement of the vessels proper to it, or upon ulceration.

The effect of excitement on the vessels of mucous membranes may be distinctly seen, when the menses are discharged from the inverted womb: the internal surface is then red from the distention of its bloodvessels.

The capillary vessels, in this instance, are enlarged, so that those which usually contain only the colourless part of the blood, receive also the red globules. Blood is sometimes observed to exude from the serous membranes, and sometimes it is effused in the cellular substance, occasioning the bloody phlegmon, or those sanguineous spots under the skin, in scurvy.

Hemorrhage from the mucous membrane can scarcely be called a disease, but is the effect of over excitement of the bloodvessels proper to the part. But it also occurs in consequence of debility; and, in that case, particular postures occasion it. I have seen blood discharged from the nose, by keeping the head bended forwards for some time: and it has occasionally proceeded from the vessels of the womb, in women of very delicate constitution, in consequence of continuing long in the erect posture.

The blood is seldom discharged in its pure state, being generally mixed with mucus, and sometimes with pus.

Powerful emetics, drastic purgatives, and also the scorbutic diathesis, have sometimes caused an effusion of blood from the vessels of the intestinal tube, without any breach of surface, or lesion of the part.

Mr Howship informs us, that, in one instance, he had seen a continued bleeding from the intestines, which at last terminated fatally *. He imputed this disorder to a scorbutic habit of body. The same author has published a very striking example of hæmorrhage from the villous coat of the stomach and intestines. "In no part of the intestinal canal was any trace of disease found, with the exception of an apparently relaxed state of the whole villous coat, and a change in its colour."

Blood has frequently been discharged by the dysenteric, without any ulceration, sometimes from the vessels on the villi of the stomach or intestines, though more frequently in consequence of ulceration. Such discharges as the former are not dangerous, except when they are excessive; but those connected with an ulcerated surface are to be regarded with suspicion, and frequently afford a very unfavourable prognosis.

When the stomach is ulcerated, blood is discharged, not only by vomiting, but also by stool.

It may also be observed, that, in cases of dysentery, the blood effused occasionally coagulates within the gut, and is discharged in a solid mass, of the form of the cells of the colon. This is illustrated by fig. 15. plate IV.

The blood discharged is generally of a dark brown colour, like coffee grounds, and was hence called by the older writers *Bilis atra*. That the fluid discharged is not bile but blood, may be proved by dissection. The stomach or intestines have been found much diseased, and the very points whence the blood had issued may be sometimes detected. Besides, this dark coloured fluid which is discharged, has not the same bitter taste as bile.

This discharge of blood by the anus, may also be owing to a

* This is not a very rare occurrence.

diseased liver or spleen, impeding the return of blood to the heart.

The quantity of blood which is discharged from an ulcerated surface, is occasionally so considerable as to cause death in a short time, as sometimes happens from cancerous ulceration of the stomach. In a preceding chapter, it has been observed, that blood is effused, in considerable quantity, into the cavity of the abdomen, when the stomach or intestines have been ruptured in consequence of external violence.

SECTION XIII.

OF SMALL-POX PUSTULES UPON THE MUCOUS MEMBRANE OF THE ALIMENTARY CANAL.

Mention has been made by Lieutaud, Wrisberg, Sir G. Blane, and other authors of high character, of small-pox pustules in the gullet, and even in the stomach and intestines. The last named author has described an instance in which the mucous membrane of the whole of the alimentary canal was studded over with small pustules, dark coloured in the middle, like those of the skin.

But though I have examined the bodies of many children, and of several adults who died of confluent small-pox, I have not yet observed this morbid appearance in the gullet, stomach, or intestines.

According to Sir G. Baker, the mucous membrane of the colon and rectum, and occasionally of the smaller intestines in those who died during the epidemic dysentery which prevailed in London in the year 1762, was found studded over with numerous minute bodies, like small-pox pustules.

It seems probable, that the supposed small-pox pustules were enlarged mucous glands of the stomach and intestines, which enlargement is not unfrequent among weakly children; or that

they were small tubercles of the mucous membrane, with fissures in them.

Professor Horner of Philadelphia lately was so polite as to send me a pamphlet, entitled "An Inquiry into the Anatomical Characters of Infantile Follicular Inflammation of the Gastro-Intestinal Mucous Membrane, and into the probable identity with Cholera Infantum." In the engraving appended to this essay, the mucous follicles of the intestines are represented as much enlarged.

SECTION XIV.

OF DISEASED SECRETIONS FROM THE MUCOUS MEMBRANES, WITHOUT ANY ORGANIC LESION.

An attempt to describe all the diseased secretions of the mucous membrane is foreign to the object of this work.

It is my intention to limit my observations to the accumulation of air, and to the generation of an acid, and of a bilious looking fluid, within the alimentary canal.

The stomach and intestines are frequently very much distended with air, and this air is probably derived from different sources. Part of it is swallowed along with the food, part is probably secreted, and part is formed by a process resembling fermentation, which sometimes takes place in the stomach, when the digestive powers are weak.

The accumulation of air is sometimes so considerable, that it has been described under the name *Meteorismus*, or *Tympanites intestinalis*. Air is also effused in consequence of perforation of the intestinal tube; and this has been called *Tympanites abdominalis*.

These two species of tympany may generally be distinguished from each other. The abdominal tympany commences

suddenly, and, from an obvious cause, the belly is uniformly distended and smooth; the patient does not feel wind moving in his bowels, nor hear the noise of it; he does not pass so much flatus as he used to do in health; or is not relieved by doing so; nor is the tension of his belly much diminished by purgation.

The gastric and intestinal tympany comes on very gradually, and frequently without an adequate cause, and is most frequent in delicate and scrofulous children, or in adults labouring under dyspepsia. The convolutions of the intestines in the emaciated are often distinguishable by the hand; the patient is sensible of air moving from one place to another; and, whilst it moves, it often produces pain and noise, or *Borborygmi*, from the intestine being spasmodically contracted, and an unusual quantity of air is discharged upwards or downwards, which gives relief.

If the patient be much emaciated, the turns of the intestines may be distinctly seen alternately rising and falling, whilst the air moves with noise within them.

The abdominal tympany is evidently much more immediately dangerous than the intestinal, as the air and contents of the alimentary canal, effused into the cavity of the peritoneum, excite a general and fatal inflammation of the bowels.

The intestinal tympany is also often attended with great danger, not only from impairing the digestion, but by producing inflammation and adhesion of the turns of the intestines, and sometimes suppuration and ulceration. In one case, I found that the turns of the intestines which adhered to each other communicated by ulcerated apertures with smooth edges. The inflammation and tympany are, however, sometimes co-existent, and the earlier symptoms are those of inflammation.

It is material to be able to distinguish the abdominal tympany from the gastric and intestinal, because it may be possible to remove the former by an operation; but, if a puncture were attempted to be made where the tympany is gastric, or intestinal, the bowels, from their distention and pressure on the containing parts, would probably be wounded, and their con-

tents discharged into the cavity of the abdomen, which would prove fatal.

My father, many years ago, published the subjoined observations on the accumulation of air within the alimentary canal of oxen and sheep.

" The swelling of the belly is owing to the distention of the stomach, and particularly the first stomach, by fixed air or carbonic acid gas, which is disengaged from the tender and succulent grass, in consequence of its quick solution and violent fermentation; while the discharge of it upwards, through the gullet, seems to be prevented by a spasm or muscular contraction of the upper orifice of the stomach. The dangerous and other fatal effects which follow the distention are not owing to the fixed air, or the juices of the fermented grass, acting as poisons upon the stomach, as a moderate quantity of either produces no bad effects; besides, the repeated experience of the grazier has shewn, that many cattle are immediately relieved and preserved, by stabbing them with a knife or trocar, or by forcing a rope down their throats, and thus allowing the air to escape.

" Cattle, therefore, may with certainty be saved, if the air be drawn off in due time, without injuring the stomach or bowels; and this may easily be done, by passing a flexible tube from the mouth down the gullet, and into the stomach.

" This tube is to be composed of an iron-wire, much larger than a common stocking-wire, or about one-tenth part of an inch in diameter. In order to give it the cylindrical form, it is to be twisted around a thick rod of iron; and, after taking it off the rod around which it was turned, it is to be covered with smooth leather.

" To the end of the tube, which is intended to be passed into the stomach, a brazen pipe, two inches long, of the same size as the tube, and pierced with a number of holes, is to be firmly connected.

" To prevent the tube from bending too much within the mouth or gullet, in time of passing it down into the stomach, an iron-wire, one-eighth of an inch in diameter, and of the same

length as the tube, is put within it, which is to be withdrawn when the tube has entered the stomach.

" The space from the fore-teeth to the bottom of the first stomach of the largest ox, measures about six feet; the tube, therefore, ought to be six feet long, that we may be sure of its answering the largest oxen.

" And to prevent the tube from being injured while it is introducing, a speculum oris, of a large size, the under plate of which is one foot long, and three inches broad, and the screw which separates the two plates about six inches in length, should be previously put into the ox's mouth, that his tongue may not come in the way, and that he may not crush or break the tube with his teeth.

" After the tube is passed into the stomach, it may be allowed to remain within it for any length of time, as, when it is pressed to one side of the throat, it does not interrupt the breathing of the animal.

" The greater part of the elastic and compressed fixed air will pass through the tube, and, if it be thought necessary, the remainder of it, or the superfluous drink, may be sucked out by bellows fixed at the upper end of the tube, with a couple of valves, one at its muzzle, and the other in the side of it, so disposed as to allow the air to pass in the direction outwards.

" And it is material to add, that Mr WALKER * has saved the lives of many sheep, as well as black cattle, by using this instrument; and, from a late publication †, it appears, that this is a matter of much moment, and well worth the attention of the farmer, as a great proportion of sheep, not less than one-fifth of the whole flock, sometimes perish from this cause."

The air accumulated within the stomach proves a source of great uneasiness, and has occasioned its rupture. This very frequently takes place after oxen or sheep have eaten a large quantity of young clover, and every skilful farmer is now pro-

* WALKER on the Diseases of cattle.

† NAISMYTH on Sheep.

vided with an apparatus, which was contrived by my Father, for withdrawing the air from the stomach.

An acid fluid is very frequently generated by the glands of the mouth and throat, when the functions of the stomach and intestines are deranged.

Dr Prout says, he found that muriatic acid was generated in the stomach of the inferior animals, and occasionally other acids. The author above alluded to detected the presence of combustible acids in the stomach, and expresses his belief that these were derived from the food.

He also observes, that occasionally the "stomach secretes a combustible acid in a free state; though" says he, "I think it more frequently happens, that some salt containing a combustible acid, *e. g.* the acetate of soda, is actually secreted; and that this, by being decomposed by the free muriatic acid, gives origin to the apparent presence of free acetic acid *."

Prout also found, in a remarkable case of disease, that the acetic acid seemed to be formed not only in the stomach, but by the salivary glands. The breath of the patient smelt strongly of vinegar.

Dr Baillie has described "an affection of the stomach, in which the digestion is very imperfect, and in which considerable quantities of a transparent viscid mucus is formed. This often produces nausea, and is occasionally brought up by vomiting. According to my experience, this condition of the stomach has been frequently little benefited by medicine, but sometimes I have found the tincture benzöes composita of considerable use. A drachm of it may be taken mixed with water, and some mucilage of gum acacia, three times a day. There is another affection of the stomach less common than the former, but far more serious, viz. where a large quantity of a fluid like cocoa is vomited. A quart of this fluid will often be thrown up at a time, and this will frequently be repeated for many days together. This condition of the stomach is sometimes connected with a diseased state of the liver, but sometimes it is independ-

* Vid. Phil. Mag. and Annual Register for August 1825.

ent of it, there being, at least apparently, no disease in this latter organ. In several instances it has proved fatal; but, in others, and especially in two cases, which, I recollect, the complaint subsided for several months at a time, and the persons enjoyed in the interval tolerable health. This state continued many years, and the patients are still alive. In one case I had an opportunity of examining the condition of the stomach after death. It was very capacious, and was half-filled with this brown fluid, but it did not appear to be at all diseased in structure. The neighbouring viscera, as the liver and the spleen, were, as far as I recollect, perfectly sound. The fluid appears to be formed by a diseased secretion of the inner membrane of the stomach, without any apparent morbid structure. This disease, according to my experience, is but very little influenced by medicine or by diet. In two or three cases, some benefit seemed to be derived from astringent medicines, combined with moderate doses of opium. As, for instance, from tincture of kino, or tincture of catechu, with a few drops of laudanum taken three or four times a day; the bowels should be, at the same time, kept free from costiveness. In some cases, the stomach will lose almost entirely the power of digestion; the patients will become pale and emaciated, and appear as if they were affected by some fatal visceral disease; at the same time no morbid structure in the region of the stomach or liver can be detected by the most attentive examination. In some of these cases, the patients have been completely restored to health by a course of the Bath waters *."

* Vide Dr Baillie's posthumous works, p. 190, 191. Lond. 1825.

SECTION XV.

OF THE MILT-LIKE TUMOUR OF THE MUCOUS MEMBRANES.*

This tumour has, as far as I know, entirely escaped the attention of pathologists.

In the former edition, I have called it "milt-like tumour," as it resembles, in colour and consistence, the milt of many fishes; and have added the words "of mucous membranes," as it grows only from membranes of this description.

This tumour bears some analogy to the tumour described by my Grandfather, under the name of an anomalous tumour, which has been lately called by Dr Burns of Glasgow, Spongoid Inflammation, and by Hey of Leeds, the Fungus Hæmatodes.

But it differs from this dreadful malady in many of its characters, as will appear in the sequel, by instituting a comparison between these diseases.

The above disease also bears some analogy to that organic disease of the testes, which has been described by Dr Baillie under the head of Pulpy Testicle.

This species of tumour generally attains so considerable a volume, as to fill, and even distend to an unnatural size, the bowel within which it is contained, as I have seen in the case of the bladder of urine; but, in other cases, this tumour grows from a part only of the mucous membranes.

The disease does not prove speedily fatal; for I had occasion to attend a patient who laboured under it for two or three years.

The milt-like tumour, in many respects, resembles the milt of fishes; it is of a pale red colour; and it also is nearly of the

* Vide a very faithful representation of this disease in the former edition.

same consistence, but rather softer; has an irregular surface, and is covered by a thin membrane, upon which there is a number of vessels filled with blood.

This species of tumour very readily falls to pieces, and mixes in part with water, forming a turbid mixture; and it becomes somewhat hardened by being put into strong spirits. It adheres but slightly to the organ from which it grows, by a number of small processes, which insinuate themselves into the thickened villous coat: after the tumour has been detached, the villous coat of the diseased bowel assumes somewhat of a honey-comb appearance, and it is besmeared with several drops of blood, derived from the vessels which supplied the tumour having been torn.

The bowel from which such a tumour grows, betrays marks of inflammation externally; there is evidently an unnatural determination of blood to the seat of the disease, the blood-vessels upon the peritoneal coat, being not only larger, but also more numerous, than in the healthy state.

The neighbouring lymphatic glands also participate in the disease, being much larger than in the healthy state; and they are filled with precisely the same milt-like matter. In a case which I had occasion to examine, the bladder was filled with the milt-like matter, and one of the lymphatic glands at the side of it had attained the size of the fist, so that I at first supposed there had been a morbid contraction in the middle of the bladder; but found, upon opening it, that there was no communication between the cavity of the bladder and the swelling connected with it.

There is another peculiarity in the disease, viz. the emission of a very remarkable and offensive fœtor: the organ containing such a tumour is as much discoloured, and emits as fœtid a smell, as the same bowel which had been exposed to the air for several days.

The veins distributed on the mucous membrane, in the vicinity of the tumour, are considerably enlarged and distended with blood.

OF THE DISTINCTIVE CHARACTERS BETWEEN THE MILT-LIKE TUMOUR AND THE ANOMALOUS TUMOUR OF DR MONRO *PRIMUS*.

1st, The anomalous tumour of my Grandfather differs, in its situation, from the milt-like tumour; the former has been found in all the tissues of the body, the latter in the mucous membranes only.

The anomalous tumour is sometimes connected with the periosteum, the capsular ligaments, especially with that of the hip-joint, the peritoneum, the liver, spleen, ovarium, and uterus, and with the albuginea and vaginal coats of the testicle; with the coats of the optic nerve, and sclerotic coat of the eye.

In short, the anomalous tumour is not confined to any one texture, but is common to all; it begins as a distinct elastic tumour, without fluctuation, and some parts of it feel harder than others. In its progress it bursts, and a soft dark purple-coloured fungous excrescence, which bleeds profusely, rises from the centre, and soon increases very rapidly in size.

The milt-like tumour is much softer than the anomalous; before it bursts, it has not the same purple colour and firm elastic feeling as the anomalous tumour, which Dr Burns has compared to a sponge tied up very tightly in a piece of bladder; and I have never observed any appearance of fungous ulceration of the milt-like tumour, nor the same inequality in the consistence of different parts of it, as in the fungus hæmatodes.

The tumour is nearly of an uniform consistence in every part, and its lobes are not so distinct as those of the anomalous, which are separated from each other by membranes.

The milt-like tumour is, in colour and consistence, uniform in every part; but the section of the anomalous tumour exhibits, in its parts, a different colour, and also a different consistence, some portions being as soft as brain, others as hard as the yolk of a boiled egg, and others like cartilage; besides,

there are cavities, of different sizes and forms, within the tumour, full of a fluid tinged with blood.

The disease I have been endeavouring to describe, appears only in advanced life; but the anomalous tumour is, in many instances, a disease of infancy, of childhood, and of the meridian of life.

The following is the history of a case of this disease occurring in the stomach, which was drawn out, at my request, by Dr ANDERSON of Leith.

"Mr ——, about fifty-six years of age, of slender make, temperate habits, and subject to no hereditary complaint, enjoyed uninterrupted good health, till towards the close of the year 1808. On the 13th of January 1809, immediately after dinner, he was attacked, without any evident cause, with sickness and vomiting; in the course of which he ejected eight or ten ounces of coagulated blood, of a florid red colour. The sickness soon left him. During the summer of the same year, he had acquired a sickly and rather emaciated appearance; notwithstanding which he thought himself in perfect health. About the end of summer, he began to experience a degree of uneasiness and pain in his stomach, soon after his meals, which he imputed to impaired digestion; and, of his own accord, restricted himself to a milk diet. By spare diet, he began to experience so great a release from the painful sensation in the region of the stomach, as to flatter himself that he was cured, and therefore resumed his former mode of living.

"About the commencement of the present year (1810), in consequence of a lameness, he was confined to his sofa, during which he evidently lost flesh.

"About the middle of the month of March, the uneasiness arising from distention of the stomach was much increased; and, within a few days, he experienced a fit of rigour, succeeded by increased heat of the body, which attacked him regularly about two o'clock of the afternoon, and continued till between five and six. He suffered five such paroxysms in as many successive days. These yielded to the Peruvian bark, combined

with the sulphuric acid. He at the same time complained much of uneasiness and sickness at stomach, and restless nights; his body was open, and his pulse, which beat about eighty times in a minute, was small and feeble. It was obvious that there was some organic disease in the abdomen.

"The region of the liver and stomach were minutely examined, without discovering any trace of disease.

"At this time Dr Monro *senior*, was called into consultation with Dr Thomas Anderson. The former said, that he thought he perceived *a swelling towards the left side of the stomach.* Pulse 88, and regular in his body. After taking into full consideration all the circumstances of the case, it was determined to put our patient on a mild and protracted course of mercury.

"Diarrhœa succeeded, and the mercury was given up; notwithstanding which, and the use of opium and astringents, it continued for some time to be very troublesome. After a short time the severity of his complaints abated, and he acquired an increase of strength, by which he was enabled to leave his room. He was also permitted to take a small portion of animal food, which was not followed by any painful sensation in the stomach; but as the quantity of food taken at any one time was very small, it is rather to this than to any other cause that the ease he now enjoyed after meals was to be attributed. In the beginning of the month of May he became worse, and on the 11th of the month Dr Gregory was joined in consultation with the gentlemen before mentioned. At this time, as the patient was much distressed with slight diarrhœa, every discharge per anum being preceded by severe griping, it was determined to try the effect of some simple aperient medicine. Magnesia, with lemon-juice, was recommended, which produced no great alleviation of the pain; in addition to that was added a large dose of opium, combined with conf. catechu, administered at bed-time, and occasionally, also, in the course of the day, when it was rendered necessary by an increase of the pain.

"In addition to the symptoms noticed I ought to have added, that about this time he was much troubled with saliva

rushing into the mouth, which, from the frequency of spitting, occasioned much trouble. The ptyalism he thought increased when the dose of opium was diminished.

" Under the use of these medicines, I had the mortification to find that my patient experienced no alleviation of his sufferings, which, on the contrary, gradually increased.

" During the mild and serene weather of the summer, my patient acquired so much strength as to be able to leave his room and go into the garden; but, in a short time afterwards, I observed my patient's strength gradually sink, and his bad symptoms daily increase. Towards the end, his stomach would receive but small quantities of food at a time; the troublesome diarrhœa became more frequent; his pulse became a little quick, ranging from 90 to 100 strokes in a minute, and very feeble. During the whole course of the complaint, the heat of the skin never rose above the natural standard; he had no hectic sweating, and his tongue was at all times perfectly clean and moist. The emaciation, however, proceeded by slow degrees, reducing him very gradually till the 25th day of August, on the evening of which day he expired.

" On laying open the abdomen, I was struck with the healthy appearance which its contents presented. The intestines looked healthy. In tracing them from the pylorus down to the rectum, a turn of the ileum was observed to be covered with a slight and diffused redness extending to the sigmoid flexure of the colon, and beginning of the rectum. Two constrictions of the great intestines were observed, by which the capacity of the gut was diminished to one-third of its usual size.

" On taking the stomach into my hand, I was struck with its firmness and thickened feeling; and, on grasping it more particularly, I found *an unusual largeness, as if of a tumour, in its substance, situated at the greatest curvature, near to the point where it touches the spleen.*

" Having removed this organ from the body, and slit it open, I observed a large tumour situated on the villous coat, above the surface of which it projected. It was of a regular round form, measuring about four inches in diameter. From

the principal mass several laminar projections issued. The structure of the tumour was fibrous, and in consistence and appearance much resembled the substance of brain. To me it appeared an example of the medullary sarcoma, so well described by Mr ABERNETHY. But of the more particular appearances and structure of this tumour, I forbear to add any further description, as the preparation itself is now in your possession.

"There were three or four small ulcerations on the surface of the tumour.

"I am, dear Sir, yours most sincerely,

"CHA. ANDERSON."

The most remarkable circumstance in the preceding case, was the slight degree of pain in the stomach which the patient suffered, and which seems to me to be connected with the situation of the tumour, which did not obstruct the pylorus.

It may not be improper to add, that I had occasion to visit, along with Mr ALLAN, surgeon, a man who was afflicted with the same disease, in his bladder of urine, and who, for ten months before his death, suffered the most excruciating agony, and was often convulsed. My father, many years ago, met with a similar tumour in the bladder of urine.

The following is a good example of the milt-like tumour of the stomach.

John Leishman, æt. 35, was admitted into the Royal Infirmary on the 22d December 1824, emaciated and hectic. The umbilical region was occupied by a large tumour of a livid colour, discharging a foul greenish matter from an ulceration in the centre, and a second smaller point below, and accompanied by inflammation and extreme sensibility of the surrounding integuments.

For several years he was addicted to habits of intemperance, and, after a debauch, experienced pains in the stomach of a few days duration. In April 1824, these became more permanent, but no distinct account of their nature could be obtained. Fourteen weeks prior to admission he became suddenly affected with intense pain in the umbilical region, which, in four days, was

succeeded by inflammation and swelling. Leeches and cataplasms were applied. Four weeks ago the ulceration commenced, and the pain has subsequently been easier.

Dissection.—The integuments were removed, and, as it was discovered that the tumour had extensive adhesions, the whole mass was dissected from the abdomen, and laid upon the table. After removing the small intestines, the ascending and descending colon, the spleen and the kidneys, all of which were natural, the diseased structure, with its connections, became apparent. The tumour involved the stomach, liver, pancreas, duodenum, and the transverse arch of the colon. The stomach was laid open, and its villous coat presented a high degree of vascularity and thickening. Towards the pyloric extremity a number of vascular fungi were observed, and, on passing the hand under these, in the direction of the external orifice of the tumour, the finger passed through a sinuous cavity, and presented at the external opening. The tumour itself exhibited, towards its circumference, a cartilaginous structure, but its centre was sloughy, and yielded a highly offensive fetor. The liver was enlarged, and contained a number of circumscribed white tubercles, of the magnitude of nuts and walnuts. the texture of which was soft, and yielded a milky fluid on pressure. Similar tubercles, of less size, pervaded the mesentery and omentum. The cavity of the abdomen contained about two or three pounds of bloody serum.

In another case of milt-like tumour of the stomach, there were the following symptoms:—The patient's countenance was pale, and he was emaciated; the abdomen was tender in the epigastric region. Sometimes he vomited after every meal, but at other times there was no vomiting for two or three days. He had occasional diarrhœa, with tormina; pulse and tongue were natural.

The degree of pain which attends the anomalous tumour, or fungus hæmatodes, is greater than that originating from the milt-like tumour. Professor Burns of Glasgow, who has given a very faithful delineation of that formidable disease, has observed, "Some degree of pain, generally shooting, sometimes deep and gnawing, is early perceived."

SECTION XVI.

OF POLYPI GROWING FROM DIFFERENT PARTS OF THE MUCOUS MEMBRANE OF THE ALIMENTARY CANAL.

DIFFERENT kinds of tumours growing from the canals or cavities, lined by a mucous membrane, have been arranged under the general head of Polypus, from their supposed resemblance to those animals called polypi; but the analogy is by no means perfect: these tumours being connected to the mucous membrane by one root only.

There are the following varieties of polypi.

The first is a circumscribed tumour, compressible and moveable, of a round or oval form, of a grey or light-brown colour, semi-transparent, glistening on its surface, with a number of bloodvessels distributed through it, soft, easily torn, sometimes solid, sometimes hollow, filled with a slimy mucus, and bearing a strong resemblance to the internal membrane filled with lymph; they are much affected by the state of the atmosphere, shrinking in dry, and expanding in moist weather; and, when partially destroyed, they rapidly grow again.

Such polypi generally grow from the ossa spongiosa of the nose, from the sinuses of the skull, &c., or from the vagina.

This kind of polypus frequently becomes partially inflamed, by which it sometimes contracts adhesions with the cavity within which it grows, and then it seems to have several roots. This kind of polypus very seldom degenerates into cancer in young persons, even though it be red and firm, and be cut or torn, compressed or otherwise irritated. It is also necessary to observe, that if a portion of the root of this kind of polypus shall remain, when the rest of the tumour has been removed by ligature, a tumour of the same kind as that which has been removed soon grows

again; hence it is important in performing any kind of operation upon a polypus, to endeavour to reach its root, and, if possible, to remove it entire.

Richter has described a variety of this polypus, which is tough, of a pale colour; and there is a viscid secretion from its surface *.

The second kind of polypus is generally a small circumscribed fleshy tumour; sometimes it has a narrow, and sometimes a broad basis, of an oval or pyriform figure, of a red or dark purple colour, perfectly opaque, of a fleshy consistence, knobby and unequal on the surface, hard to the touch when within reach, not easily torn, nor moveable on blowing the nose, apt to bleed when touched, not at all affected by vicissitudes of the weather; sometimes is stationary, then grows rapidly, and attains a large size; becomes very painful, and sometimes it discharges a bloody mucus. The tumour is covered generally by a thin and vascular membrane.

This kind of polypus often grows from the posterior nares, from the pharynx, gullet, stomach, intestines, and uterus. Such tumours are generally accompanied by shooting pain.

In persons considerably advanced in life, and of a broken constitution, we frequently observe that such tumours become cancerous, and more especially when much irritated or lacerated.

There are, in some cases, repeated discharges of blood from the tumour, by which the patient's strength is much exhausted.

Polypi, in many cases, fill up the cavity in which they exist, and sometimes extend beyond it; and the projecting part expands to a much greater size than the body of the tumour. Owing to the continued pressure of the tumour, the membrane of the cavity ulcerates, and the neighbouring bones are sometimes destroyed; thus, when the investing membrane of the ossa spongiosa of the nose is destroyed, the bones become carious, for they cannot, on account of their thinness, exfoliate.

Sometimes the bones of the nose have been disunited, by large polypi growing within it.

* This kind is most frequent in the nose, and is rather an elongation or relaxation of the mucous membrane of the nose, than a polypus.

This kind of polypus, when divided, is found to be solid, and in some places fibrous: it resembles, in colour and consistence, the unimpregnated uterus, and is pierced with numerous blood-vessels.

There are a few small cavities in some of these tumours *, which are filled with lymph †.

There is a variety of this species of polypus, which consists of a number of distinct lobes of different sizes; and when a section is made of such a polypus, a small quantity of a fatty substance is found intermixed with the inspissated lymph.

In the Museum of Edinburgh, a very excellent specimen of this kind of polypus is preserved, which grew by a narrow root from the membrane of the pharynx, and which filled and distended to a great degree the whole of the œsophagus ‡.

In the old and debilitated, this kind of polypus sometimes assumes a malignant aspect, becomes rough on the surface, bleeds frequently and profusely, discharges a fœtid, sanious fluid, becomes also extremely painful, ulcerates, and is at length converted into a genuine cancer.

There is a third and rare kind of polypus which is soft, in colour resembling coagulated blood, and which discharges blood even upon being slightly touched. In the old and debilitated, this kind of polypus frequently degenerates into cancer.

Before proceeding to describe the symptoms occasioned by polypi, it may not be improper to observe, that those tumours grow much more frequently from the mucous membrane of the nose, pharynx, and uterus, than from that of the gullet, stomach, intestines, or bladder of urine, which illustrates the following observation of Dr C. Smyth ‖:—"There is great reason to believe that the structure of the mucous membranes is somewhat different in different parts, according to the various purposes of the animal economy."

* Vid. Plate XIII. of my Thesis De Dysphagia.

† Vid. Plate XIII. of my Thesis, fig. 1st, 3d, and 4th.

‡ Vid. Figure of this polypus in the Edinburgh Physical and Med. Literary Essays, Vol. III.

‖ Vid. Lond. Med. Communic. Vol. II. p. 206.

OF POLYPUS OF THE NOSE.

The earlier symptoms occasioned by a polypus of the nose are very similar to those of a common catarrh.

But when the tumour has increased in bulk, by plugging up the nostril, and pressing the partition of the nose to the opposite side, it occasions difficult breathing, impedes the passage of the tears into the nose, causing thereby a watering of the eye, and impairing the sense of smell.

When it has become still larger, so as to hang backwards into the pharynx, it creates a difficulty in breathing, and also in deglutition, and frequently continued headach, probably by compressing the jugular vein, and opposing to a certain extent the free return of blood from the head.

OF POLYPI IN THE PHARYNX.

Polypi frequently are attached to the internal membrane of the pharynx, to the posterior nares, or cuneiform process of the occipital bone, and occupy a part of the cavity of the pharynx.

Polypi within the pharynx give rise to the following symptoms, which are referable solely to the pressure of the tumour :— The breathing and deglutition are more or less interrupted in proportion to the bulk and length of the tumours; by their pressure on the Eustachian tubes, they create dulness in hearing; and by impeding the free return of blood from the head by the jugular veins, occasion considerable headach, vertigo, and drowsiness *.

The partial enlargement of the cervical vertebræ occasions a swelling in the pharynx not unlike to a polypus.

My Father was desired to visit a lady, who had been his patient about twenty years before, on account of a polypus which grew from the soft palate, and which was removed by the

* I have known patients in this situation, treated as if they were about to be seized with apoplexy.

knife *. She supposed that she again laboured under the same disorder, but she was mistaken, the swelling in the pharynx being perfectly hard, and occasioned by an enlargement of the anterior parts of the bodies of three of the cervical vertebræ.

OF POLYPI OF THE GULLET.

A very remarkable case of this kind is preserved in the Museum of Edinburgh, of which the following is the history †.

" James Davidson, aged 68, was admitted into the Royal Infirmary, April 9. 1763, for the cure of a polypus in his throat.

" Upon examining his throat, there was nothing preternatural perceived; but, on giving him a vomit, or irritating the fauces, so as to make him retch, a large fleshy excrescence was thrown up into his mouth, as far as to his fore teeth, consisting of four different fangs, joined together by one common root. These were of a pretty firm fleshy texture, possessed of a good degree of elasticity. He could hardly allow them to remain half a minute in his mouth, as they shut up the larynx, and thereby entirely stopt his breathing.

* Polypi may be also removed by ligature. In my thesis De Dysphagia, I have observed, " Levret polypos uteri ac vaginæ ligatura excidendas suadet: illi tamen videbatur modum operandi, quem descripsit, non posse adhiberi ad polypos in gutture natos tollendos. Quum vero patri meo videbatur, polypos, in locis præcipue arctis sitos, exscindi aut forcipe evelli non posse, sine grave injuria partibus vicinis illata, hæmorrhagia enormi, ac tumoris renascendi periculo, ob radices ejus relictos, ligaturam, in omni fere casu, excisioni aut evulsioni prætulit; atque per triginta annos elapsos, varios modos quibus secundum tumoris situm, adhiberi possit, auditoribus suis in cadavere demonstravit, argento nitrato postea polypi radici admoto, atque variis exemplis ægrotantium illustravit, in quibus, exitu secundo, operatio sic instituta erat.

" Inspiciat lector Tab. III. fig. 2., Tab. VI, XII, et XIII. ut tumorum naturam, instrumenta his tollendis adaptata, atque operandi modum intelligat."

† Vide Edin. Physical and Literary Essays, vol. iii. p. 525.

" This polypus had, for several years, prevented him from swallowing any thing without much difficulty; neither could he breathe so freely, nor speak so distinctly as usual; it likewise occasioned a cough, which frequently forced the polypus into his mouth.

" On the 15th of May last, while Mr Dallas attended the Infirmary, the result of a consultation was, that bronchotomy should be performed, to enable the patient to breathe by the opening made in the trachea, till such time as I should get a noose cast on the polypus. This method of cure, suggested by Dr Monro junior, was the most rational; for the extracting of it would have been improper, because the hæmorrhage could not have been stopped, besides the danger there was of pulling away the inner coat of the œsophagus.

" By means of a ligature passed through a hollow ring, to which a long stalk was connected *, a large part of the tumour was removed, which was discharged by stool."

The sequel of the case was published by my Father. " The patient died in the Royal Infirmary, in April 1765, to which he had returned, a few weeks before that, very feeble and emaciated; as, for several months past, he had not been able to swallow any solid food, and even swallowed fluids with much difficulty.

" The polypus had not, however, been seen by the surgeons who had examined his throat.

" On dissecting his body, the œsophagus was found to be greatly dilated by a very large fleshy excrescence or polypus, which grew out from its fore part, by a single root, about three inches lower than the glottis, but was split, at its under part, into several lobes, the largest and longest of which reached down to the upper orifice of the stomach.

" On viewing this figure (alluding to the figure in the Physical and Literary Essays, Vol. III.) it is evident, that when, by the effort of vomiting, the polypus appeared in his mouth, its

* For a more particular description of the apparatus, vide Edin. Med. Literary Essay, vol. iii.

parts must have been inverted, or that the lobe which was longest, and generally undermost, had been thrown up into the mouth. And, as a certain proof that such inversion had actually happened, a cicatrice could be distinctly observed at the under end of the longest lobe, from which the four branches or fangs mentioned by Mr Dallas, had been cut off by the ligature he had applied.

" It is probable that the increase of the polypus, during the two last years of the patient's life, had prevented its inversion and appearance in the mouth, and, at the same time, added much to the difficulty of swallowing."

OF POLYPI IN THE STOMACH.

This is a very rare disease.

These tumours, when situated near the pylorus, by preventing the free egress of the contents of the stomach, increase its size, and change its figure *.

My Father met with a remarkable case of this kind, of which he gave me the following relation :

" A lady, ætat. 45 (1802), the mother of several children, about sixteen years ago, was attacked by paroxysms of difficult breathing, which had ceased about a year before I visited her.

" She then complained of pain in the epigastric region, indigestion, and wind in her stomach and intestines ; her body was loose, her menses irregular.

" She had of late lost much of her colour, flesh, and strength.

" The above symptoms gradually increased. Upon examining the belly, a tumour was found on the right side of the navel, of an oval shape, and about the size of an orange ; which at the time was supposed to be lodged within the colon.

" Medicines were found to afford no relief ; her complaints continuing without abatement. She died much emaciated.

* Vide Plate VI. of former Edition of this book, and also a case of Tumour of Stomach, MORGAGNI, Epist. 30. art. 7.

"On examining her body after death, the stomach was found to have fallen down as low as the navel; upon opening it, there appeared a tumour adhering by a neck to its villous coat. The surface of the tumour was smooth, and the body of it so firm, solid, and tough, that it was cut through with some difficulty."

The section of this polypus exhibits an uniform substance.

The stomach was much enlarged, and of an unusual figure.

Polypi have been sometimes found within the intestinal canal, especially in the large intestines. I had occasion to see a case in which a polypus in the sigmoid flexure of the colon filled up the cavity of that intestine so completely, as hardly to give passage to a goose's quill.

In another case, the middle of the arch of the colon was nearly filled with a spongy excrescence.

RHODIUS has made mention of a similar case *; and FANTONUS has observed, that he found within the colon of a dysenteric patient, a polypus, of a pound weight, eight inches long, and connected by a narrow peduncle.

These polypi create colicky pains, by obstructing the intestines, and impeding the progress of the fæces.

PORTAL makes mention of two cases in which he found polypi within the colon, which almost entirely plugged up its canal, and which were connected to it by narrow necks †.

Both persons suffered severely from pain in the intestines, had frequent vomiting, were subject to obstinate costiveness of considerable duration, and died of marasmus. The portions of intestines above the tumours were much dilated.

Such polypi have, in some cases, been discharged by stool, after occasioning the symptoms above enumerated ‡, but often the patient obtains only a temporary relief; for there are generally more polypi within the intestine; and, in consequence of the enlargement of these, the intestinal canal is again obstructed. PORTAL has related a case of this kind; the polypi proved the cause of death; and, upon dissection, several of them, of different sizes, were found within the colon.

* Vide Act. Hafn. vol. iv. p. 1. &86.

† Vide PORTAL, Anat. Med. tom. v. p. 243. ‡ Ibid.

In cases of cancer at the pylorus and rectum, I have seen a number of small tumours of different sizes, with narrow necks, which gave rise to symptoms nearly similar to those just mentioned.

Polypi in the rectum differ somewhat in appearance, from those already described, being generally smaller in size, and two, three, or even a greater number, occasionally exist in the same subject; and, when the patient is at stool, they often project beyond the verge of the anus.

A considerable degree of constriction in the rectum is described by Dr STARK, as being produced by soft, spongy, rotten tubercles *.

In illustration of the symptoms occasioned by a polypus of the rectum, I subjoin the history of a patient who was afflicted by this disorder, which was communicated to me by Mr JOHNSTON, surgeon, who attended the patient along with my Father.

"*5th May* 1810.

"Mrs ———, about 50 years of age, a considerable part of which was spent in the West Indies, where she became the mother of several children. During her various pregnancies, she enjoyed very indifferent health, being in particular much and violently afflicted with piles. About ten or twelve years ago, she began to complain of constant uneasiness in the rectum, with occasional prolapsus ani. These symptoms, by degrees, grew worse; frequent attacks of very severe inflammation of the parts took place, with profuse discharges of blood, and the prolapsus became almost constant, unless retained by a bandage. The violence of these complaints greatly injured the general health, and in particular the functions of the stomach and intestines were much affected. Upon examination of the parts during a complete prolapsus, a firm fleshy-looking tumour was found within the sphincter, about the size of a chesnut, with a broad base. It was proposed to remove this, but at first this

* Vide STARK's Works.

was not consented to. The symptoms of distress continued daily to grow worse, and the health of the patient became so precarious and infirm, as to induce serious apprehensions for her life; in consequence of which, by great entreaty, she at last consented to the removal of the tumour: this was done, without any difficulty, by means of ligature. She suffered much agony during the strangulation of the tumour, and indeed for a considerable time after it dropt off; much inflammation and sloughing were endured, and for a week or ten days, appearances were rather formidable. By degrees, however, the inflammation subsided, the parts became easy, the prolapsus ani was quite removed, the functions of the stomach and intestines became more natural, and since that time, now nearly two years, her health has gradually mended, and is at present much better than at any time for the last twelve years of her life. She has had no hæmorrhoidal attack since the removal of the tumour; no discharge of blood; nor has she any feeling in the parts which indicate any remains of disease there."

This case distinctly proves that a polypus (when not malignant), is simply a local disorder; for the disease was completely eradicated by the operation, and did not return; and, in further corroboration of the above opinion, it may not be improper to add, that, in my Father's Case Books, there are several instances in which polypi have been removed from the nose, uvula, pharynx, and uterus, and where there had been no return of the disease after the lapse of five, ten, or even twenty years.

Small polypi, with narrow necks, sometimes come off along with the fæces, after having proved a cause of colic and very considerable uneasiness. I lately attended a young lady, who passed a polypus of the size of a small olive, and whose bowels had been previously much deranged: she has had no symptom whatever of pain about the anus since the passing of the polypus, so that the disease may not perhaps return *.

* Some valuable remarks on tumours of the Intestinum rectum occur in the works of DELPECH.

SECTION XVII.

OF FATTY OR STEATOMATOUS TUMOURS OF THE MUCOUS COAT OF THE GULLET, STOMACH, AND INTESTINES.

These have occasionally been found within the gullet,* though more frequently within the stomach † and intestines.

It seems to me probable, that the observations which Vic D'Azyr has made upon this subject ‡ are well-grounded; but I speak only from conjecture, as I have not seen in any anatomical museum an example of this disease of the mucous coat of the alimentary canal.

Such tumours, when within the stomach, have been said to occasion pain in the region of the organ, nausea, vomiting, obstinate constipation, and sometimes jaundice.

A remarkable case of this description has been described in the 61st volume of the London Philosophical Transactions, by Dr P. Hanly.

Mrs R. æt. 36. formerly of a healthy constitution, "in the fifth month of her pregnancy, felt an uncommon lump in her stomach, about the size of a hen's egg." This tumour occasioned nausea, vomiting, and emaciation. Five weeks after delivery, the tumour increased very much in size, "and to the feel seemed to resemble the head, trunk, and extremities of an extra-uterine fœtus."

* *Vide* Portal, Anat. Med. tom. iv. p. 539.

† *Vide* Portal, Anat. Med. tom. v. p. 196; also Rhodius, Obs. 103.

‡ He has observed, in the 2d volume of the Encyclopedie Methodique, p. 343,—"Il eût peut-être convenu de placer, comme a fait M. Lieutaud, les Stéatomes de l'estomac dans un article séparé de celui des squirres de ce viscère; mais indépendamment de ce que cet auteur ne cite que trois exemples de ces tumeurs enkistées, il n'a eu aucun soin d'en examiner de près le caractère; et ce qu'il dit du troisième cas paroît si vague, qu'il est au moins fort douteux que la tumeur qui en est le sujet, fut un Stèatome."

She lived only five months longer.

Upon dissection, a tumour was found in the cavity of the abdomen, weighing seven pounds, about seven inches in length, near to five in breadth, and about three in thickness. It adhered above to the anterior part of the stomach, and below to the right ovarium, and compressed the colon, and smaller intestines *.

SECTION XVIII.

OF FUNGUS OF THE MUCOUS COAT OF THE ALIMENTARY CANAL, AND OF FUNGOUS TUMOURS CONNECTED WITH THAT MEMBRANE.

Fungous tumours have been observed in every part of the alimentary canal.

Such tumours are generally of a small size, of a very soft consistence, bleed when torn, and generally are composed of several small lobules.

I have seen the uvula and upper part of the pharynx covered by a number of such tumours, of a small size; and the membrane from which these grew was of a dark purple colour, seemed considerably thickened, and was in some places eroded. Ulceration also sometimes takes place, and the fungous tumours often assume a malignant aspect.

My Father met with a case of fungus of the pharynx, which occupied a considerable share of its internal membrane, and also that of the upper part of the gullet, which was thereby very much thickened; the patient died from inanition: ulceration had taken place in some of the fungous excrescences.

M. Kerkaradec shewed to the Royal Academy of Medicine the pharynx of a woman, æt. 60, which was covered with fungous vegetations, that had a cauliflower appearance. Nothing

* It appears probable that the tumour above described was a disease of the right ovarium.

could be seen upon examining the throat, and the disease was supposed to be spasmodic. 1*st*, This patient had had a convulsive action of the muscles of the throat, and, on attempting to swallow food, was threatened with suffocation: such attacks were at first only occasional. 2*d*, The patient became more and more emaciated, and (as in a case which fell under my own notice) there was considerable salivation. The breathing became much oppressed. A hissing noise was heard during inspiration. The difficulty in swallowing became greater and greater, and, when she did swallow, she was obliged to lie down in bed *.

Dr Baillie has described a case of fungus of the pharynx, which, when cut into, appeared to have a fibrous structure, disposed in some measure at right angles to the inner membrane, upon which it was formed: it was ulcerated on its surface.

Razoux has described what he calls a Fungous Tumour. "Nous trouvâmes une espèce de *fungus* d'un pouce et demi d'épaisseur, qui bouchoit exactement l'orifice inferieur de l'estomac; c'étoit une excroissance formée par plusieurs couches l'une sur l'autre, qui partoient toutes du pilore, comme d'une racine ou d'un pédicule commun, et venoient s'épanouir sur la surface de l'estomac. Ce *fungus* étoit composé de cinq à six couches assés distinctes d'une substance membraneuse et charnuë; elle étoit dure en certains endroits, et paroissoit presque calleuse†."

In ten cases, my Father found the mucous coat of the stomach or of the intestines in a fungous state, when before death there had been a discharge of a large quantity of black bile.

When the mucous coat has been reduced to this condition, it assumes a pulpy appearance, is much softer, thicker, and redder than usual, and very irregular on its surface.

The distinction between the sound and diseased part is generally very manifest, the latter having at its edges a puckered appearance.

These fungous tumours sometimes pass across the bowel

* I have seen several cases, in patients advanced in life, of tumours of the pharynx, where similar symptoms existed. The tumours were medullary sarcoma of various degrees of consistence.

† *Vide* Tables Nosol. &c. p. 279.

within which they are lodged; the colon is thus divided: the fungous tumours are of different sizes, some of them nearly as large as small walnuts.

Such fungous tumours, by obstructing the intestinal canal, occasion considerable dilatation above their seat.

This disease is as common in the smaller as in the larger intestines.

The fungous ulceration is sometimes of considerable extent. There is a specimen in the Museum of the University, in which it occupies the larger share of the rectum.

A fungous state of the mucous coat is sometimes observed in cases where albuminous matter has been deposited between the coats of the stomach, and still more frequently in cases of scirrhus, or cancer of the gullet, stomach, or intestinal canal *.

A similarly diseased state of the mucous coat of the gullet gives rise to difficult deglutition, with a sense of pain in the part, which is much augmented during the effort of swallowing even the mildest substances, and there is occasionally a bloody mucus spit up. These excrescences, when of large size, obstruct the gullet so much, that the patient in a short time dies of inanition.

This disease, when in the stomach, creates acute pain in the organ, with all the usual symptoms of indigestion, very frequent nausea, and vomiting occasionally of blood.

The fungus of the mucous coat of the intestines produces painful distention of the bowels, purging, and discharge of blood along with the fæces. On account of the great distention of the colon, and the size of the fungous tumours within it, as in the case from which Plate VII. of the former edition of this work was taken, the patient was supposed by my Father, at his first visit, to labour under a concretion within the colon. But on a more accurate examination, he was persuaded, from the softness and inequality of the surface of the tumour,

* Vide Plate IX. of former edition.

the almost constant pain, the great discharges of blood and pus by stool, and the emaciation of the patient, that there was a fungous excrescence of the mucous coat of the colon.

Such fungous tumours may frequently be traced to chronic inflammation of the membrane; and they are also the effect of organic diseases, as cancer, in progress to a fatal termination.

SECTION XIX.

OF MEDULLARY SARCOMA OF THE MUCOUS MEMBRANE OF THE STOMACH.

This tumour has been described by that very distinguished surgeon Mr Abernethy, as appearing sometimes externally.

I have met with several instances of this disease, in two of which (as in the specimen from which Plate VI. was taken), there were tumours somewhat of a similar description in the substance, and also on the surface, of the liver, which was very much enlarged. The lymphatic glands in the vicinity were considerably enlarged and indurated. This tumour is of a pulpy consistence, and a part of the pulp seems to be soluble in water.

This disease, which, at the time of the first publication of this work, was not generally known to the profession, may probably be illustrated more clearly by cases than by any description or narrative. I subjoin the histories of those which are contained in the Anatomical Museum of the University.

In case first, there is, at the cardiac extremity of the stomach, an extensive lobulated tumour of a medullo-sarcomatous nature, the lobes of which are covered with a delicate mucous membrane.

In the right lobe of the liver there are two scirrhous tubercles. The left lobe adheres to the cardiac extremity of the stomach; and at the attached extremity, there is a tumour, the centre of which is occupied by a sloughy, fungoid mass, extending through an aperture into the stomach. Symptoms: Countenance exsanguine, tenderness in epigastrium, vomiting, alternate constipation and diarrhœa, and emaciation. Patient a female, aged forty-six.

In case second, at the cardiac extremity of the stomach there is a large medullary fungoid tumour, of a light straw colour, covered by a delicate vascular membrane. The serous membrane of the diaphragm was much thickened, and intimately adhered to the left lobe of the liver, and to the stomach. The patient, a man of seventy-three years of age, had a sense of constriction in the throat, combined with difficult deglutition, which was relieved by the use of the probang. He also had cough, constipation, latterly diarrhœa, and became much emaciated.

In case third, the patient, a man aged forty-four years, complained of pain in the right hypochondriac and epigastric regions, which is much increased by pressure. There is considerable hardness and swelling in the upper part of abdomen, with tension and elasticity in the lower. Suffers much from nausea and retching, when the epigastrium is pressed upon. On examining the abdomen, immediately under the false ribs of the right side, there can be distinctly felt two hard circumscribed tumours, each apparently about the size and shape of a walnut. His urine is passed without difficulty, but only in small quantity. Appetite impaired. Has difficult breathing, accompanied with cough. Has much thirst. Tongue white. Bowels slow. Pulse natural. Headach sometimes severe. "Says, that, about five weeks ago, he felt frequent sharp shooting pains in the epigastrium, which were followed by the gradual enlargement of the parts."

An opening medicine was ordered, also a sinapism to the epigastrium.

Eighteen leeches next day were applied, with much abatement of the pain in epigastrium; but it is now felt in the lower

part of the abdomen, and he has not passed urine since last night. Two scanty stools. Pulse 80, feeble.

Feet and ankles were œdematous last night.

On the fourth day, urine under lb. ii. Abdomen continues tense. Countenance pale.

Pulse 72. Of moderate strength. Frequent shooting pains in the belly. Several loose stools from medicine. Anorexia. Tongue moist.

On the tenth day, emaciation increasing. In general he suffers much pain in what he calls "*two lumps*" in the epigastrium. Urine lb.iss.

Lower extremities more swollen, and fluctuation in abdomen obvious.

The debility increased, and the patient died on the eighteenth day.

On opening the abdomen, the liver appeared much increased in size. A number of large tuberculated tumours were found on its surface. Some of these, when cut into, were of a hard cheesy consistence, while others, more advanced, were in a state of suppuration. The abdomen contained about lb. xv. of serum.

The tumour represented in Plate V. was found connected with the cardiac portion of the stomach, the coats of which were somewhat thickened.

It may not be improper to add, that medullary sarcoma of the stomach is not always similar to the medullary matter of the brain, being sometimes more of a yellow, reddish or brown colour, and also that there is some variety as to the consistence of different parts of the tumour; the consistence towards the circumference being harder than that in the centre of the tumour, which may perhaps be owing to an imperfect suppuration going on in that part of the swelling, as, according to Mr ABERNETHY, happens when the primary disease is seated in the testicle.

There is also a coincidence between the external medullary sarcoma, and the internal, which grows from the mucous membrane; in respect that in both there is swelling and enlargement of the glands connected with the absorbent system.

MEDULLARY SARCOMA OF THE CARDIAC PORTION OF THE STOMACH.

PLATE V.

Explanation
AA *The tumour*
B *The Pylorus*
C *The Duodenum*

Dr Savage Pinxt

W.H. Lizars Sculp.

In one of the specimens in the Museum, the mucous membrane of the stomach is ulcerated, and there were melanotic depositions on it; and there is a large irregular opening in the stomach communicating with the centre of a medullo-sarcomatous tumour of considerable size, which occupied the whole of the smaller curvature of the stomach.

Medullo-sarcomatous tumours, of a harder description, sometimes grow from the mucous membranes. I have in my possession a specimen of this description, which grew from the pharynx, and proved fatal, by obstructing respiration and deglutition *.

I received from my late pupil, Dr GEORGE WYLIE, of Paisley, the following valuable communication:—

"ROSEANNE GRAY, aged eleven, of a lively disposition, ruddy complexion, with dark hair and eyes.

"During the earlier part of the spring of 1810, this girl was much exposed to cold whilst sitting at work, and constantly complained of a chilliness. About the end of March she complained of a pain in the head, and especially in the left ear, accompanied by giddiness, which were much increased by exercise. She became weak, and of unhealthy appearance, and for three weeks in April was confined to bed. During the summer months, she was now and then so free from her complaints, for a few days at a time, as to be able to stir abroad.

"About the middle of August, her relations first observed that she spoke less distinctly.

"About the end of September I first saw her. She complained of pain in the head and left ear, and giddiness; her deglutition and speech were impaired; the mouth was a little distorted to the right; she breathed none through the left nostril; heard less distinctly with the left ear; and the eye of that side was so full that the eyelids could not completely cover it, yet she saw equally well with them both. She was much emaciated; had little appetite, and was costive; pulse small, frequent, and weak.

* Medullary sarcoma differs considerably in colour, consistence, vascularity and form in the greater number of cases.

On looking into the mouth, a tumour was observed to be situated partly behind, and to the inside, of the backmost grinder on the left side of the upper jaw; its base extended to the gum before, and to the velum palati behind, stretching to the right as far as the suture which joins the palate bones. It was about the size of a small nutmeg, and had a groove or depression alongst its middle from before backward. When pressed it was slightly elastic, and had so much the appearance of an abscess as to be repeatedly mistaken for one. It was a little moveable; and when moved, gave a sensation similar to that felt from moving a small hard steatoma.

" Laxatives were prescribed, which greatly amended the general health.

" The patient was not again brought to me till the 13th of November. The tumour had increased rapidly, and had become as large as a pippin, was immovable, and so completely filled the fauces, that liquids were swallowed with great difficulty. It was connected with the gum of the backmost grinders and the tonsil of both sides, and completely hid the velum and uvula. It was larger on the left side, and, from its great projection, depressed the root of the tongue, so as to give the appearance externally of a tumour above the pomum Adami. By depressing the tongue with a spatula, the uvula was seen to be pushed toward the right, and depending from the posterior part of the tumour. The right half of the tumour was firm, the larger or left half was a little elastic.

On the 16th, a small oblong superficial ulcer appeared on the fore part of the tumour; a second was in a few days formed by the pressure of the under molaris of the left side; neither of these gave any pain, and they discharged very little; the first healed in a short time. More than the usual quantity of saliva was secreted; and, from the difficulty of deglutition, it almost constantly ran from the mouth.

" On the 20th the tumour was observed to be larger; and the patient breathed and swallowed with extreme difficulty. Inspiration became more difficult in the horizontal posture, especially during sleep, and she was frequently awaked suddenly

by it, and had recourse to the semi-erect posture, like one in a paroxysm of asthma. In a consultation, it was agreed that extirpation should be speedily resorted to, for the following reasons: The tumour, though fixed, was at first moveable; from its rapid increase the patient must in a short time have died from inanition or strangulation; the operation would at the least produce a temporary alleviation: And a case occurred lately, in which a similar tumour was removed with success.

"21st, Betwixt the hours of one and two P. M. the tumour was removed by incision, after being freed from its attachments to the gum and tonsil on the right, and the cheek, gum, and tonsil on the left side. The velum and uvula were removed along with it, which exposed to view a tumour nearly as large as the first; they were connected at their bases, and seemed to be only one tumour with two lobes. This posterior lobe hung, from its attachment behind the velum, down into the pharynx. The effusion of blood from the wound was trifling; the pulse 120, and weak. Feeling weak and much exhausted, she was put to bed, with the intention of waiting till she became stronger before any thing further should be attempted.

"The tumour being cut into, was found to be of the sarcomatous kind; very like gristly fat in texture, but of a rather whiter colour.

"About an hour after being put in bed, the patient was alarmed by an oozing of blood from the wound; this increased very fast, and before assistance could be got she had lost a great quantity of blood. She had swallowed a considerable quantity of the blood; had little sleep during the night.

"On the 22d she complained much of sickness, and a burning pain in the region of the stomach, and vomited some dark grumous matter. She swallowed with ease, and spoke tolerably well. Pulse frequent and weak; slept a little. She obstinately refused to take any wine.

"23d, She vomited some more of the dark grumous matter; and passed something similar by stool, which greatly relieved the cardialgia. Took some beef-tea and panada for food; slept well. The wound had a putrid disagreeable smell. She be-

came quickly stronger, and continued entirely free from pain. The caddis was removed from the wound on the 26th, and the mouth was ordered to be washed with a watery solution of myrrh. Was able to sit up out of bed on the 27th; her belly being bound, she had four grains of calomel, which relived her. The pulse was good; she slept well, and was still free from pain, and amending.

On the 29th, she was able to walk about the house without support. Her appetite and sleep were good. She breathed easily by the mouth and right nostril. The discharge from the wound, which for the first two days after removing the caddis smelled considerably, had become free from fetor.

" December 3d, The face, especially the left side, was much swelled, and occasionally flushed. The tumour hehind the velum had increased much. Externally a small conical tumour, hard and immoveable, was observed projecting from below the mastoid process of the left temporal bone. She began to hear less distinctly, and was frequently seized with faintness: was confined to bed.

" On the 4th took an opiate to relieve the pain. She dozed much during the day, but had little sleep at night. Difficulty of breathing returned during sleep. Being costive, she had two drachms of castor oil, which operated several times, although part was rejected by vomiting. The pulse was 120, full, and pretty strong. She was relieved by the purgative.

" The tumour behind the velum and the base from which the anterior one was removed, increased rapidly; and the ulcerated surface discharged a fœtid clear matter, which became the less fœtid the smaller the quantity.

" The tumours increased rapidly, and of consequence respiration and deglutition were proportionally more difficult. She dozed constantly, unless when tormented with pain. As soon as she at any time fell asleep, her breathing became more laborious; the difficulty increased with every breath she drew; she awoke almost suffocated, and stared wildly around her: after drawing a deep sigh or two, she breathed short, was bedewed with perspiration, and only recovered to a distressful repetition of such paroxysms.

" She died on the 27th of January 1811.

" *Dissection.*—By sawing through the inferior maxilla at the middle, and turning back the left half, after dividing its muscular connections, the tumour was fully exposed to view. It now appeared to fill the whole of the throat and pharynx. Its base was attached to the palatal plates of the palate bones, to the left of the pterygoid process of the sphenoid, and the point of the petrous portion of the temporal bone, where the eustachian tube issues. Its left side grew to the cheek, the gum, and tonsils, and sent a sharp process to occupy the space betwixt the angle of the jaw and the mastoid process. Its posterior surface was connected by cellular membrane, to the back of the pharynx. As it passed the nostrils, it sent a process into each; that into the left was bloody. Upon opening the cranium, the base of the tumour was observed to have obliterated the extremity of the os petrosum and corresponding portion of the sphenoid bone, causing the dura mater over the cavernous sinus to be elevated as high as the clinoid processes. The left nervus trigeminus could not be traced after it pierced the dura mater. The hole which the tumour had made in the bones was roundish, with sharp and rough edges; and was large enough to admit the point of the forefinger. The tumour seemed to have no connection with the orbit. About an ounce of water was found in the ventricles of the brain.

" The tumour, at its attachments, was firm and almost cartilaginous; but its apex, which rested on the gullet, was soft and friable. The processes which were in the nostrils were as soft as brain."

SECTION XX.

OF MELANOSIS OF THE STOMACH AND INTESTINES.

Melanosis of the stomach is sometimes combined with ulceration and fungus hæmatodes of the mucous membrane; but this is an accidental, and not a constant appearance.

This disease bears some resemblance to purpura.

The deposition of a black matter on the alimentary canal has occasionally been observed. It is not peculiar to any one tissue, and I consider it to be secreted by the vessels proper to the part.

The quantity secreted is very various: sometimes it appears in patches upon the coats of the bowels, and at other times there is a small quantity of this black fluid mixed with the contents of the bowels.

Dr HENRY has analyzed with great care the melanotic fluid, and has published the following report as to its nature:

"1st, By filtering through paper, much of the colouring matter remained on the paper, and the colour of what passed through was much less intense.

"2d, Boiling does not destroy the colour, nor even when a little caustic potash has been added.

"3d, It is not changed by acids, even when heated, except by nitric acid, which deprives it of its black colour, and turns it yellow.

"4th, A stream of chlorine passed through the liquid destroys the black colour, and throws down light fawn-coloured flocculi.

"5th, A few grains of corrosive sublimate stirred up with the fluid, precipitates the whole of the colouring matter, and leaves the supernatant liquid quite clear.

"6th and 7th, Nitrate of mercury and muriate of tin produce the same effect, but more slowly.

"From these experiments it appears that the black matter is a peculiar secretion, analogous in some properties, especially in the 5th, 6th, and 7th, to the colouring matter of the blood. It would be necessary, however, to repeat and extend the experiments on a larger quantity of the fluid, and in a more recent state, before any just conclusion can be deduced respecting its nature."*

* Vide Observations on Melanosis in my Elements of Anatomy; and also some excellent observations on this disease which have been published by Mr FAWDINGTON. London 1826.

In conclusion, it may be remarked, that melanosis is, in some instances, a very extensive disease, and common, at the same time, to the bones as well as to the soft parts of the head, thorax, abdomen and pelvis *.

Two striking illustrations of this fact are to be found in the Museum of the University. The cases occurred to my learned colleagues Drs Home and Alison.

In the first case, the patient, a male, aged fifty-one, had formerly a painful disease in the right eye, for which it was extirpated; afterwards he suffered severely from rheumatism; and, a month before death, he had had severe pleuritic symptoms. Upon dissection, a number of black globular bodies were found in the cellular tissue, between the pectoral muscle and third and fourth ribs of left side, some adhering to the periosteum. Similar bodies were imbedded in the subcutaneous cellular tissue of the chest and abdomen, and among the fibres of the intercostal muscles. The substance of the rib itself, and sternal portion of the clavicle, were completely black, but, in other respects, natural. The pleura was studded with similar bodies, many of them congregated, so as to resemble clusters of purple grapes. Some had long slender necks, like pedunculated polypi; most of them were jet black; some were of a deep purple or reddish colour; and others contained portions of white matter. Several black tumours were connected with the lungs; and some small ones were seen under the mucous membrane of the bronchia, in the pericardium, substance of the heart, liver, spleen, kidneys, peritoneum, omentum, skull, and on the pericranium †.

In the second case, the ovaria were greatly enlarged; their surface had a shining mottled appearance, from deposition of small lobules of melanotic matter, of a uniform black colour, and soft consistence; beneath the peritoneal coat the cellular tissue was condensed and vascular. In various parts of the body, small encysted tumours, containing dark pulpy matter,

* In this disease the bones are affected almost invariably through the medium of the periosteum.

† See Edin. Med. Chir. Trans. vol. i. p. 204.

were seated in the subcutaneous cellular tissue. The peritoneum lining the parietes of the abdomen was of a dark colour, from an irregularly striated deposition of melanotic matter. The omentum was similarly diseased; and also the cellular tissue of the mesentery, peritoneum of intestines, kidneys, liver, spleen, pleuræ, lungs and pericardium. The sternum, anterior portion of ribs, parietal and occipital bones, with inner table of skull, were black, brittle, and softer than usual. There were dark striæ on the membranes at the base of brain. Patient, aged forty-two, had had ten children.

The symptoms during life were the following:—A circumscribed moveable swelling occupied the lower part of the abdomen, which was painful on pressure. There were several small, slightly painful, tumours, perceptible beneath the integuments of abdomen; the patient also suffered severely from lancinating pains in the loins, abdomen, and extremities, which were increased by motion, and during the night; she had also febrile symptoms, and ultimately hectic; urine scanty; amenorrhœa; had occasional dyspnœa; copious expectoration; and occasional vomiting of dark coloured matter. The above symptoms were of ten weeks' duration, and followed exposure to cold.

In short, this disease is common to all the parts of the body.

The black matter assumes different shapes, being deposited on the surface of the different membranes, in the form of tumours, of various sizes, some of which are encysted, but others have no distinct cyst; and it also appears in a state of infiltration in various organs.

I have also seen melanotic tumours on the surface of the body. In one of these instances, the patient was an old woman, of a dark sallow complexion, and there was every reason to suspect that her liver was diseased.

There are no symptoms which are peculiar to melanosis of the internal parts of the body *.

* The disease is not uncommon in old grey horses; but I have not seen it in other quadrupeds.

SECTION XXI.

WARTY EXCRESCENCES.

Warty excrescences sometimes, though rarely, grow from the mucous membranes of the gullet, stomach, and intestines.

These are nodulated, hard tubercles.

They sometimes grow from the mucous membrane of the larynx, and create suffocation; or from the gullet, and occasion difficulty in swallowing. They sometimes also occur in the mucous membrane of the gullet, stomach, and intestines, bladder of urine, and womb. I suspect that small tubercles of mucous membranes, which are fissured, have often been mistaken for warts.

SECTION XXII.

OF THE DEPOSITION OF CARTILAGE AND BONE ON THE MUCOUS COAT OF THE ALIMENTARY CANAL.

A SMALL portion of the coats of the alimentary canal has been occasionally converted into cartilage, and even into bone, or cartilaginous tumours have grown from them: Such organic derangements are most common in the gullet *, or in the rectum

* METZGER, in his Advers. Med. p. 176 and 177, has thus described an ossification of the gullet. The patient, a postilion, who was much addicted to dram-drinking, lost the power of swallowing solids, and at length even fluids would not pass: "Discisso per longum canali (œsophago) parietes non solum *ossefactos*, sed et crassitie plurimum auctos cernere erat; et quod rei caput est, villosa nervea, ac duplex musculosa œsophagi tunica, cum cellulosa circumjacente, ab organica sua structura ita degeneraverant, ut unam eamque inorganicam ostenderent massam.

"Vicinæ glandulæ ex conglobatarum genere duræ erant et atræ."

Dr WALTER, of Berlin, has described, in his Catalogue, No. 1536, a still

or colon. Cartilaginous formations generally appear in the shape of small irregular tumours, which grow from opposite sides of the part affected, entrench upon the cavity of the rectum, and act somewhat like valves.

De Haen has described an osseous deposition in the stomach *.

Dr Short † described a bony deposition in the colon and rectum.

A well marked case occurred to Dr Webster ‡, in which an osseo-cartilaginous tumour was attached to the vicinity of the pylorus, one of its extremities passed like a stopper into the pylorus, and prevented the egress of the contents of the stomach, in which there were some marks of inflammation.

The deposition of bone within the womb has been described by Baillie, Lettson,‖ and Mackie.§

This organic derangement seldom proves fatal, until it has made considerable progress, and involved all the coats of the part affected. As the ossification of muscles is much more frequent than that of mucous membrane, I am disposed to conclude, that the disease in the alimentary canal begins in the muscular rather than in the mucous coat. This species of disease causes constriction, and gives rise to considerable expansion of the parts above the seat of the disease. Symptoms of inflammation in the mucous coat, and sometimes ulceration of a malignant species, which is frequently succeeded by erosion, and considerable destruction of the neighbouring parts, occasionally take place.

more remarkable case in these words: "Pharynx cum œsophago quatuor pollices supra cardiam præter naturam angustato, et in cujus superficie interna, undecem lineas infra hanc angustationem, concrementum osseum unum et dimidium pollicem longum, decem lineas latum hæret. E. quinquagenario."

* Vide Rat. Medend., tom. iv. cap. 1.

† Vide Short, Edin. Med. Essays, vol. iv.; also Com. Leipsic, tom. xx. p. 317; also Gion de Letter, tom. xxi. p. 143.

‡ Vide Dr J. Johnson's Medico-Chir. Review. New Series. Vol. viii. 1828.

‖ Mem. of Med Society, vol. v. § Med. and Phys. Journal.

OF THE SYMPTOMS.

METZGER's case above quoted gives a good idea of the symptoms of this organic disease of the gullet.

Dr WEBSTER's patient laboured for some time under dyspepsia, accompanied by costiveness, and shortly after, was seized with excruciating pain in the stomach.

He died twenty-two hours after the commencement of the attack.

When the intestines are in this morbid state, the patient suffers pain, and also has a sense of fulness and weight in the diseased part; the pulse is quicker than natural; there is an almost complete obstruction to the passage of the fæces, so that they are discharged only after the exhibition of the more active purgatives, and, in consequence of the continuance and increase of the obstruction, inflammation of the intestines, and death follow.

The following are the concomitant symptoms of the cartilaginous stricture of the rectum:

Slight difficulty of making water is sometimes the earliest symptom; this is followed by nausea, impaired digestion, colicky pains, tenesmus, and habitual costiveness. The fæces have not their usual size and shape, but resemble small earth-worms, and a considerable effort is requisite to expel them; and, when the patient is very costive, blood is sometimes discharged with the excrement, together with a quantity of fœtid mucus, or purulent matter.

As solid fæces cannot pass through the stricture, the contents of the intestines are discharged in a liquid form only.

The nature of the disease may frequently be ascertained by the finger in ano, or by the bougie, the introduction of which generally creates very considerable pain.

This disease sometimes gives rise to fistula ani.

SECTION XXIII.

OF SCIRRHUS AND CANCER OF THE ALIMENTARY CANAL.

These disorders are by no means rare in advanced life.

It has not yet been fully determined, whether scirrhus begins always in the mucous coat, or the mucous glands. The specimens of this disease which I have examined induce me to adopt the latter hypothesis. Some of these glands do not at first much exceed their natural size, they rapidly become larger, and compress the mucous coat. In favour of such an opinion, it may be observed, that the disease is most common in those parts of the alimentary canal, where the mucous glands are abundant, as at the cardia, pylorus, caput cæcum coli, and rectum.

The disease is propagated from the mucous glands to the submucous cellular substance, which attains an unnatural thickness and hardness, being converted into a dense, tough, yellow substance, through which fibres of a cartilaginous appearance pass transversely.

By this disease, the alimentary canal is more or less contracted, and, in a few rare cases, has been nearly totally obstructed.

The diseased portion has a contracted and irregular form, generally adheres to the neighbouring parts, and, when pressed, feels hard and heavy. Scirrhus is commonly limited to one part of the intestinal canal, but sometimes it pervades a considerable portion of the stomach or of the intestines.

The peritoneal coat, in this disease, resembles the coarser kind of parchment, and, in some cases, acquires the transparency of horn.

The fibres of the muscular coat are seldom to be seen, and, when visible, are generally of a paler colour than natural, and

are separated from each other by cartilaginous septa of different thickness; but I have never seen cysts filled with a bloody fluid, similar to those which so frequently are observed in cancer of the mamma or testicle.

The cavity of the stomach is very much diminished by a scirrhous thickening of its tunics; and most frequently the disease is limited to the cardiac and pyloric portions of the organ, and sometimes the same disease extends to the neighbouring parts.

In a specimen in the Museum of the University, the stomach is small, and the pylorus scirrhous, above which, there is a tumour apparently composed of tubercles, similar to those found in the liver of the same patient. Above the tumour, a portion of the stomach is ulcerated and elevated. The patient, a female, æt. 51, had laboured under tuberculated liver; the tubercular masses were scirrhous, white, fibrous, somewhat granular, and unencysted. The larger portions seemed to be formed by the aggregation of small round tubercles.

The rugæ of the stomach generally are much thickened, and frequently a number of tumours grow from them.

In many cases, the disease is generally slow in its progress, and a considerable time elapses before the scirrhous tumours have attained so considerable a bulk as to obstruct the cardiac or pyloric orifices of the stomach.

But, in other cases, the progress of the disease is much more rapid, and it speedily proves fatal.

In some cases of scirrhous stomach the adhesive precedes the ulcerative process; thus life is maintained, though the coats of the bowel be destroyed by ulceration.

If the scirrhus be so situated as to interrupt the passage through the alimentary canal, as at the cardia or pylorus, the parts above the stricture generally become prodigiously enlarged, and at first much thickened, but after a time they become thinner, and even ulcerated, and at length perforated, by which a communication is established between the seat of the disease and the neighbouring parts. There is in some constitutions so great a tendency to scirrhus, that the disease extends to the

neighbouring parts, as from the cardia and pylorus to the stomach, or from the cardia to the diaphragm, or from one bowel to another, or from the stomach to the liver.

There is much variety as to the thickness of the coats of the affected part, as to the proportion of cartilage in the tumor, and also in the appearance of those which grow inwardly, as when the disease affects the mamma, testes and hips.

I shall describe these varieties as they occur in the stomach.

1*st*, We observe an universal and unnatural thickening and hardness of the coats of the stomach, sometimes only at, and in the vicinity of, the pylorus, which somewhat resembles the os uteri, and the thickness is, on some occasions, much greater on one side of the pylorus than the other; hence the passage through the pylorus is not direct, the thickened portions acting somewhat like valves, and obstructing the passage to a greater or less degree. There is, in such cases, a stratum of a yellow dense substance, between the muscular and villous coat. There are transverse white lines of a cartilaginous hardness, passing through the muscular coat, to be seen on making a section of it. The rugæ, on the internal surface of the stomach, are much thickened, enlarged and indurated.

Scirrhous tubercles are frequently observed in the liver in such cases.

2*d*, The mucous coat of the stomach has sometimes been studded over with a number of processes of a cartilaginous consistence.

We sometimes observe a hard tumour lying transversely across the pylorus, the parietes of which are very much thickened, and crossed by thin cartilaginous striæ.

The coats of the stomach become rather thinner than in the healthy state, and acquire such a degree of hardness, as to resemble cartilage.

3*d*, In the third variety, there are one or more circumscribed tumours of a rounded form, with narrow necks, growing from the muous coat of the stomach, that, in some cases, attain the

size of a small orange, and which exhibit the genuine scirrhous structure, and these tumours so completely obstruct the pylorus that the stomach, filled with its liquid contents, may be compressed without any part of the liquid escaping into the duodenum.

From the duration of the disease, the scirrhous part becomes softer and ulcerated in the centre, and we sometimes meet with, within the stomach, apertures of one or two inches in diameter, which are bounded by a distinctly scirrhous and ulcerated portion.

4th, There is often a fungus from the ulcer, which has ragged, unequal, and retorted edges. The ulcer is then said to be in a cancerous state, and this sometimes extends over a considerable portion of the stomach.

In some instances the coats of the stomach are eroded by the ulceration, so that the bowel communicates with the cavity of the abdomen, and sometimes with the navel. We also occasionally, though rarely, meet with, at the same time cancerous ulceration of the duodenum.

The lymphatic glands, in the smaller curvature of the stomach, are generally also scirrhous or cancerous, and often considerably enlarged.

OF SCIRRHUS AND CANCER OF THE GULLET.

Scirrhus of the gullet is generally limited to the cardia, which seems referable to the greater number of glands in that situation.

But scirrhus sometimes pervades every part of the gullet. Ulceration frequently occurs above the seat of the disease, after it has lasted for some time; thus, a communication is sometimes established between the gullet and the trachea, which speedily proves fatal.

I subjoin an interesting case from my father's case-book :—

" The patient, an old lady, had had sore throat twenty years ago, and before recovering from it she had (to employ her own phrase) strained her throat, and soon afterwards she felt pain and difficulty in swallowing, which has increased till she could swallow liquids only, and these with difficulty. She suffered acute pain in her throat, and felt as if it was much swollen. Her voice was much affected, and even speaking was painful to her.

" She died, at length, completely exhausted.

" Upon examining her throat, the bottom of the pharynx, and beginning of the gullet, were found to be thickened, and so much constricted, for the length of an inch, as scarcely to admit a goose-quill. The internal membrane of the whole right side of the cornu of the thyroid cartilage, to the top of the gullet, was eroded, and a hole was found in it which led to a sac, on the right side of the larynx, extending down to the thyroid gland, part of which was corroded, and the corrosion seemed to be of a cancerous nature.

" The matter from this sac had probably got into the pharynx by the hole above mentioned, which was a little below the upper and posterior process of the thyroid cartilage. The right arytenoid cartilage was much thickened, and the back part of the cricoid, yet the arytenoid cartilage was moveable upon the cricoid. The root of the epiglottis was also thickened. A small white indurated point was observed on each of the ligaments of the larynx."

Scirrhus and cancer, beginning in the neighbourhood of the gullet, sometimes extend to it, or from the gullet to the neighbouring organs.

I had occasion to visit an old lady, whose under lip, uvula, and pharynx, had become scirrhous.

The scirrhus, which had begun in the gullet, extended to the diaphragm and the stomach.

The following appearances were discovered on dissection :—

The gullet was preternaturally enlarged, thickened, and hard, and, for the space of an inch, so much contracted, as scarcely to receive a goose's quill.

Three scirrhous masses, about the size of olives, imbedded in

the cellular substance between the coats of the stomach, had occasioned the stricture. There had existed in the constitution of this patient a strong tendency to cancer, for the cardia, smaller curvature of the stomach, diaphragm, pancreas, and uterus, were similarly diseased.

The eighth pair of nerves were larger than usual, and flattened, where they passed over the scirrhous masses at the cardia *.

The dorsal vertebræ and intervertebral cartilages, have sometimes also been involved in the more inveterate cases of this disease.

OF THE SYMPTOMS.

Pain, and an inability to swallow solids, are the earlier symptoms of this disease; and, after a time, even fluids are arested in their course downwards; they remain for a short time in the gullet, and, by distending it, create a sense of suffocation, until ejected through the nose and mouth, by an inverted action of the tube; the patient is thereby much relieved, and the re-remainder passes down with a gurgling noise, like water flowing through a contracted passage.

The degree of obstruction is different in different cases, and in some is so great as to shut up the passage completely.

The following case, communicated to me by Dr Home, gives a good idea of the effects of scirrhus, when situate in the under part of the gullet:

The complaint began in the fifth month of pregnancy, with a slight pain in the epigastric region, and distention of the stomach.

A few days after delivery, the patient was seized with a difficulty in swallowing. In a few months she could swallow nothing but liquids, or bread soaked in milk or water, and not without a considerable effort. What she attempted to swallow passed no farther down than the middle of the chest, where she

* *Vide* Plate VI.

felt it stop; sometimes it remained in that situation only for a few minutes, at other times it stuck there for many hours; the greater part of it was then returned by an inverted action of the œsophagus, and sometimes even the small quantity of food which reached the stomach was rejected by vomiting, almost unchanged.

When she lay on her back, or in any other posture, except half-inclined to the right side, she experienced the same sensations in her bowels as a person does in a limb, when it is said to be asleep; which sensations left her when she assumed any other position; she complained of pain and distention of stomach. Her body was much bound, she having had only one evacuation in eight days.

In that miserable state she lived for four or five months, and at last was unable to force any thing beyond the pharynx. She became, a few days before her death, so weak, as to be unable to speak for any time without being exhausted. Her death seemed to have been the effect of inanition.

Her body, as might have been expected, from the small quantity of food she could swallow, was much emaciated.

A probang passed readily to the middle of the gullet, but no farther.

The preceding symptoms led to the suspicion of stricture in the gullet, and the examination of the body after death shewed that those suspicions were well founded*.

Some patients afflicted by this disease, swallow with great difficulty at particular times, and suffer much from what they call a constriction in the throat, that give the sensation of suffocation, which possibly may be owing to the spasmodic being combined with the organic stricture: there are others who are thrown into convulsions during the effort of swallowing.

Towards the termination of the disease, pus is ejected, a proof that there is ulceration of the gullet.

* *Vide* Plate V.

OF SCIRRHUS AND CANCER OF THE STOMACH.

Scirrhus and cancer are more frequent in the stomach than in the gullet, and are partial or general, and sometimes combined with similar diseases of the gullet, or of the colon, which adheres firmly to the stomach.

The capacity of the stomach is commonly much diminished by scirrhus affecting the body of the organ, its coats being much thickened, and sometimes a scirrhous tumour projects into its cavity. I measured the quantity of water such a stomach would hold, and found that it was capable of containing little more than four ounces.

The pylorus is a more frequent seat of cancer than the body of the stomach, or the cardia; and the disease, when much advanced, by obstructing the progress of the aliment, occasions an enlargement of the stomach, which, on account of its increased size and weight, when filled, descends in many cases lower than in the healthy state; in some cases it preserves its transverse position in the abdomen, but in others, the cardia retains its natural situation, whilst the pylorus sinks as low as the navel, and may be distinguished there during the life of the patient; and, when in that unusual situation, it has, on account of its hardness and mobility, been mistaken for scirrhus of the colon, an intestinal concretion within the intestine, a tumour in the omentum, or an enlarged mesenteric gland.

The distended stomach is sometimes connected with the pancreas; and, in one case, communicated with a cavity in the pancreas *.

A scirrhous contraction of the pylorus is often accompanied with ulceration, and perforation of the mucous membrane of the stomach, and often, also, with scirrhous thickening of the pyloric portion of the stomach.

In a specimen of this description in the Museum, the pylorus is much contracted, and there is internally a fungous tumour;

* *Vide* Printed Catalogue of the Anatomical Museum of the University.

and in the vicinity of the pylorus there is an oval opening, and also another opening at the cardiac extremity of the stomach, which has thin smooth edges.

In this disease the mucous membrane of the stomach is more vascular than usual, and upon it there are often small extravasations of blood.

Such a diseased stomach generally contains a very offensive gas, and also a quantity of dark-brown or black fluid.

The lymphatic glands, in its smaller curvature, are commonly considerably indurated, and often considerably enlarged.

SYMPTOMS OF SCIRRHOUS PYLORUS.

The symptoms of scirrhous pylorus may be divided into three stages.

Those of the first stage are indigestion, acidity of stomach, sense of weight, oppression, nausea, and constant pain in the organ, which is on some occasions very acute.

The bowels generally are much constipated, but are sometimes alternately loose and constipated, and the patient becomes somewhat emaciated.

Occasional doses of ipecacuanha, followed by bitters, afford temporary relief in this stage of the disease.

The symptoms of the second stage, which come on at very different intervals, and frequently not until the lapse of four or six months, are, a sallow complexion, sunk eyes, considerable emaciation, disturbed sleep, great pain and acidity, and occasional vomiting; and the contents of the stomach are mixed with a viscid sour mucus, which is sometimes very acrid, and the food on some occasions is rejected, almost unchanged. After meals these symptoms are aggravated; the pulse is generally quick and feeble, and ranges between 90 and 110 in the minute.

The swelled and indurated pylorus may frequently be perceived by external examination, as it has descended lower than usual, and the food being retained within the stomach for a considerable time, that organ becomes much distended, and an evi-

dent fluctuation of its contents may be perceived, by careful examination.

When vomiting takes place during the scirrhous state of the coats of the stomach, it is produced by the action of the abdominal muscles solely.

Some patients also suffer more when they lie upon the left than upon the right side, as in the case from which Plate VI. was taken, and was probably owing to the pressure of the diseased cardia on the nerves.

When the pylorus has become ulcerated, there is, in some cases, no nausea or vomiting, which is probably to be imputed to the contents of the stomach passing readily into the duodenum.

The scirrhous pylorus sometimes attains such a bulk as to be a cause of jaundice.

The following symptoms render it probable that the disease has arrived at the third or ulcerated stage.

Hectic fever, great anxiety, excruciating burning pain in the region of the stomach, much increased on the taking of food. The matter discharged by vomiting has a very offensive smell, and is of a brown-black colour, like coffee-grounds. This brown colour is owing to an admixture of blood, which is derived from the small bloodvessels of the villous coat of the stomach, that have been eroded by the cancerous ulceration; but it is necessary to add, that this dark coloured vomiting occurs in other diseases of the mucous membrane of the stomach.

In some cases, large quantities of coagulated blood and pieces of membrane have been vomited, probably in consequence of the erosion of a large vessel; the disease, however, generally proves fatal before it has extended so far as to ulcerate any of the large bloodvessels of the stomach. Some patients, however, survive the hæmorrhage, and die rather from the repeated loss of blood, than from the great expenditure of that fluid at any given time, and, in the case recorded*, 12 lb. were vomited in the space of two hours, and the patient recovered.

* Phil. Trans. vol. xxxvii.

The following case affords a good illustration of the preceding remarks:—

A man, 57 years of age, who had been for many years subject to stomach complaints, fell down in a state of insensibility.

Upon recovery, he discharged, by vomiting, a quantity of blood, and also passed clotted blood by stool for some weeks.

In about six months, the vomiting returned, and with increased severity; at last, after having suffered in the course of one night six successive fainting-fits, followed by vomiting of blood, he suddenly expired. On examining his body, several coagula, and about 2 lb. of fluid blood were found within the stomach.

The orifice, or orifices, from which the blood had been discharged, could not be discovered.

An extensive cancerous ulcer occupied the whole of the left sac of the stomach.

In this disease, owing to the small quantity of food which passes the pylorus, the discharge by stool is very trifling, and somewhat resembles the meconium of infants.

Clysters are generally required to procure a passage, and often even the most drastic purgatives.

After the disease has arrived at its third stage, every kind of food except milk, gruel, soups, jelly, or sago, aggravates the very acute pain in the stomach. I visited a patient in this state, who could take nothing else than tapioca, during the latter weeks of his life; and there are some who reject almost instantly every kind of food.

From the duration of the disease great emaciation and weakness follow.

The vomiting commonly ceases a few days before the patient's death.

The pulse, towards the conclusion of the disease, is generally from 96° to 100°, or 110°, and very weak, and small.

There is much variety as to the severity of the symptoms and the progress of this disease, and also as to the pain the patient suffers. In some instances the appetite is good, the bowels

are regular, and the symptoms so obscure as to be scarcely distinguishable, while in others they are nearly similar to those of dyspepsia, and the disease is slow in its progress. The above remarkable fact may probably be owing to diseases of a different description being mistaken for cancer, as the genuine cancer is always accompanied by acute lancinating pain, when the disease has made some progress. Many afflicted by this disorder have intervals of ease for weeks, who occasionally suffer much from acute pain in the stomach, and severe vomiting.

In the progress of the disease, the intervals of ease become much shorter, and in consequence of the acute pain and imperfect nutrition, the patient dies at length completely exhausted.

The following case, written by Mr Tytler, surgeon, conveys a very impressive and correct idea of the nature, progress, and consequence of scirrhus of the pylorus, when the disease has assumed an aggravated form :—

August 18. 1781.—" J. B. ætat. 58, of a thin spare habit, and tender constitution. During all his life has been distressed with the heartburn, and, of late years, this has been accompanied with excruciating pains in his bowels, borborygmi, acid eructations, costiveness, and indigestion. Acrid fluid, colourless and thin as water, frequently runs from his stomach for hours together, and never fails to increase his complaints. This symptom is of a long standing, and generally accompanied with an increase of costiveness. Has occasionally a voracious appetite, and irresistible longing for particular kinds of food, which he knows he cannot digest. Such as salt and smoke-dried salmon, hams of all kinds, dried fish, rich sauces, melted butter and vegetables, which never fail to increase his heartburn, and pain in his bowels, even though taken in very small quantity. About two months ago, his symptoms suddenly became more violent, without a cause, the discharge of water from his stomach by the mouth became perpetual, and continues so, insomuch, that a large basin is filled by it once in twenty-four

hours, and he gets very little rest in the night. This liquor is of so acrid a nature, that his lips, palate, throat, and probably the œsophagus, are swelled and ulcerated. He is distressed with frequent vomiting, excessive thirst and costiveness, which is removed by doses of salts, which generally abate his symptoms for a few days.

Emetics and the use of Tinct. Sacr. procured him long intervals of ease for a number of years. What he throws up at present is exceedingly acid, and so hot, that, during the operation of the vomit, he feels as if a live coal were in his breast. Pulse weak, but slow and regular.

" In summer 1779, after a severe paroxysm of his disorder, he was suddenly seized with a vomiting of thick dark coloured matter, resembling coffee grounds, which continued about twenty minutes, accompanied by great prostration of strength, paleness of the face, &c. But these symptoms soon left him after the vomiting ceased. By a dose of salts and manna, a considerable quantity of the same dark-coloured matter were discharged, and after that his complaint abated for several months.

" *August* 20.—After a severe paroxysm of his stomachic disorder, he fainted when walking in the fields, and immediately threw up a large quantity of the same kind of dark coloured matter that he had vomited two years before. Continued very weak and feverish all day, and at night took of laudanum gutt. xx. which seemed at first to give him some relief; but about midnight, the vomiting returned with much greater violence than at first, insomuch, that he lay for some time without sense or motion, was so weak as to be unable to rise, or even turn himself in bed after he recovered from the faint, and could take no sort of nourishment. At the same time, the pains in his bowels were most excruciating, and the discharge of clear matter from his mouth perpetual.

" The discharge of clear matter and the vomiting never left him a single day (though sometimes better and worse), from August 18th to the time of his death, which happened the 28th of December following. Some days, in the forenoon, the

watery discharge would stop altogether, but about an hour after dinner, it began with great violence, and he cried incessantly from the pain in his bowels. In a little while after the vomiting came on, and continued, with very short intervals, till bedtime; and for the last five or six weeks, scarcely ever left him, night or day: But what ease he had was always in the forenoon. From the beginning of September, the vomiting was always of a blackish-brown colour, as if more of the dark-coloured matter had been lodged in the stomach, except when he threw up his food, immediately after eating, which frequently happened.

" *6th.*—Discharge from his stomach considerably increased, and the burning pain in his breast is very severe. Cannot swallow the mildest liquid without much uneasiness.

" His costiveness increased so much, that, after the beginning of October, no purgative whatever had the least impression on him, and it was found necessary to give him an injection every night, which invariably produced a stool about half an hour after it was administered. Many laxatives were tried: Ol. Ricin. to the quantity of ℥iv. per diem, purging salts of every kind, tinctures, and at last strong stimulants, all to no purpose.

" On the 27th, I was called in a hurry. I found him very much emaciated, and in the last degree of weakness, but constantly racked with the most excruciating pain, making repeated attempts to vomit, but nothing came up. On a sudden, the pain of his bowels increased to the last degree of torture, and, though he had the most violent retching, never threw up again. In about a quarter of an hour after my arrival, he became delirious, and his speech inarticulate; but every now and then making signs to be lifted up that he might try to vomit. Thus he continued all night, and expired about nine in the morning.

" On dissection, the pelvis was quite full of a thin dark-coloured liquor, which likewise overspread the intestines, insomuch, that we filled a large basin with it, to the quantity of about two Scots pints. The acid smell was intolerable. The

bottom of the stomach was full of the same kind of blackish matter he had vomited; a considerable degree of inflammation and scirrhosity appeared about the pylorus; on the anterior part was a small hole, perfectly circular, and on the outside of the posterior were a number of black tubercles. The intestines were considerably inflamed, and almost quite empty."

Vomiting of black matter has been supposed to be characteristic of cancer of the stomach, but this is an erroneous opinion, as vomiting of a similar fluid has occurred where there was merely a thickening of the mucous coat of the stomach.

From the above statement, it is evident that there is great variety as to the symptoms of this disease, and much uncertainty as to the diagnosis between this disorder, and chronic inflammation of the stomach. Some suffer slight pain; others only complain of a sense of weight and constriction, with a degree of tenderness on pressure in the epigastric region; but others bear pressure without inconvenience. In short, unless the scirrhous pylorus can be felt by the hand, there are often no symptoms of the disease, except a pale sallow complexion, emaciation, and great prostration of strength. It also seems necessary to apprize the reader of the possibility of mistaking a scirrhous pylorus for scirrhus of the colon, or for enlarged mesenteric glands, or for a concretion within the colon. Some patients have suffered only a sense of constriction and uneasiness, after meals, who had extensive cancerous ulcers of the stomach; whilst in others, who have been much afflicted, after meals, with pain in the region of the stomach, and acid eructations, the mucous membrane of the stomach has been found merely softer and redder than in the healthy state.

I shall here add an account of the appearances discovered on the dissection of Napoleon Buonaparte, with which I was favoured by my friend Dr Shortt. It is certainly remarkable, considering the extent of disease of the stomach, how slight a degree of emaciation had taken place.

"*Longwood, St Helena, 6th May* 1826.

"Report of appearances on Dissection of the Body of NAPOLEON BUONAPARTE.

"ON a superficial view, the body appeared very fat, which state was confirmed by the first incision down its centre, where the fat was upwards of one inch thick over the sternum, and one inch and a half over the abdomen. On cutting through the cartilages of the ribs, and exposing the cavity of the thorax, a trifling adhesion of the left pleura was found to the pleura costalis. About three ounces of reddish fluid were contained in the left cavity, and nearly eight ounces in the right. The lungs were quite sound. The pericardium was natural, and contained about an ounce of fluid.

"The heart was of the natural size, but thickly covered with fat. The auricles and ventricles exhibited nothing extraordinary, except that the muscular parts appeared rather paler than natural.

"Upon opening the abdomen, the omentum was found remarkably fat; and, on exposing the stomach, that viscus was found the seat of extensive disease: strong adhesions connected the whole superior surface, particularly about the pyloric extremity, to the concave surface of the left lobe of the liver; and, on separating these, an ulcer, which penetrated the coats of the stomach, was discovered, one inch from the pylorus, sufficient to allow the passage of the little finger. The internal surface of the stomach, to nearly its whole extent, was a mass of cancerous disease, or scirrhous portions advancing to cancer; this was particularly noticed near the pylorus. The cardiac extremity, for a small space near the termination of the œsophagus, was the only part appearing in a healthy state. The stomach was found nearly filled with a large quantity of fluid resembling coffee-grounds.

"The convex surface of the left lobe of the liver adhered to the diaphragm; with the exception of the adhesions occasioned

by the disease in the stomach, no unhealthy appearance presented itself in the liver.

" The remainder of the abdominal viscera were in a healthy state.

" A slight peculiarity in the formation of the left kidney was observed.

(Signed) " Thomas Shortt, M.D. Phys. &c.
Arch. Arnott, M.D. Surg. 28th Regt.
Charles Mitchell, M.D. Surg. H. M. S. Vigo.
Francis Burton, M.D. Surg. 66th Regt.
Mathew Livingston, Surg. H. C. S.

" (A true Copy) Thomas Shortt."

I subjoin a case, communicated to me by the late Mr A. Burns of Glasgow, with remarks upon it by him, as it tends to illustrate the effects of a morbid communication established between the stomach and colon, and also shews that a pulsation is sometimes communicated to a diseased stomach from the subjacent arteries.

" The patient, a middle-aged male, had, during many months, gradually declined, and had been much tormented with violent pulsation in the epigastrium, where a very considerable sized tumour was perceptible. On opening the body, I found that the tumour which had occasioned the beating, arose from a diseased state of the stomach and colon. They were both matted together, considerably thickened, and very much indurated. The adhesion of the one to the other extended along the line of the great curvature of the stomach. The omentum was necessarily involved. The side of the stomach, colon, and omentum, formed a tumour about the size of a large orange, and of a solid consistence. The morbid parts lay over the root of the cæliac artery, attached also to the inferior mesenteric vessel. It was from the impulse of these, and from the communication of action from the aorta, that the apparent pulsation proceeded. The arterial system was healthy, but the heart and vessels were very small.

" Near to the pyloric extremity of the stomach, the coats of that viscus, and of the colon, were ulcerated, so that a large opening led from the one into the other. The aperture was about three inches in diameter. It was surrounded by thickened and indurated margins. The whole diameter of the colon was very much diseased. It was thickened, indurated, and ulcerated. The ulcerated surface was mottled, and covered by a very fœtid sanies; and from the interstices, dark purple shreds of diseased cellular membrane depended. The ulcer had a most unhealthy look, yet it did not present the true characters of carcinoma. It was an ulcer which is not rare in the stomach, but it does not seem to be accurately distinguished from cancer of that viscus. The pylorus was somewhat thickened, but shewed no carcinomatous bends when cut. The opening from the stomach into the duodenum was large enough to allow the thumb to pass with ease. The small intestines were healthy, and quite empty. The lower part of the colon and the rectum contained some purulent matter.

" This case I consider valuable. In scirrhous pylorus, few patients escape most distressing vomiting. In these, however, dissection has shewn a reduction of the opening, leading from the stomach into the bowels. In the present patient, there was no vomiting, a circumstance which may have arisen from the ready passage of the food from the stomach into the colon. I do not believe that much could pass through the pylorus, because, on the contraction of the fibres of the stomach, the food would escape with more facility by the ulcerated opening into the colon, than it could by the pylorus. The latter is provided with a sphincter muscle, the action of which could never be overcome as long as a free outlet remained for the food through an opening not defended by a muscle. That little really passed by the pylorus, is clearly proved, by the empty condition of the whole track of the small intestines. We cannot wonder that in this patient the emaciation and debility were extreme. Independently of the effects of the ulcerous secretion in weakening the body, little nutrient matter could be absorbed from the

lower part of the colon and the rectum, into which, however, the chief part of the contents of the stomach was directly sent.

"This case, besides adding another to the numerous examples already collected of apparent aneurism arising from other causes than disease of the arteries, also shows how extremely the stomach may be disorganized without vomiting being occasioned, and it leaves it doubtful whether the vomiting, which usually accompanies scirrhous pylorus, be not produced by the mere obstruction to the transmission of the food from the stomach into the bowels.

Scirrhus and cancer of the body and the stomach are not accompanied with the same urgent symptoms that characterize scirrhous pylorus; and there are instances recorded in which the stomach has been found, on dissection, scirrhus, where there had been no previous vomiting, or any reason to suspect that such a disease existed.

Scirrhous pylorus is occasionally obscure in its origin, insidious in its progress, is very similar to dyspepsia, and generally does not occasion any well-marked symptoms until it has made considerable progress, and in some instances even until in its advanced stages. Vomiting two or three hours after meals, which is one of the more striking features of the disease, does not invariably occur; and there are occasionally intervals of good health.

Many observations as to the deviations from the usual train of symptoms, are to be found in the valuable treatise of Dr Abercrombie on the Pathology of the Stomach and Intestines, to whose work the reader is referred. Vide pp. 63, 64, &c.

OF SCIRRHUS AND CANCER OF THE INTESTINES.

The larger intestines, and especially the head of the colon and upper part of the rectum, are more frequently scirrhous than the smaller.

The appearances on dissection are very similar to those which are observed in the same disease affecting the stomach.

The parietes of the intestine are harder, thicker, and sometimes nearly an inch in thickness, by which the caliber of the diseased portion is much diminished; and the passage of the food being, to a certain degree, impeded, the intestine above the stricture becomes more or less expanded into a kind of pouch or pouches, the coats of which are thinner at certain places than the rest of the dilated intestines. Ulceration of the coats of the intestines follows, from the continuance of which, the contents of the diseased bowel escape into the cavity of the abdomen, or, where there has been previous adhesion, morbid communications are formed, as between the arch of the colon and stomach; between the different turns of the intestines; between the rectum and bladder, or between the rectum, vagina and bladder, so that the fæces and urine are discharged by a common orifice. The perforated part of the intestine is sometimes filled with a malignant fungus. In some instances, cancerous tumours grow from the peritoneal surface of the intestines, and at length form one common ulcer with those that are internal.

There are two preparations in the Museum, which exhibit a variety of cancer of the intestines, which I believe is very rare, and has not been described. About a foot of the internal surface of the ileum is studded over with distinct tumours, of a dark-brown colour, inclining to purple, which are about half an inch thick, and which seem to be very soft; every part of the surface of these tumours is perforated by small holes, which are disposed at equal distances from each other, and are of a uniform size. Vide I. 75 of printed Catalogue.

SYMPTOMS OF SCIRRHUS AND CANCER OF THE INTESTINES.

The disease generally comes on in a slow, and almost imperceptible manner, and makes for some time but little progress.

The patient at first has distention of the bowels; and more frequent calls to go to stool than usual, so that the earlier symptoms of the disease may be mistaken for diarrhœa. Some difficulty and pain also occur during the passing of the fæces, which are of a thin consistence, mixed with frothy mucus, or tinged with blood: hence the disease may be mistaken for colic, or dysentery.

When the disease is more advanced, very acute lancinating pain is felt at some particular part of the belly; and when the patient is at stool, flatus passes through the diseased portion of the bowel with a hissing sound and tremulous motion, and a tumour is, on some occasions, perceptible, which is painful on pressure.

In some cases, by carefully examining the quantity of fluid which may be thrown up through the anus, a probable conjecture may be formed of the seat of the disease.

But, generally, it is by no means easy to determine by the symptoms, in what particular part of the canal the disease is seated, unless it be within the reach of the finger, or of an instrument.

The fæces are discharged only in small quantities at a time, they are generally thinner than natural, and, when solid, are much narrower than in health, and mixed with a frothy slimy mucus, or with blood, and the patient becomes much emaciated.

The pulse, at this period of the disease, is quicker and feebler than in health. The disease generally follows a slow but uninterrupted course.

Only a small quantity of fæces is discharged as the intestine becomes more constricted, which is soon followed by swelling of the belly, considerable distention of the intestines, and very acute pain.

The pain and distention increase, and are followed by occasional vomiting, which becomes more and more frequent.

Inflammation generally follows, unless a stool can be procured.

A slimy mucus, tinged with bile, which is discharged, induces the friends of the patient to expect a recovery.

If the patient does not die from the more immediate effects of

inflammation, the strength is much impaired, the body much emaciated, and at length he sinks.

In some cases, clysters have been vomited in a few minutes after they have been received, which affords a presumption of the existence of an unnatural communication between the arch of the colon and the stomach.

It ought to be recollected, however, that clysters will often be vomited, if injected incautiously, and in large quantities, particularly if the patient be much exhausted.

OF THE APPEARANCE AND SYMPTOMS OF SCIRRHOUS RECTUM.

By this disease the coats of the bowel are intimately united; thickened, and also indurated; and, according to RUYSH, are sometimes of cartilaginous hardness, and the mucous coat forms hard and irregular folds.

The tunics of one side of the bowel are often much thicker than those of the opposite, so as to render the passage of the fæces through the rectum indirect, which is increased by the contraction of the muscular coat; the bowel is expanded above the constriction, owing to the accumulation of its contents, and the muscular fibres are increased in size, in proportion to the resistance and duration of the disease.

The breadth of the part more immediately constricted is various; it seldom exceeds two or three inches.

There is also much variety as to the degree of constriction. There is generally a difficulty in passing a bougie of the size of the little finger; and sometimes the stricture is so great as only to admit a surgeon's probe.

A number of cartilaginous bands may sometimes be observed passing transversely between the outer and inner coats of the scirrhous rectum. The disease frequently extends beneath that portion of the peritoneum, which is reflected over the os sacrum.

The rectum is sometimes surrounded by enlarged glands and scirrhous tumours, which, in some cases, communicate with the cavity of the intestine by small apertures, and, from the continuance and extension of the ulceration, these tumours, which are external to the rectum, form, with the diseased coats of that bowel, a large cancerous ulcer. The scirrhous rectum generally contracts adhesions to the neighbouring parts, and very frequently is closely bound down to the os sacrum; fistula also frequently follows, which communicates with the vagina, or the neck of the bladder.

The first symptoms of scirrhous rectum are a disordered state of the functions of the alimentary canal, accompanied with a copious discharge of ropy clear mucus from the gut; with pain in the loins, or region of the os sacrum; and pain, or difficulty, in micturition.

The above symptoms are owing to the sympathy which exists betwixt neighbouring viscera, and also to the morbid adhesions between the bladder and rectum.

Every kind of exercise, especially walking or riding, creates much uneasiness.

The patient has frequent calls, and great difficulty in passing his fæces, which increase with the duration of the disease; often considerable pain is felt during the efforts at stool, and the fæces are neither of the usual size, nor consistence.

These symptoms are occasionally succeeded by diarrhœa, which affords temporary relief; but as the disease makes progress, costiveness becomes more obstinate, tenesmus and colic are frequent, and accompanied with general tenderness of the abdomen, fever and sympathetic pains in the head, palpitation of the heart, and intermissions of the pulse.

If the obstruction proceeds from scirrhous rectum, even a brisk cathartic does not always procure an evacuation; but if it arises from hardened fæces, the cathartic produces a plentiful discharge, which affords much relief.

There is much difficulty experienced in throwing up a clyster, even when administered by a skilful person, but if it

does pass beyond the stricture, it is retained longer than usual, and comes away in small quantities at a time.

When ulceration has taken place, the administration of a purgative adds much to the patient's sufferings, as the liquid fæces in passing over the ulcerated surface create very acute pain.

In some cases, liquid stools only are discharged, and involuntarily, owing to the sphincter ani being paralyzed.

In the advanced stage, a considerable quantity of ropy mucus, with an admixture of ichorous or purulent matter, is generally discharged along with the fæces; and, during the effort, the patient suffers the greatest torture.

The nature of the disease may frequently be discovered by introducing the finger into the anus; but the practitioner ought to be on his guard lest he mistake for scirrhus of the rectum, an enlarged prostate gland, or a cancerous uterus.

Upon introducing the finger within the rectum, there is often much difficulty in passing it upwards, on account of the tumours which have been already described.

Some patients afflicted with this disorder have difficulty in making water, or retention of urine.

Scirrhus of the rectum generally terminates fatally, in consequence of the retention of the fæces, tympanites intestinalis, and subsequent peritoneal inflammation.

When there are fistulous openings between the vagina and neck of the bladder, the more fluid part of the fæces passes through these canals, which are thereby much irritated and inflamed.

The symptoms of scirrhous rectum and piles, being somewhat similar, it may not be improper to add, that the rectum is most commonly scirrhous in its whole circumference, and at about two or three inches from the anus; hence the fæces, which are not of their usual size, are discharged with much pain and difficulty; but the uneasiness from piles is most severe whilst the tumours are protruded externally, and compressed by the sphincter ani. In other circumstances the patient's sufferings are inconsiderable.

Besides, piles have generally narrow necks, but scirrhous tumours, and also venereal verrucæ, when in the rectum, have broad bases; and further, the verrucæ give little pain, and not only grow from the rectum, but also from the skin around the anus.

In short, the pathognomic symptoms of scirrhous rectum are: Distention of the larger bowels, tenesmus, pain and difficulty in the evacuation of the fæces, which are scanty, and discharged, only after a considerable effort, in a flattened form, or liquid state, and accompanied with a burning sensation in the part affected, and the discharge of a fœtid, ichorous fluid, of blood, or of ill-conditioned pus. The stricture caused by scirrhus is, in some instances, destroyed by ulceration, and a passage is frequently formed between the rectum and the bladder, or sometimes between the rectum and vagina.

EXPLANATION OF PLATE VI.

The case from which this engraving was taken, is described in page 458.

This Engraving represents a stricture at the cardiac orifice of the stomach, formed by cancerous and fungous tumours which grew from the mucous membrane of the stomach.

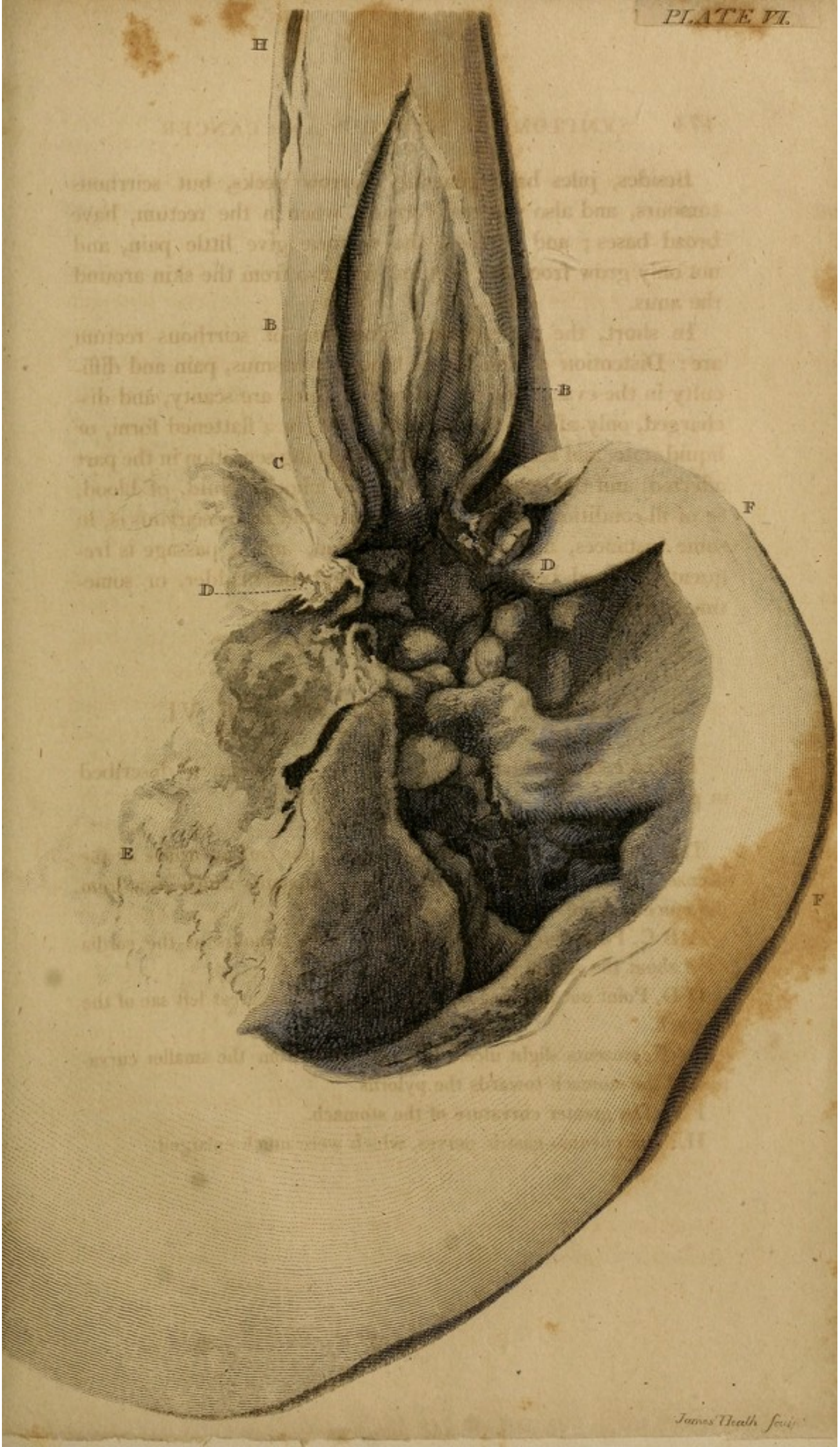
A B C, Point out the gullet opened. The tumours at the cardia were about the size of small olives.

D D, Point out the fungous tumours within the great left sac of the stomach.

E, Represents slight ulceration extending from the smaller curvature of the stomach towards the pylorus.

F F, The greater curvature of the stomach.

H, The pneumo-gastric nerves, which were much enlarged.



James Heath fecit

SECTION XXIV.

OF HÆMORRHOIDS, OR PILES.

Hæmorrhoids, or piles, are fleshy-like tumours, which vary in size, and are situated within the sphincter ani; or at or near to the verge of the anus, and hence they have commonly been divided into two classes, the external and internal. These tumours are of three kinds, essentially different in structure, the one is a dense, though somewhat compressible tumour, that consists chiefly of compact cellular substance, and contains a few cells, some of about the size of a pea, which are filled with mucus or blood.

The size and colour of this kind of pile are by no means uniform, being sometimes about the size of an olive, and frequently smaller, of a brown or reddish colour; but others are larger, have a transparent appearance, and, when pressed, are elastic, like sponge, and of a pale colour.

A second kind of pile, according to Richter, is formed of blood extravasated under the mucous coat of the intestinum rectum, and the cyst is composed of the mucous coat; and, in proof that this is the nature of the disease, the tumour is sometimes as large as an apple; and even when it is cut off, there is no hæmorrhage, a proof that it is not caused by a varicose vein; besides, the tumour is sometimes nearly flaccid.

There is a third kind of pile, which is formed by varix of the veins. Mr Kirby, who has devoted much attention to this subject, affirms, that he found piles formed of a varicose distention of the great hæmorrhoidal vein: the tumour appeared to be composed of the cellular substance in a state of unusual firmness, surrounded by veins, and covered by the integuments. The veins were branches of the internal iliacs *.

The veins of the villous coat of the lower part of the alimentary canal more frequently become varicose than those of

* *Vide* Kirby, on certain Severe Forms of Hæmorrhoidal Excrescences, p. 40.

other parts of the intestinal tube,—an opinion confirmed by an observation of DELATOUR, who states, that one of his patients had several hæmorrhoids of large size, from which blood issued per saltum, on every contraction of the sphincter ani muscle, a statement confirmed by MONTEGRE, who met with two instances, in which the blood spouted out of hæmorrhoids in a continued stream*.

I attended a case, in which the veins of a part of the villous coat of the stomach attained a great size; one of these gave way, and a large quantity of blood escaped.

The veins of the larger intestines are also sometimes varicose. "J'ai vu," says PETIT, "tout l'interieur du rectum variqueux, jusqu'à l'S du colon †."

Hæmorrhoids are largely supplied with blood; hence, they appear larger and more elastic during life, and become more tense, during what has been called the hæmorrhoidal paroxysm.

When several piles co-exist, one of them is generally harder than the others, and the most recent is generally painful and inflamed; but those which have existed for some time are soft and shrivelled, and not at all painful.

The varicose hæmorrhoid is at first soft, and of a dark purple colour, but it gradually becomes firmer, owing to the thickening of the coats of the veins which form it.

Piles do not enlarge equally in all directions, but extend in a transverse direction, so as to acquire the shape of an olive, placed transversely. After the disease has been of some duration, the enlarged veins give way, from an absorption of their coats, and discharge serum and blood; and thus the tumour becomes hard and chronic.

After the hæmorrhoidal paroxysm, the serum of the blood escapes through the small ulcerated apertures in the distended veins more freely than the fibrine which is retained.

The blood which has coagulated within the pile, in process of time is absorbed, and the thickened coats form a colourless

* *Vide* Dict. des Scienc. Med. tom. 20. p. 43.

† *Vide* Op. Posthum. tom. ii. p. 83.

tumour. When such varicose tumours do not discharge blood, they have been called *blind piles*.

OF THE SYMPTOMS.

There are certain general, as well as local symptoms, which precede the appearance of piles.

The general symptoms are, fulness of the system, hardness of the pulse, impaired digestion, frequent inclination to pass urine, and to go to stool, and a discharge of mucus from the rectum.

The local symptoms which precede piles, are a sense of weight and numbness about the os sacrum; a pricking or stinging at the lower part of the rectum, with morbid sensibility of the bladder and urethra, of two or three days' duration. After the evacuation of the fæces, a little blood, of a bright colour, is discharged; in a short time, a small tumour appears, which speedily attains, in many instances, the size of an olive, or filbert nut, and has a distinct neck. The surface of the tumour is besmeared with a fluid, which is often tinged with the blood, that oozes from its surface.

Piles often disappear for a time, and, after their re-appearance, are more solid and firm to the touch; and especially when, to a certain degree, they are strangulated by the spasmodic contractions of the sphincter ani.

Besides the symptoms already enumerated, the patient complains much of tenesmus, of a sense of weight, compression, and pain in the fundament, extending to the back and loins, which is much aggravated by walking, riding on horseback, or even by sitting on a hard chair.

Piles being, on some occasions, much compressed by the sphyncter ani, become inflamed; they induce heat of skin, thirst, general restlessness, fever, and the discharge of acrid mucus from the rectum, which soils the linen, and prove a cause of extreme torture when the patient is at stool. The spasmodic contraction of the sphyncter ani sometimes induces strangulation and gangrene of the pile. We are informed by Mr Howship, that Mr Heaviside met with two instances, in which hæmorrhoids became inflamed, and were so violently strangula-

ted by the spasmodic contraction of the sphincter ani, that the parts underwent a spontaneous mortification, and a radical cure took place.

Those afflicted with piles generally pass, at certain times, more or less blood, which affords relief, but some piles bleed so profusely, as to induce great weakness, or even endanger life.

If the bleeding from the pile be stopped, the patient occasionally suffers from vertigo, headach, and other symptoms, which indicate an unusual determination of blood to the head.

Active hæmorrhage is characterized by a full pulse, and acute pain, increased heat, tension, and weight at the anus: these unpleasant sensations are relieved by the loss of blood.

Passive discharge of blood is the sequel of the former, and occurs in persons of a debilitated frame of body, who have a weak pulse, and it is not preceded by tension, nor heat around the anus, but is the result of the laxity of the vessels produced by repeated attacks of the disease, or by rupture of vessels.

External piles, in consequence of repeated attacks of inflammation, become hard and solid tumours, and generally may be removed by the knife, or ligature, without much risk of hæmorrhage; and, if they be not removed, they sometimes cause ulceration and even prolapsus ani, but profuse bleeding sometimes follows the excision of internal piles; and it may be added, that the application by the ligature occasionally gives rise to acute colic, and even to tetanus. If the cut be made into the substance of the pile, if the knife be ever employed, the incisions should be made in the sound part of the rectum in the vicinity of the pile.

CONSEQUENCES OF PILES.

Piles are sometimes followed by prolapsus ani.

Another consequence of piles is, that fissures are observed in the pile, and its membrane is ruptured in consequence of the passage of the indurated fæces.

This is sometimes not accompanied with pain, or at first only with a slight degree of it, but afterwards upon going to stool, the patient labours under very acute pain.

Boyer has published several valuable observations on the spasmodic stricture of the rectum, occasioned by fissures in the pile, and has recommended the division of the sphyncter ani for the purpose of removing the disease.

These fissures are often formed by the process of ulceration, which sometimes causes absorption of the neck of the pile, and the tumour is discharged per anum.

Contraction of the anus is sometimes consequent to piles, and is the result of the induration of the cellular substance around the anus, or of the long continued spasmodic contraction of the sphincter ani, which proves a cause of acute pain, when the patient goes to stool.

OF THE SYMPTOMS OF INTERNAL PILES.

The symptoms of internal piles are not so obvious as those of the external.

Internal piles create less pain than the external, as the surrounding parts are more yielding and elastic, and uninfluenced by the sphyncter muscle, and many patients suffer no other inconvenience from this disorder, except the loss of a small quantity of blood when they are costive. When blood from piles is sometimes effused into the cellular substance around the rectum, suppuration follows, and the matter bursts externally, occasioning fistula in ano. Internal piles often cannot be seen unless the patient, previously to the examination, sits over the steam of warm water, and partially inverts the rectum, or by the use of the speculum ani. Internal piles create in some women symptoms of bearing down, and when they create acute pain, or considerable bleeding, sometimes induce abortion.

OF ARTERIAL HÆMORRHAGE FROM THE RECTUM.

This disease may be mistaken for piles. Dr Abercrombie has given a very lucid description of this disease, which is as follows * :

* Vide his Pathology of the Alimentary Canal.

" I have seen a good many cases of arterial hæmorrhage from the rectum, and they presented some facts worthy of being recorded. The discharge is usually at first considered as hæmorrhoidal, and does not excite any apprehension, especially as the quantity of blood lost is often not great. But after some time, the patient begins to look pale, haggard, and exhausted; palpitation and breathlessness are excited by any exertion, frequently with attacks of giddiness, and a sense of severe throbbing in the head, and sometimes there is anasarca of the legs. The pulse becomes small and frequent, and is excited to the highest degree of frequency by very moderate exertions, perhaps by walking across a room. He becomes more and more exhausted, till he acquires all the appearance of a person sinking under the advanced stage of some deep-seated disease. During this time, he probably complains of nothing except extreme weakness; and says he is sensible of no disease, except a degree of piles, which bleed regularly, but in no great quantity. On examining the parts immediately after he has been at stool, or on making the extremity of the rectum protrude by means of a stimulating injection, a small fungous mass is discovered within the verge of the anus, on the apex of which a minute artery is seen bleeding per saltum. The remedy is simple and effectual, and consists in taking up the bleeding point with a tentaculum, and tying it, so as to include a part of the fungus. It is not necessary to go to the base of it; and in this manner much irritation is prevented, while the cure is equally effectual. The patient soon begins to recover strength, and it is astonishing with what rapidity every appearance of disease vanishes. It is difficult to say what is the source of the alarming character of the symptoms in these cases; whether the greater permanency of the discharge,—or that there is more exhaustion from the loss of arterial than venous blood; for the quantity of blood lost is often not so great as, certainly not greater than, is often lost from hæmorrhoids for a length of time, without any effect upon the general health. When the ligature does not entirely command the hæmorrhage, the free application of the nitrate of silver is often very beneficial. The affection is, upon the whole,

one of extreme interest, from the alarming appearance of the patient, and the rapid improvement he makes after the vessel is tied. The disease is sometimes marked by the blood coming off in coagulated masses; and it would appear, that, in these cases, the minute vessel is nearly at all times bleeding a little, and that the bload coagulates in the rectum, and accumulates, till such a quantity is collected as excites the patient to go to stool. This, I think, does not take place with the discharge of hæmorrhoids. The affection is also distinguished by the arterial colour of the blood,—that which is hæmorrhoidal being probably always venous."

It may not be improper to add, that blood is sometimes discharged from the vagina and uterus for a considerable time, which may be mistaken, by an inattentive observer, for the discharge of blood from the anus.

Before concluding this chapter, it seems necessary to state, that the submucous tissue of the rectum becomes very considerably indurated in those who have been afflicted for some time with piles *.

When the patient suffers much pain, from swelling and local inflammation, the topical detraction of blood by leeches affords relief.

Costiveness, a frequent cause of piles, is obviated by the milder cathartics.

Some astringent applications do good.

If the hæmorrhage be slight, it gives relief, but if profuse, it occasions great weakness, and must be restrained by pressure and astringents.

* Vide Mr B. Bell's System of Surgery, vol. vi. 7th Edit.
Callisen, Syst. Chir. Hodiern. vol. ii.
Delpech, Precis. Element. tom. iii. sect. 8.
Calvert's Practical Treatise on Hæmorrhoids, London 1824.

CHAPTER III.

OF THE ORGANIC DERANGEMENTS OF THE CELLULAR COAT OF THE ALIMENTARY CANAL.

SECTION I.

OF INFLAMMATION AND ABSCESSES IN THE CELLULAR SUBSTANCE OF THE ALIMENTARY CANAL.

The coats of the alimentary canal are united by two cellular strata; the one is situated between the mucous and muscular, the other between the muscular and peritoneal coats: the former or submucous is much more abundant than the latter or subserous, and both these layers are connected by fine cellular threads and bloodvessels, which pass through the interstices of the muscular fibres. Inflammation begins in the cellular membrane, or it is sometimes translated from the mucous coat, its original seat, to the cellular substance, which, becoming condensed and thickened, diminishes the caliber of the portions of bowel affected. This condensed state of the cellular substance, in cases of gastritis and of enteritis, is often combined with an effusion of lymph, or with the formation of pus.

When inflammation of cellular substance is circumscribed, the disease has been called *phlegmon*.

The pus which the tumour contains is secreted in consequence of the vessels of the part taking on (as my Grandfather calls it) the action of a gland; at the same time, from the neighbouring arteries, serum, lymph, and blood, are effused, according to

the severity of the inflammation, which increases the size of the swelling.

The nature of this inflammation was not unknown to GALEN *, who has given a faithful description of it in his chapter De Tumoribus, but he has not mentioned its frequent termination in suppuration, or its more rare termination in gangrene. The symptoms enumerated by GALEN are aggravated before the vessels of an inflamed part secrete pus; and when suppuration has taken place, the pain and heat abate, a sense of weight and heaviness is felt in the part, the symptomatic inflammatory fever moderates, and the patient is affected with rigors, after which a sweat breaks out.

Inflammation of the cellular substance does not always terminate in suppuration, but often in an effusion of lymph, which occupies the cellular substance, and often forms the bases of tumours. It is unusual for acute inflammation in the cellular substance to pass, unattended with pain, into the chronic; and the first intimation of this is, the appearance of a collection of purulent matter, forming what has been called *chronic abscess*.

It may, however, be remarked, that such abscesses often occur without having been preceded by pain, or any other indication of inflammatory action.

Another form of inflammation of the cellular substance has been described by KIRKLAND, WILLAN, and others, under the name of *phlegmonoid erysipelas*. The swelling is diffuse, doughy, inelastic and compressible, and accompanied with deep-seated pain, sense of weight, and tension of the skin.

Abscesses frequently form in the cellular substance, in the immediate vicinity of different parts of the alimentary canal, or in the cellular substance between its component coats.

Abscesses have been observed in every part of the alimentary canal, as the result of inflammation, originating in organic dis-

* "Hoc phlegmones nomen Græcis dici consuevit, de carnosis partibus, majorem in molem, cum tensione, renixu, dolore pulsatorio, calore et rubore extuberantibus."

Vid. GALEN, De Tumor. præter Natur. Lib. i. cap. 11.

eases, from extraneous bodies accidentally swallowed, or from external injury.

Tubercles, and other tumours, in the cellular substance, sometimes inflame and suppurate.

Considerable abscesses frequently form in the neck, and particularly when situated beneath the deep cervical fascia, impede, to a great degree, deglutition and respiration. The late Mr John Bell gave me an excellent specimen of this disease.

The patient, a man of middle age, had a deep scrofulous abscess occupying the right side of the neck, displacing the trachea, and causing slight difficulty in swallowing and breathing.

The tumour increased gradually, became very painful, protruded into the fauces, and almost entirely occupied the pharynx. An incision was made into the lower part of the tumour, and about lb. iij. of purulent matter were discharged; the respiration and deglutition became easier, and the internal swelling disappeared. Hectic symptoms supervened. Eighteen days after the incision, the internal swelling gave way, and discharged its contents into the pharynx. A short time only had elapsed, when it was observed, that all the injesta passed into the cavity of the abscess, through the ulcerated apertures in the pharynx, and compressed the œsophagus. Attempts were made to support the patient's strength by injecting nutritious fluids through a catheter into the stomach, but he gradually sunk from inanition. Upon dissection, the pharynx was found much ulcerated, and the abscess communicated with the œsophagus.

In a remarkable specimen in the Museum of the University, all the cellular substance around the trachea and gullet was much condensed and infiltrated with a mixture of pus and serum, which compressed the gullet to a very considerable degree.

The mucous membrane of the larynx and trachea was found to be ulcerated; and, on the right side, the windpipe is perforated by an oblique fistulous opening of considerable size.

During a violent fit of coughing, in consequence of pus having passed into the windpipe, the patient died.

In another case, an abscess, of a few day's duration, which

contained two pounds of pus, was situated on the right side of the windpipe, and proved suddenly fatal.

Abscesses are more frequent in the rectum (especially on its external surface) than in any other part of the intestinal canal; as that bowel, from its position, functions, and connexion with the organs of urine and generation, is very liable to disease: thus the rectum sometimes is ulcerated from internal piles, condylomata, lumbar abscess, caries of the ossa coccygis, and diseases of the bladder and uterus.

After an abscess of this kind has formed, the absorbent vessels are stimulated, and erosion follows; by which a communication is established between neighbouring parts of its parietes, that in some cases abridges, but in others prolongs life. Matter escaping from the gullet into the windpipe, or from the stomach into the cavity of the peritoneum, generally proves fatal in a short time. But when in cases of obstructed pylorus the contents of the stomach pass directly into the colon, or when *the contents of the bowels*, in strangulated hernia, are discharged by an artificial anus, in the former case life is prolonged, and in the latter, radical cure is sometimes effected.

OF THE CONCOMITANT SYMPTOMS.

The severity of the symptoms is generally proportioned to the extent of the suppuration.

In addition to the symptoms above enumerated, which characterize the formation of matter, as the pain diminishing, the pulse becoming slower and fuller, rigors, and sense of pulsation subsiding, &c. these are symptoms which indicate the precise situation of the abscess.

When suppuration takes place in the pharynx or gullet, the patient breathes and swallows with considerable difficulty and pain.

Abscess in the stomach occasions loathing of food, sense of heat, fulness and weight in that organ, together with heartburn, pain, nausea and obstinate vomiting, and that which is vomited

is often mixed with blood. Beside the above symptoms, there are fever and marasmus; and, upon an attentive examination, a tumour may, in some cases, be perceived in the region of the stomach.

Abscess in the upper part of the intestinal canal is generally characterized by long-continued and obstinate colic, bilious diarrhœa, and the occasional mixture of purulent matter with the stools.

Such abscesses, whether seated deeply or not, commonly terminate in fistula; sometimes the abscess bursts outwardly, and establishes a red callous orifice near to the anus, with a narrow canal extending along the coats of the rectum; at other times, the abscess, after destroying the cellular substance surrounding this intestine, gives way through a small aperture into the gut; and not unfrequently the abscess has both an external and an internal opening. The first case has been denominated *the external*; the second, *the internal blind*, or incomplete; and the third, *the complete fistula*.

Fistula in ano gives rise to considerable swelling around the buttocks, together with a circumscribed hardness of the part affected. The disease is attended with considerable pain, sometimes with fever, when the inflammation is violent.

When the patient is of a bad habit of body, the cellular and adipose substances slough as in carbuncle; the skin assumes a purple colour, though the tumour be not so large as in the usual kind of fistula; and in this erysipelatous variety of the disease, the quantity of purulent matter is small in proportion to the size and extent of the tumour.

The following symptoms are commonly observed, when abscess is about to be formed in the vicinity of the anus:

The patient has a frequent desire to go to stool, is commonly costive, and has sometimes slight strangury; in the vicinity of the anus, there is considerable pain, which is much increased by walking, or any kind of exercise. On examination, in the neighbourhood of the anus, a considerable swelling is observed, of a red colour, and hard to the touch.

In a few days a pimple appears, and also a fluctuation may be perceived, where the hardness and redness were; and in a short time the tumour bursts, forming either a complete or incomplete fistula; and after the matter escapes freely, the acute pain in the part, and the symptomatic fever, considerably abate.

If the fistula be complete, the swelling, in some cases, subsides a little, after the fæces have been voided, as the contents of the abscess pass through the fistulous canal into the rectum. But the communication with the gut is, in other instances, very narrow, and oblique, and can only be discovered by injecting water through the external orifice of the fistula; or, on introducing a flexible probe through the fistulous canal, which may be made to pass into the rectum.

It frequently happens that the principal fistula has several branches.

When the disease has been neglected, there are sometimes several external openings, but, even in this case, the communication with the rectum is generally small and indirect.

The fistula sometimes produces dysuria, or retention of urine, obstinate costiveness, and sometimes even prolapsus ani.

In some cases, the ulcerated opening at the side of the anus becomes daily larger, as the liquid contents of the rectum pass through it, and gangrene sometimes takes place around the anus, which proves fatal.

In children, twelve or twenty-four hours after birth, the cellular tissue of the legs or arms and face has been sometimes indurated, the soft parts become partially firm, and dense, and swelled, and the skin of the affected part assumes a red or purple colour, with more or less depression. The pulse is quick and small, the breathing very difficult, and the child dies from suffocation on the second or third day from the invasion of the disease, and some linger on until the eighth or ninth day.

For a more particular description of this remarkable affection, the reader is referred to the works of Drs Underwood and Burns, who have described this disease under the name of *skin bound;* or to the writings of Leger, and other French authors, who have called this disease the *compact œdema.*

SECTION II.

GENERAL OBSERVATIONS ON THE DEPOSITION OF A SUBSTANCE RESEMBLING INSPISSATED ALBUMEN IN THE CELLULAR COAT OF THE ALIMENTARY CANAL, AND OTHER ORGANS.

The space occupied by the cellular substance is sometimes filled with inspissated albumen. This is the effect of previous inflammation, and, though by no means an unfrequent disease, it has attracted hitherto little notice. The substance deposited is of a grey or bluish colour, and no bloodvessels are seen in it. Different bowels of the abdomen and pelvis, and also the lymphatic glands in their vicinity, frequently are reduced to the same morbid state, and are often covered by plexus of bloodvessels.

In the earlier stage of the disease, we observe, in the cellular substance, small hard tumours, about the size of a pea; these enlarge in the direction of the mucous coat, and push it before them; but, in a few cases, the tumour projects towards the peritoneum, and attains a very considerable bulk.

In the more advanced stages, the stomach, when affected, acquires an unnatural hardness and size, its tunics are prodigiously thickened in some places, and it does not collapse when cut into. Tumours of a pyramidal figure grow internally from the thickened parietes, and diminish the diameter of the part affected. On making a section of the stomach, the peritoneal coat is found to be harder, whiter, and thicker than usual; but there is no appearance of the cellular or muscular coats, as their situation is occupied by the albuminous substance.

There is some variety in the colour and quantity of the albuminous matter deposited; generally it bears a strong resemblance in colour and consistence to the white part of the skin of an orange, but it is not perfectly homogeneous in its texture, being in some cases harder, and more transparent, than in others; and occasionally of the colour and consistence of equal parts

of bees-wax and tallow. On putting the albuminous matter into an acid, or alcohol, it becomes considerably harder, and not unlike cartilage in its texture and colour.

The mucous coat is also considerably thickened; and is somewhat like white leather that has been soaked in boiling water.

The liver, uterus, or testes, when affected with this disease, acquire an uncommon size, except when the tumour has a long and narrow neck; and upon their surface, and also in the substance, there are deposites of albuminous matter. When the albuminous substance is deposited in the substance of the liver, testes, or lymphatic glands, it completely destroys their organization.

I received from the late Dr BARCLAY a uterus, which, in consequence of this disease, was as large as when in the gravid state, and its parietes were fully an inch thick.

It was lined with a layer of coagulable lymph, and contained several irregular shaped masses, of different sizes, and of a white colour.

Dr BARCLAY informed me, that this uterus, sent to him from a distant part of the country, had been mistaken for a dropsical ovarium, and an attempt made to puncture it; the patient survived the operation only three days.

The veins in the submucous cellular membrane of the alimentary canal are often much enlarged in such cases.

Suppuration sometimes, though very rarely, takes place in the centre of this albuminous matter. The matter is not well-conditioned pus, but a thin sanious fluid, in which there are a number of irregularly shaped white masses. The black substance of melanosis is sometimes intermixed with the albuminous.

I have had various opportunities of examining this disease in the liver, and subjoin a short account of the appearances it assumes.

This disease appears on the surface of the liver in the form of small round tumours, which in colour and consistence resemble pressed curd. The organ does not retain its usual form, but becomes much thicker at its edges.

The tumours are circumscribed, flattened, of different sizes,

and rarely larger than a walnut. Such a diseased liver sometimes weighs from 10 to 20 lb. avoirdupois. The increase in the size of the bowel is by no means in a ratio to the increase of its weight, as albuminous matter is much heavier than the substance of the sound liver.

The peritoneal coat that covers those tumours, is found to be of an unusual thickness.

Tumours of a similar description, and of different sizes, are found throughout the substance of the liver.

I have seen such tumours connected with the mucous membrane of the womb, and also with that of the urinary bladder.

A thin fluid, like recent coagulable lymph, is sometimes found in the centre of albuminous tumours; these, when macerated in water, become soft and flabby; and when viewed, even with the naked eye, appear, in some cases, perforated with a number of apertures.

When albuminous matter is deposited in one part of the substance of the liver, I have generally remarked, that another portion of the gland is of the consistence of jelly. Is it not probable, that the portion of the liver reduced to a state of jelly, had undergone the same change, as occurs in other tissues before they are absorbed?

The substance of the liver between the tumours is of different shades, of yellow or of green.

In this, as in most other species of enlargement of the liver, the smaller biliary vessels in the hepatic substance of the gland are enlarged, the bile is of a darker colour, and thicker consistence than usual, probably in consequence of the pressure of the enlarged liver on the biliary ducts.

The glands in this disease are of the size of a filbert nut, and sometimes of a walnut, have broad bases, and are to the touch not unlike inspissated albumen. In the mesentery, they sometimes have attained the size of a small orange.*

* For an excellent case of this description, vide Catalogue of the Museum of the University of Edinburgh.—Absorbents diseased. "Whole of mesenteric glands much enlarged, and compressing each other. The larger tumours composed of several glands of a pink colour, slightly vascular, and of a uniform pultaceous consistence, enclosed in distinct cartilaginous cysts.

The glands are often filled with a fluid like cream, at other times with a white curdy substance.

This disorder is sometimes combined with thickening and ulceration of the mucous membrane of the intestinal canal.

Albuminous tumours, in some cases, increase rapidly in size, irritate the mucous membrane to a great degree, and give rise to the discharge by stool of a considerable quantity of ropy mucus.

I have a specimen taken from the body of a woman of sixty years of age, who, during the greater part of her life, enjoyed good health. She was suddenly seized with difficulty in swallowing and breathing, and expectorated a good deal of ropy mucus. From the duration of the disease, she became much emaciated. In consequence of a sense of immediate suffocation, she frequently got up from bed. That distinguished surgeon Mr Liston endeavoured to relieve her, by passing a flexible tube into the gullet: this was accomplished with difficulty, on account of several tumours of different sizes which encircled the pharynx, and one of them, about the size of a walnut, was found, on dissection, in the immediate vicinity of the larynx.*

Similar hard white tumours are frequently found in the rectum, and there is reason to suppose they do not create much uneasiness, till they have attained so large a size as to straiten the caliber of the intestine, or become ulcerated.

Albuminous tumours have, in some cases, completely obstructed the biliary ducts, and occasioned fatal jaundice.

In two cases of this kind, Dr Duncan was so obliging as to analyse the contents of the gall-bladder, and found that the fluid possessed very different qualities from bile; for 3i. of it contained only four grains of a substance like the white of an

Peritoneum in many places vascular. Liver was soft and enlarged; pancreas surrounded by enlarged glands; glands in lesser omentum enlarged, and of a soft purulent consistence; cervical and inguinal glands similarly affected: spleen tuberculated; transverse processes of cervical vertebræ enlarged. Patient, a female, æt. 37. *Symptoms*:—Countenance pale; permanent contraction of muscles of neck, with subsequent projection of cervical vertebræ; great thirst; œdema of lower extremities; irregular tumour perceptible in left hypogastrium, painful on pressure; much emaciation."

* It is doubtful whether this was not a case of medullary sarcoma.

egg, and so small a quantity of yellow resinous matter, as to be imponderable in the nicest balance. The coats of the gall-bladder were much thicker than usual, and so indurated that the bowel, when empty, retained the same figure as when distended with bile.

Does the inspissated mucus secreted by the arteries of the mucous coat of the biliary ducts and gall-bladder, form the white crust which so frequently covers those biliary calculi passed by persons with a diseased liver?

Or, is it not more probable that this coating is obtained in the intestines?

OF THE SYMPTOMS.

Deposites of albumen in the submucous cellular tissue of the alimentary canal, when considerable, obstruct the passage of the aliment, and give rise to different symptoms, according to the seat of the stricture.

When the liver has acquired an uncommon size, it may be felt much lower than usual, and its surface may be perceived to be very irregular.

The patient suffers, at the same time, indigestion, acidity, nausea, and pain at the top of the shoulder, and is generally also afflicted with jaundice and ascites.

OF MELANOSIS IN THE CELLULAR TISSUE.

This black deposite, which is the result of a peculiar secretion, is often found in the cellular substance. When melanosis affects any particular organ, it is still doubtful whether it be seated in the cellular tissue, or in the substance of the affected part.

OF FLUIDS AND TUMOURS OF THE CELLULAR TISSUE.

Serum is often effused into the cellular substance in considerable quantity, in the disease called Anasarca.

Pus also is frequently found, as a consequence of chronic inflammation, in the cellular tissue.

Blood sometimes is effused into the cellular substance, independently of external violence, as in purpura and sea scurvy, and gives rise to hard and livid tumours. Blood also is effused into this tissue in some bad cases of ague, and of remittent fever. Air also sometimes fills this tissue. It is either secreted, or it proceeds from a rupture of the larynx, windpipe, or lung.

Different kinds of tumours are occasionally lodged in the cellular substance.

Mr ABERNETHY has described vascular sarcoma as being imbedded in the subcutaneous cellular tissue; and inclosed in a thin capsule, formed of condensed cellular substance.

The different species of encysted tumours and cysts, filled with fluids of different kinds, as pus, serum, blood, melanotic fluid, or a mixture of these, have been often observed in this tissue, and these cysts are, in all respects, similar to serous membranes.

Hydatids have occasionally been found in the cellular tissue.* I have never seen, in the cellular substance of the alimentary canal, encysted tumours, containing a white chalky-like substance, or steatomatous, or meliceritious matter.

Various other kinds of tumours have been occasionally met with in the subcutaneous cellular substance.

Many attempts have been made to classify such tumours, which, though hitherto by no means completely successful, have proved of some use, and drawn the attention of medical men to this important subject. Much, however, yet remains to be done; the inquiry is very far from being exhausted, and will amply remunerate any one who directs his attention to this very important branch of investigation.

* There is a good specimen of this disease in the Museum of the University. Vide Catalogue. Tumours.—" Large cyst, removed from upper part of the thigh. It contains, inclosed in imperfect membranes, numerous hydatids (*Cysticercus cellulosus*, R.) several of which contain internal granulations. Parietes of sac, cartilaginous and lamellated. The tumour adhered to the lower part of the tensor vaginæ femoris.

CHAPTER IV.

OF THE ORGANIC DISORDERS OF THE PERITONEAL COAT OF THE STOMACH AND INTESTINES.

SECTION I.

GENERAL OBSERVATIONS ON THE STRUCTURE AND DISEASES OF SEROUS MEMBRANE.

The serous membranes are soft, semi-transparent, flexible, and somewhat elastic, of considerable strength, and various degrees of thickness, and largely supplied with absorbents and bloodvessels.

The outer flocculent surface of serous membranes is united to the neighbouring parts by fine cellular substance; but the inner is remarkably smooth and free, directed towards certain cavities of the body, and constantly kept moist, by a fluid which is secreted from the exhalant arteries.

A serous membrane forms a shut sac, and many of the organs which are lined by a mucous membrane are covered by a serous membrane, as the lungs, stomach, intestines, and uterus.

Serous membranes, in the healthy state, do not possess much sensibility, as has been frequently remarked, and distinctly proved by my Father.

In three different cases, in which the chest was punctured, he introduced a curved probe, and rubbed the point of it against the pleura, yet the patient *did not experience pain.* And, in another case, he inserted a long bougie into the chest; and, on turning it round, the patient felt something moving, but *did not suffer pain.* He also repeated the experiments of Haller upon pigs, removing the intercostal muscles, pricking, and even

tearing the pleura, but the animals did not seem to suffer from it.

It is also remarkable, as Dr CARMICHAEL SMYTH has observed, in his paper on the different kinds of inflammation, "that, though not very sensible to the usual stimuli, they (serous membranes), are affected in a singular manner by the air; a stimulus which has little or no operation on other parts of the body endowed with the highest sensibility *." But several cases are recorded of patients having survived even the operation of gastrotomy.

Serous membranes, when inflamed, become exquisitely sensible; and it is not a little remarkable, that Baron HALLER, who was no less distinguished for his talents than his industry, and who also had devoted much attention to pathology, should have entertained a different opinion; he endeavoured to prove that the intercostal muscles are the seat of pleurisy,—an opinion which is contradicted by all the phenomena of the disease, and by the dissection of those who have fallen victims to it.

The serous membranes are liable to several organic derangements, and especially to inflammation and thickening.

All serous membranes are not equally liable to inflammation: thus, the peritoneal coat of the intestines is much more liable to inflammation than that portion of the same membrane which lines the parietes of the abdomen.

The inflammation is induced by slight causes. This observation applies to all serous and synovial membranes, as an instance of which, inflammation of these membranes is often renewed by so slight a cause as exposure to cold.

Their vessels, from particular causes, secrete purulent matter, or a gelatinous fluid, or coagulable lymph †, or a substance which forms the basis of cauliflower excrescences, cartilage, bone, or of earthy concretions.

The limpid fluid, which, in the healthy state, moistens only the inner surface of serous membranes, is either secreted in extra-

* Vide London Medical Communications, vol. ii. p. 200.

† Such was the name given to it by Mr HUNTER. I have called it *fibrine*. The foreign authors describe it under the name of Albuminous Deposition.

ordinary quantity, or the absorbent vessels of the membranes cease to perform their functions with their usual activity; hence a dropsy follows: on many occasions, the dropsical fluid contains a number of hydatids.

The quantity of pus secreted by the vessels of serous membranes is, on many occasions, very considerable, in some cases of peritonitis, pleuritis, pericarditis, and of injuries of the head.

When purulent matter is contained within the sacs formed by the serous membranes, it very rarely happens that there is any degree of ulceration of the affected membrane.

OF THE ACUTE INFLAMMATION OF THE PERITONEAL COAT OF THE ALIMENTARY CANAL.

If a serous membrane be slightly irritated, its vessels pour out serum; if further excited, inflammation follows, together with adhesion; but if adhesion does not take place, pus is frequently effused.

Peritonitis is acute or chronic, and occurs as a primary or secondary disorder. In the former, it is to be imputed to the usual causes of inflammation; in the latter, to rupture, or strangulation of a portion of the intestine.

Serous membranes, when inflamed, become thicker, softer, and of a brilliant scarlet colour, from the number of their capillary vessels that are filled with arterial blood. The corresponding veins are also distended with blood, and the redness of the inflamed part is often increased by an effusion of blood into the cellular substance under the peritoneum, in the form of streaks or patches. But I have seen the peritoneal coat of the intestines of a sea-green colour, when its vessels were much gorged with blood, and when coagulable lymph had been at the same time effused. These membranes also lose their natural thinness, lustre and transparency, and become opaque; the bloodvessels are much distended, and red points or patches appear on the inflamed membrane.

In acute inflammation of ten or twenty hours' duration, there is seen on dissection an effusion of lymph, the thickness of

which varies according to the degree of the inflammation, from a line to a quarter of an inch. When recently effused, it is always soft, and of a light yellow colour. This fluid coagulates, on account of the quantity of albumen it contains, so that, if alcohol be added to it, it becomes opaque, white, and shrivelled.

In such instances, there are distinct projections from the surface of the lymph; in others, particularly the pericardium, it assumes the form of Brussels lace.

The cavities lined with fibrine, generally contain a turbid serum, which is effused from the capillary vessels; this is yellowish or greenish, homogeneous, and semi-transparent, through which, films of fibrine of different sizes shoot in different directions.

When the contiguous surfaces of serous membranes have been inflamed, as the pleura costalis and pulmonalis, they sometimes adhere intimately to each other, and bloodvessels pass through the bond of union. In a short time, the lymph becomes more opaque and firm, and at length organised, and is said to form *a false membrane*, or *membrane of adhesion.*

There are many causes which induce this inflammation, of which the action of the external air is the most remarkable; and when the air gets admission to such membranes, the wound proves very dangerous; hence a great danger of wounds penetrating the cavities of the belly, or chest, joints, or the opening of the bursæ mucosæ.

The baneful effect of the influence of the air has been proved at great length by my father, in his treatise on the Bursæ Mucosæ, which suggested to him the means of preventing its admission, in performing various operations of surgery, which method has now received the sanction of surgeons in general.

This inflammation is extremely apt to spread from one part of a serous membrane to another, and also to neighbouring membranes, though they be of a different structure. Thus, it often happens, that the peritoneal coat of the intestines is inflamed, in the first instance, and this inflammation sometimes extends to the parietes of the abdomen, or even to the muscular or mucous coats of the intestines.

In cases of peritoneal inflammation, the intestines are frequently distended with a considerable quantity of gas.

When the peritoneal coat of intestines is inflamed, there are frequently contractions in different parts of the tube, which is probably owing to inflammation having been extended to the muscular coat.

SECTION II.

OF INFLAMMATION OF THE SEROUS COAT OF THE STOMACH.

This disease is by no means frequent, and its symptoms bear a striking resemblance to those of inflammation of the mucous membrane of the stomach. The tongue is, however, not red at its tip and edges, but pale; there is not the same acute sensation of internal heat or burning in the region of the stomach, and the breathing is more hurried than in inflammation of the mucous membrane; the pulse, instead of being soft and compressible, is small, quick, and hard.

In the subacute form of this disease, the symptoms above enumerated are comparatively milder, and more especially the sense of heat in the epigastric region.

This inflammation is generally combined with that of the peritoneal coat of the intestines, and with that of the serous membrane of the liver.

SECTION III.

OF INFLAMMATION OF THE PERITONEAL COAT OF THE INTESTINES.

Peritonitis is either acute or chronic, and a primary or secondary disorder. It is of the latter description, when induced in

consequence of a strangulated hernia, or of ulceration or rupture of the intestines; or of cutaneous disorders having been suddenly repelled. When I was lately at Harrowgate, Mr RICHARDSON informed me, that he had seen many instances of peritonitis, which had been induced in persons afflicted with cutaneous disorders, with bathing too soon in Harrowgate water; and that he had seen much relief obtained, after bleeding and blistering, by the use of tepid baths, which restored the cutaneous disease.

The subsequent statement has been deduced from between forty and fifty cases, in which the symptoms and post-mortem appearances were accurately observed. The morbid specimens of a very considerable number of them are preserved in the Anatomical Museum of the University of Edinburgh.

The majority of the patients were females. None of them were below the age of ten, few below that of twenty, few above fifty, and none above that of sixty-seven years.

In eight of the males the disease was far advanced. Among these there were four cases of complete erosion, and three of stricture of the intestines. The intestines were much diseased in eleven of the females; there were five cases of erosion, and three of stricture.

In three males, the inflammation of the intestines had apparently not proceeded farther, than what used to be termed its *adhesive* stage. In these cases, the peritoneum was thickened, had lost its healthy semi-transparency, and its glistening surface; it appeared unusually vascular, and of a red colour. Generally this appearance did not equally pervade the whole of the membrane, but was more apparent in some places than in others. The vascularity of the peritoneum may not have been apparent from the effusion of coagulable lymph on its surface, into which a quantity of bloodvessels passed from the inflamed membrane. The effused lymph, in some places, was organized and vascular, thick and tough. In two cases, the effusion of lymph was confined to the peritoneum, lining the *parietes* of the abdomen; in the third case, the effusion equally pervaded the whole of the membrane. The other coats of the intestines were also frequently found thickened.

The different turns of the intestines are frequently agglutinated to each other by the effused fibrine. Generally the mucous coat was vascular, and of a red appearance; but, in one case, it was *natural*, though the parietal peritoneum was *covered* with lymph, and the external surface of the intestines bore marks of *high* inflammation. A serous fluid, containing shreds of lymph, was generally effused into the abdomen.

There were also occasional deviations from the usual appearances. Thus, in one case, there were numerous steatomatous-looking tumours on the peritoneum, and the membrane was of a darkish-red colour, apparently from effusion of blood into the cellular tissue beneath. The peritoneum was occasionally studded with tumours of a more dense structure. In one case, the *external* surface of the *parietal* portion of the peritoneum was covered with fibrine, in consequence of a large abscess, filled with purulent matter, having been situated betwixt it and the abdominal muscles. The other abdominal viscera were also frequently affected. The omentum was sometimes thickened, indurated, and adherent to the peritoneum, and occasionally contained small firm steatomatous tumours, or cysts filled with a serous fluid. In one case, the liver was diminished in size, hard, and of a mottled appearance, whilst the spleen was much enlarged. The liver also frequently adhered firmly to the stomach and adjacent convolutions of the intestines, by means of lymph effused on its peritoneal surface. The spleen was occasionally of small size, and covered by a similar adventitious membrane.

The inflammation was occasionally limited to the smaller intestines.

The serous membranes of the thorax were occasionally sympathetically affected. We sometimes meet with serous effusion into the cavity of the abdomen, and at the same time considerable serous effusion into the cavities of the pleuræ.

The mesenteric glands, in several cases, were enlarged, and often contain cheesy, and occasionally *earthy*, matter. In some instances the glands were in progress towards suppuration; in others, completely suppurated.

The smaller intestines were sometimes much distended with

air, and frothy fæculent matter; and, in some cases, the smaller intestines were considerably dilated, except the termination of the ileum, which was so contracted as scarcely to admit the point of the finger. In this last instance, it is to be presumed that the contraction, had taken place but a short time previous to death, as the intestines appeared to be only highly vascular and adherent to each other; the only peculiarity in the morbid appearances being, that the peritoneum was remarkably *dry*.

In one case, the coats of the whole of the intestines were much *thickened*, as also those of the stomach, the cavity of which was considerably contracted; in this case there was ℔ viii of serum in the cavity of the abdomen.

I subjoin three cases of violent peritoneal inflammation, produced by external injury.

In the first of these, the patient was eighteen years of age. The intestines were distended with flatus, vascular, and of an intermixed dark-green and red colour. The cavity of the pelvis was filled with a large quantity of dark bloody urine. The symphysis pubis was separated; the right os pubis was fractured in two places, near its symphysis, and at its junction with the ischium. The right sacro-iliac synchondrosis was also separated for about an inch. A sound passed into the urethra, entered the cavity of the pelvis, the bladder being entirely separated from the membranous portion of the urethra, close to the prostate gland. A wheel of a loaded cart had passed over the perineum, symphysis pubis, and right iliac region. The symptoms were, the lower part of abdomen, the perineum, and upper part of thighs, much swollen. The scrotum much distended with extravasated blood. The patient suffered intense pain, much increased by pressure, especially on the lower part of abdomen. There was no discharge of urine. A quantity of fluid, similar to the effusion into the cavity of the pelvis, was drawn off by the catheter. No alvine evacuation. Delirium followed. There were gangrenous spots on the perineum and upper part of thighs. On the third day after receipt of the injury, the patient died.

In the second patient, the peritoneum, abdominal muscles, and integuments were apparently entire. The peritoneum, especially of the intestines, was highly vascular, and covered by coagulable lymph. The intestines closely adhered to each other. About the middle of the jejunum, there was a round aperture, sufficient to admit a man's thumb; "this was surrounded by a smooth brim and puckering of the adjoining part of the gut." A considerable quantity of serous fluid was effused into the cavity of the abdomen. The patient had received a violent kick from a horse, above, and a little to the left side of, the umbilicus. This was followed by excruciating pain over the whole of the abdomen, increased by pressure, and relieved neither by opiates, bleeding, nor fomentations. Spasms of abdominal muscles and vomiting followed, together with great anxiety. The pulse at first was low, it gradually rose, and becoming such as is usual in enteritis. The patient died forty-three hours after the receipt of the injury.

In the third patient, a lad of sixteen, the abdomen was swollen, crepitated, and contained a great deal of offensive air; and lb. v. of fluid blood was found in the cavities of abdomen and pelvis. The intestines were of a red colour, as if dyed by the blood. There was an extensive laceration of the duodenum, the gut being almost divided, three inches from the pylorus. The surrounding parts were of a dark-red colour. The stomach was empty, and of its natural appearance. The upper part of liver was extensively lacerated, and numerous coagula were dispersed through its substance. He received a severe injury of abdomen, by having been crushed between a post and the wheel of a cart. This was followed by severe pain of abdomen; countenance was pale and anxious; pulse enteritic, and abdomen swollen. Spasms of abdominal muscles, together with extreme restlessness and vomiting, followed. The patient died comatose.

In these cases, the pain ceases, coldness of the extremities, and clammy sweats follow, and the pulse intermits before death.

OF THE SYMPTOMS OF ACUTE INFLAMMATION OF THE PERITONEAL COAT OF THE INTESTINAL CANAL.

The symptoms of this disease are by no means uniform in rapidity and urgency, which probably depends upon the degree, extent, and different causes which have excited it.

Generally the disease assumes a very acute form, is very rapid in its progress, and frequently proves fatal in two or three days.

It is characterized by loss of appetite, occasional nausea, restlessness, thirst, dry, hot and scaly skin, rigors, sharp, small, irregular and contracted pulse, by extreme tenderness, or rather acute pain, over the whole belly, which is most severe at or near the navel, which is tense; and the pain is much increased by the slightest pressure, any bodily exertion, or by the action of a purgative, or by constipation.

When the disease has been of a few hours' duration, the belly becomes swollen from distention of the bowels with air, which probably is to be imputed to the loss of tone in the coats of the intestines, occasioned by the inflammation.

The pulse in this disease is various, and not an unerring index of the degree of inflammation. Sometimes it is scarcely accelerated, sometimes frequent and full, or small and frequent; when, upon dissection, a considerable effusion of fibrine within the abdomen has been discovered.

The pain becomes still more acute at particular times, which is probably owing to the distention and transit of air from one portion of the inflamed bowels to another; the patient tosses from acute pain, and sometimes the belly is so tender that the weight of the clothes cannot be borne, and the pulse becomes more rapid and weaker; and, when vomiting follows, a quantity of bilious fluid is discharged, which sometimes contains a portion of feculent matter.

The subsequent symptoms are short, laborious and painful respiration, and is performed chiefly by the intercostal muscles,

in consequence of the extension of the inflammation. As the peritoneum lining the abdomen is inflamed, the movements of the body and the action of the diaphragm and abdominal muscles occasion pain.

For a similar reason, hiccup and vomiting sometimes take place, and often a peculiar spasmodic action, like the belshing of wind, continues for a considerable time without interruption, and accompanied by acute pain; and, on some occasions, there is acute pain during micturition, and diminution or almost suspension of the secretion of urine; and, in the case of a female patient, there were frequent calls to make urine, which was voided frequently in small quantities, and with great pain. The fundus uteri was found much inflamed.

In the progress of the disease, the pain is sometimes considerably aggravated in particular regions, in consequence of the propagation of the inflammation, or of a sudden increase of it, where it originally existed.

Towards the fatal termination of this inflammation, the features become collapsed, and the strength much depressed; the breathing more difficult, the vomiting more frequent; the acute pain in the belly abates, whilst the swelling increases; the pulse sinks, becomes very quick and irregular, which is rapidly succeeded by hiccup and death.

Towards the termination of the disease, the sensorium becomes much affected, occasioning wildness of expression, incoherence in conversation, and delirium.

It is a remarkable fact in the history of peritonitis, that the activity of the disease may subside, leaving the patient in an apparently convalescent state, with all the functions of the abdominal bowels in a healthy state, while most extensive disease remains. This may be unsuspected until the disease assumes a fatal character, either suddenly or gradually undermining the health of the patient.

Such is the usual train of symptoms. There are certain *exceptions* to these which merit attention.

It has been already observed, that constipation is a usual

symptom, but occasionally the constipation alternates with slight attacks of diarrhœa, which are generally, however, but of short duration.

On the other hand, diarrhœa, with tormina and tenesmus, are sometimes the principal symptoms of the disease. The stomach is almost always much disordered, with constant headach, and occasionally there is fixed pain in the region of the epigastrium.

When the bowels are easily moved, it sometimes happens that the fæces are evacuated with violent pain; and sometimes after the disease seems subdued, the operation of a purgative is immediately followed by a renewal of the symptoms in all their original violence.

In the milder form of this disease, the menstrual discharge is generally suppressed, but, in one case, the menses appeared regularly every fortnight.

Peritoneal inflammation is sometimes very much relieved in consequence of the appearance of an eruption all over the skin of the abdomen. I had occasion to visit an elderly lady, who was seized with all the ordinary symptoms of acute peritoneal inflammation, after exposure to cold and damp.

Upon the invasion of the disease, twenty leeches were applied to the abdomen, and afterwards a large blister.

I was desired to visit her, on account of the cutaneous eruption, which she informed me had removed the acute pain and tenderness in the bowels, as soon as it appeared.

The disease sometimes assumes somewhat of the typhoid type, as is indicated by the great prostration of strength, small contracted wiry pulse, anxiety, and occasional delirium.

Lastly, the symptoms of acute peritonitis are sometimes consequent to rheumatism.

From what has been stated as to the nature of this acute disease, it is obvious that the lancet is the most powerful remedy in the earlier stage of the disease; and the quantity of blood to be drawn must be varied, according to the severity of the symptoms. When the more acute symptoms have been removed, leeches and blisters should be applied to the pained part. Purgatives are also useful when the effusion has taken place.

SECTION IV.

OF THE CHRONIC INFLAMMATION OF THE PERITONEAL COAT OF THE INTESTINES.

This inflammation is more frequent than the acute.

Upon dissection, the peritoneal coat is found much thickened in different places, from the thickening of the subjacent cellular tissue. The different turns of the intestines are found adhering to each other, to the omentum, and often to the parietes of the abdomen, by vascular fibrine, which has been converted into membranous adhesions of different lengths; and more or less serum is generally effused within the abdomen; and, at the same time, the peritoneum is sometimes tuberculated to a greater or less extent.

Purulent matter is frequently found in the cavity of the abdomen, or lodged within small cysts between the adhering intestines; and, occasionally, there is ulceration of the mucous membrane. The symptoms of the disease are milder than those of the more acute form; these are, distention of the belly, accompanied with sense of heat, and slight pain, which is constant, or only occasional, and this is limited or diffused, and is increased on pressure or motion, and especially during the erect position. Some patients complain of tenderness rather than pain in the belly; others of no degree of pain, though, upon dissection, the turns of the intestines have been found adhering to each other. The pulse is generally small, full, and hard, the tongue furred, and the breathing somewhat laborious, and rather quicker than in health.

In some cases the above symptoms are more moderate. There is variable appetite, merely accompanied with irregular bowels, and some degree of tenderness of the belly, a sense of distention of the belly, which scarcely amounts to pain, excepting when considerable pressure is applied; some patients suffer from constipation, others from diarrhœa.

This subacute or chronic peritonitis, is sometimes consequent to the acute form of the disease, or to scarlatina and measles; and it has been sometimes combined with diseased mesenteric glands, or with diseases of the lungs, or extensive suppuration within the abdomen, or tubercles of the peritoneum.

I have given cases of acute peritonitis, arising from external injury; the chronic form of the disease has been sometimes induced by the same cause.

The chronic peritonitis is by no means rare, is often very insidious in its origin, comes on without a very obvious cause, and is also obscure in its progress, and often fatal in its consequences, unless it be obviated at or near to its commencement.

This form of peritonitis is sometimes connected with perforation, proceeding from without inwards, and is caused by the suppuration of tubercles.

Dropsy of the abdomen is occasionally a consequence of inflammation of the peritoneum, and the consistence, as well as the other sensible properties of the dropsical fluid, are very various, as well as the rapidity with which it is effused; generally it is limpid, and straw or greenish coloured, but occasionally brown, and somewhat like coffee in colour, and mixed with albuminous matter.

A fluid is sometimes found under the peritoneal coat of the intestines, and under the muscular parietes of the abdomen.

According to Dr Bright *, when the urine is coagulable by heat, in those who have died from dropsy, the kidneys are always diseased.

A sero-purulent fluid is frequently secreted by the inflamed vessels, and in very considerable quantity, especially in women who have died after child-bearing.

Pus is also occasionally secreted by the serous membranes, when these are inflamed, and without lesion or ulceration of their surfaces.

* Dr Bright's Reports on the appearances observable in diseases terminating in dropsical effusion, merit peculiar attention.

When an inflamed serous membrane is covered with fibrine, the pus is derived from the vessels of the inflamed membrane, but when the fibrine forms an organised false membrane, as in chronic pleuritis or in chronic peritonitis, pus is secreted by the vessels of the new membrane only.

The sero-purulent fluid or pus is contained in a distinct sac, as was long ago observed by MORGAGNI, Epist. 34.

OF THE PUERPERAL PERITONITIS.

Besides the more frequent species of peritonitis, which is common to both sexes, there is a variety of the disease which is modified by the puerperal state, and which sometimes occurs soon after delivery, from exposure to cold, violence during delivery, or the use of stimulants.

It often affects the peritoneum of the ovarium and Fallopian tubes, which is rendered opaque, thickened, and loses its glistening appearance; and, upon certain portions of the inflamed membrane, there are red spots of different sizes, together with an effusion of more or less fibrine. A quantity of purulent or sero-purulent fluid is frequently found between the bladder and womb, or between the womb and rectum; and it sometimes happens that the fibrine forms a cyst, which is filled by pus.

In the more severe cases, the inflammation extends over the whole of the peritoneal covering of the intestines, and sometimes even to that portion of the peritoneum that lines the parietes of the abdomen. In a few instances, a suppuration is observed in the veins of the womb by the late Mr WILSON *.

When this disease has passed its acute stage, purulent matter, in some instances, is discharged at the navel. According to that excellent pathologist Dr CRAIGIE, "this opening is effected, first, by distention, the pressure of the matter separating the recti, and enlarging the umbilical afterwards by lace-

* Vid. Transactions for the Improvement of Medical and Surgical Knowledge.

ration, while the peritoneum, detached from the supporting tissues, and sustained only by the skin, at length gives way, and forms an opening *." Peritonitis is often combined with puerperal fever.

Dr DENMAN has mentioned cases which terminated favourably, in which the purulent matter was discharged by the urethra. Much valuable information on this disease is to be found in the works of Drs ARMSTRONG, LEAKE, HAMILTON, BURNS, HULME, &c.

OF THE CORRESPONDING SYMPTOMS.

The symptoms of puerperal peritonitis are not essentially different from those of the ordinary peritonitis, but it sometimes begins without shivering.

The disease is characterized by headach, oppression, great anxiety and prostration of strength, by flushing of the face, or sometimes by a pale ghastly countenance expressive of dejection of mind, and much bodily suffering, and even of despair. Nothing will stay on the stomach, nausea and vomiting are excited even by the mildest food; and in the more advanced period of the disease, a dark coloured fœtid fluid is rejected by vomiting, even though the coats of the stomach be sound; a general fulness generally precedes the pain of the belly, which begins low down in the region of the womb, and this is accompanied frequently by a sense of bearing down, which I have observed even in virgins affected by peritonitis. The tongue is pale, or rather white at first, but becomes brownish, and aphthæ appear in the mouth and throat. The pain in the belly is at first slight, but it soon increases, and sometimes is excessively acute, especially in the region of the womb, and it extends down to the thigh. The pulse, which had been at first full, becomes feeble. There is generally less thirst, less heat of skin, and less flushing of the face, than in common peritonitis.

* Vide his Elements on General and Pathological Anatomy. Edin. 1828.

Constipation takes place in the earlier stage, but afterwards the body becomes loose, and the lochial discharge is vitiated or ceases.

In consequence of peritonitis, ulceration sometimes follows: the mucous and peritoneal surfaces of the bowel directly communicate, and form tubes, which communicate freely with each other, and with the thickened and ulcerated peritoneum, by numerous openings. Dr GEORGE GREGORY has described a species of chronic peritonitis occurring in children, and giving rise to symptoms resembling tabes mesenterica, and which induces thickening, and finally ulceration of the peritoneum, and the secretion of matter, called by him scrofulous.

From what has been stated regarding peritonitis, it follows,

1*st*, That this is a frequent and dangerous disorder, which assumes different shapes, and is modified by pregnancy.

2*dly*, That the acute is a primary or secondary disorder, and that it sometimes passes into the chronic; that the former is frequently of two or three days' duration, but the latter of as many weeks, or even months.

3*dly*, That the inflammation, in the greater number of instances, primarily commences in the peritoneal coat, but is seldom limited to it; though sometimes it originates in the mucous coat, and is propagated speedily to the other coats, until, in the progress of the disease, all the coats are at the same time implicated.

4*th*, That peritoneal inflammation is an invariable consequence of perforation of the intestinal tube, unless when arrested by adhesion, and obliteration of the aperture.

5*th*, That this inflammation is occasionally limited to a certain portion of the smaller or larger intestines, but is more frequent in the latter; but that, in the progress of the disorder, it frequently extends to the peritoneum lining the parietes of the abdomen, or to that of the stomach, kidneys, or bowels of the pelvis, or occasionally even to the pleura.

6*th*, That the symptoms vary somewhat according to the seat and extent of the inflammation of the peritoneum.

7*th*, That inflammation of the intestines may prove fatal, without their being obstructed. This, it may be observed, on-

ly occasionally takes place, as is proved clearly by the subjoined interesting case, published by Dr Marshall Hall.

" A man, aged fifty, had acute pain in the hypogastric region, with frequent desire and difficulty of voiding his urine. After some relief during the night, his complaint was renewed on the following day, and, after the operation of a dose of castor oil, it increased to such a degree as to produce writhing of the body, with urgent ineffectual attempts to void urine; the pulse natural. Relief was obtained from the warm bath, after which urine was voided. (3d day.) Pain and dysuria continued, and the pain extended more generally over the abdomen; the bladder was found empty by the catheter; pulse nearly natural. (4th day.) There had been copious evacuations by stool; some high coloured urine passed; pulse 90, and soft; tongue white. (5th day.) Pain returned after a saline purgative, which operated scantily; it was now chiefly referred to a spot on the left iliac region, increased by pressure, but also attended with a more general pain over the abdomen; great restlessness, and much flatus in the stomach; a little vomiting for the first time on taking any thing, but no continued nausea or retching; pulse 96; in the evening 84, soft and regular. (6th day.) The chief pain had shifted to the right iliac region,—the former pain in the left having now ceased; pulse 124, and small; feature collapsed; body cold; died at 4 P. M.

" *Inspection*.—Much exudation and adhesion over the surface of the bowels; the ileum, cœcum, and colon, were injected with numerous vessels in some places, so as to acquire a dark colour; but the texture was firm and entire. The appendiculæ pinguedinosæ were injected and covered with a viscid effusion, communicating the appearance of a mass of disease. The external and posterior portion of the bladder appeared also a little injected; the other viscera were natural."

In the above case, the dysuria was probably connected with the inflammation of the peritoneal coat of the bladder of urine.

8*th*, That hardness, tension, and enlargement of the abdomen, and tympanites intestinalis, in the advanced period of the disease, are bad symptoms, as indicating extensive adhesion,

and effusion in the abdomen, and loss of tone of the bowels, and more especially when this latter occurs before the severity of the inflammation has been checked or removed.

9*th*, That tympanites abdominalis proves generally fatal.

10*th*, That the pulse is not an unerring index of the degree of the inflammation of the bowels; that it is sometimes frequent and small, and sometimes frequent and full, or it may be scarcely accelerated when there has been effusion of fibrine and of serum, and other marks of inflammation discovered upon dissection.

11*th*, That partial inflammation of the peritoneum of the lungs, diaphragm, stomach, omentum, liver, or bladder of urine, may similate other diseases of these organs.

12*th*, That the slighter grades of inflammation of the peritoneum cause dropsy of the belly, and that the dropsical fluid varies in its quantity, colour, consistence, and other properties, and is occasionally mixed with a little blood or pus, or with shreds of fibrine.

13*th*, That inflammation of the peritoneum is sometimes succeeded by extensive suppuration.

14*th*, That inflammation of the peritoneum sometimes occasions only partial adhesions of the convolutions of the intestines to each other, or to the contiguous viscera; even when before death the symptoms had been so slight as to escape observation.

15*th*, That inflammation of the peritoneal and other coats of the intestines, generally proves fatal, before gangrene has come on. According to Dr Abercrombie, "cessation of the pain, sinking of the vital powers, great weakness of the pulse, and coldness of the body, are generally considered as indicating gangrene." He adds,

"When treating of ileus, I have produced evidence that this is by no means invariably the case; for I have shewn these symptoms connected with slight and recent inflammation, and I have shown them recovered from. I shall now only add the following example:

"CASE.—A man, aged 40, was affected with enteritis in the usual form, for which he was treated in the most judicious manner by a respectable practitioner. On the fifth day the pain ceased; the pulse was 140, and extremely feeble and irregular; his face was pale, the features were collapsed, and his whole body was covered with cold perspiration; his bowels had been moved. In this condition I saw him for the first time. Wine was then given him, at first in large quantities, and, upon the whole, to the extent of from two to three bottles during the next twenty-four hours. On the following day his appearance was improved; his pulse 120, and regular; the wine was continued in diminished quantity. On the third day his pulse was 112, and of good strength, and in a few days more he was well.

"In such a case as this, there could be no doubt as to the only practice that could be adopted; but there are cases in which, at a particular period of the disease, wine is given with much advantage, though the symptoms are much more ambiguous, and it is difficult to decide upon the practice which ought to be followed."

16*th*, That chronic peritonitis is a disease by no means uncommon, and which, though sometimes a consequence of the acute form, or of measles, or scarlet fever, generally supervenes, without any obvious cause, and most frequently in debilitated constitutions, and in those advanced in life.

It is very insidious in its progress, variable in the urgency of its symptoms, and very frequently fatal.

17*th*, That the more usual symptoms of chronic peritonitis are, a degree of tenderness, or pain, in some part of the belly, which is increased by pressure, motion, and the erect posture, and accompanied with impaired appetite, loss of strength, listlessness, distension of the intestines with air, occasional vomiting, and constipation; but that, in some cases, the earlier symptoms are so slight, as not to attract the attention of the patient, until he becomes considerably emaciated. There is diarrhœa, or constipation, frequent pulse, with a degree of hectic blush on the cheeks; and, on an attentive examination, a certain degree of uneasiness and tenderness of the belly on pressure is perceptible.

18*th*, That sometimes the symptoms of the disease are very obscure.

Lastly, That chronic peritonitis is sometimes combined with organic diseases of the mesenteric glands, liver, spleen, lungs, or omentum, and that, in this form of disease, the peritoneum is much thickened, and sometimes considerably indurated; and its different portions frequently adhere to each other to a greater or less extent, or to the parietes of the abdomen.

SECTION V.

OF ULCERATION OF THE PERITONEUM.

This morbid condition of the membrane has been sometimes but by no means frequently observed *.

According to Broussais, perforation took place in one of sixteen cases of chronic peritonitis.

SECTION VI.

OF TUBERCLES OF THE PERITONEUM.

Tubercles of the peritoneum are generally of a greyish colour, various in size and number. In a few instances, they are limited to a portion of the membrane; but, in others, they extend over the greater part of the peritoneum, and sometimes occur when the peritoneum is in a state of chronic inflammation.

They are occasionally as small as pins' heads, at other times large, of a caseous consistence, and somewhat softened in their centre, and they excite inflammation of the membranes.

I have seen such tubercles attached to all the serous membranes, but most frequently to the peritoneum.

* Broussais, Phlegmasies Chron. sect. ii. chap. vi.
J. Hunter on the Blood, part ii. chap. vi.

Cartilaginous excrescences from serous membranes are more rare.

I subjoin a striking example of tubercles of the serous membranes of the head, thorax, and abdomen.

February 23. 1823.—A. B. æt. 35. complains of pain in epigastrium, and difficult respiration, oppression about the breast, and œdema of the lower extremities. Has redness, desiccation, and slight swelling of scrotum, which is painful on pressure. Pulse 128. Tongue clean Appetite tolerable. Little thirst. Urine copious. Bowels loose.

Has been indisposed during fourteen months; but had no medical aid till November last, at which time, he had all the symptoms of hepatitis, with violent itching over the whole body, attended with considerable weakness.

These symptoms were partially removed by the use of mercury, the warm bath, and various external applications, viz. murias hydr., nitras hydr., sulphas potassæ, &c.; but having incautiously exposed himself to cold, the present complaints supervened.

The patient died five weeks afterwards.

Sectio cadaveris.—After the removal of the skull-cap, there appeared *small tumours*, about the middle *of the longitudinal sinus, one on each side*: one of them made a corresponding depression in the internal table of the cranium. The veins of the brain were very turgid.

On elevating the dura matter, considerable effusion was observed between the arachnoid and pia mater, and about ℥iv of serum were removed from the ventricles. The substance of the brain was of a very light red colour, as also the plexus choroides.

When the thorax was opened, a large quantity of serous fluid was found in each of its cavities, but more in the left than in the right; in all about lb. v.

The pericardium contained about ℥xx of the same fluid.

On the anterior part of the mediastinum *an enormous cartilaginous mass was found, attached superiorly to the cartilages of the first and second ribs, and to the first bone of the sternum*; ad-

hering on both sides to the lungs, but more to the left than to the right; extending *posteriorly around the curvature of the aorta, and inferiorly involving the pericardium**. On more minute examination, the lower portion of the trachea, with its divisions into the bronchiæ, the arch of the aorta, with the vessels to which it gives origin, the pulmonary artery, with its divisions, and the descending vena cava, were all found imbedded in the tumour; but none of these, except the left branch of the pulmonary artery, was in the least compressed.

The left lung was interspersed with small cartilaginous points, some of which had proceeded to suppuration; and the lung appeared injured in its texture. The right lung was perfectly healthy.

The pericardium was studded *with small tumours, of cartilaginous consistence.*

There was some serous fluid in the abdomen.

The liver was a little indurated and enlarged, the spleen soft, and covered with the *same cartilaginous-looking substance as the tumour above described.*

All the other viscera were healthy.

The fluids taken from the brain, thorax, and abdomen, coagulated on the application of heat; the fluid from the brain was slightly coagulable; in that from the thorax the precipitation was greater, but the fluid from the abdomen contained the greatest portion of coagulable matter.

Tubercles of the peritoneum give rise to a slow, insidious, and generally fatal disease, which begins by tenderness and distention of the abdomen, accompanied with nausea and vomiting.

The appetite is generally inordinate; there is a languid expression of countenance, the features are sharp and contracted; there is undue sensibility to cold, together with a regular but frequent pulse. The body is generally costive, but sometimes in the opposite state: there is swelling and tenderness of the

* I have often seen the bronchial glands forming a large sarcomatous tumour, in which the original dark matter of the glands was disposed in an arborescent form.

belly, which gradually increase, and also the debility. There is often œdema of one leg. The alvine evacuations are pale coloured; and, occasionally, a tumour is perceptible in some part of the abdomen, but, in other cases, there is effusion into the cavity of the abdomen, and a distinct fluctuation to be perceived. If the patient be a female, the catamenia cease. When the disease has been of some duration, every kind of food creates great uneasiness; the patient suffering much from flatus, and sense of weight in the belly, and occasionally from acute pain, at length dies much emaciated.

To the valuable works of MORGAGNI, Drs BAILLIE, and BARON * of Gloucester, and of Dr MONCRIEFF of this city, the reader is referred for a more minute account of the nature and symptoms of tubercles of the peritoneum.

SECTION VII.

GANGRENE OF THE PERITONEUM.

SEROUS MEMBRANES are occasionally the seat of gangrene, in consequence of very acute inflammation. This I have seen in the peritoneum, and also in the pleura, when the intestines or lungs were gangrenous.

Gangrene of the intestines is not unfrequent in cases of strangulated herniæ.

The protruded portion of intestine acquires a black or dark-brown colour, loses its healthy texture, is flaccid, tears like a piece of wetted paper, is thickened, emits a fœtid odour, and, owing to an effusion of blood beneath the peritoneum, this membrane may be readily detached.

Gangrene may be mistaken for the dark-brown or purple colour, which a portion of strangulated intestine acquires, from the veins of the displaced part being gorged, and from the infiltration of serum, tinged with blood, beneath the peritoneum. But, in this case, the surface of the displaced intestine is clear, smooth, of the healthy texture, and does not emit a fœtid smell.

* Vid. BARON on Tuberculous Accretion of Serous Membranes. London, 1819.

SECTION VIII.

OSSIFICATION OF THE PERITONEUM.

Ossification of serous membranes is not unfrequent, and especially that of the arachnoid, pleura, and pericardium. It seldom occurs that serous membranes are actually converted into bone, but the osseous matter is deposited on them as the remote consequence of inflammatory action. It may be a question whether coagulable lymph becomes gradually firm, dense, cartilaginous, and ultimately osseous.

The ossification probably is the effect of chronic inflammation, as we observe such ossifications of the vaginal coat in some cases of long continued hydrocele.

Small cartilaginous excrescences are attached sometimes to serous membranes; these have been supposed to be the preludes of ossification, but of the truth of this opinion I am very doubtful.

Numerous cartilaginous tumours are frequently found beneath the peritoneum of the uterus; these often become partially or completely ossified in advanced life.

SECTION IX.

DISCHARGE OF BLOOD FROM THE PERITONEUM, CALLED HÆMENTERIA.

A discharge of blood into the cavity of the peritoneum is not very rare; and, as already stated, is often combined with inflammation, and, according to Dr Duncan, sometimes with sea-scurvy.

Merat * has published several examples of this disease, in

* Vide Mem. de la Societé Medic. d'Emulation, tom. vii. p. 55.

which the quantity of effused blood was considerable; in one case, twenty pints of blood were discovered in the abdomen.

The patient died in the course of forty-seven days after the commencement of the disease.

The inflammation of the peritoneum in the above instance was very intense.

MORGAGNI has described a case, in which blood was discharged from the peritoneum, and there were black spots upon that membrane *.

Discharges of blood from the other serous membranes are not unfrequent, and have often been confounded with other disorders. From my own observation, that from the free surface of the arachnoid coat is most common; it also takes place from the tomenta of the pia mater, and also from the pia mater that lines the ventricles of the brain.

I have frequently seen blood effused within the pericardium, without rupture of any part of the heart, but have seldom seen any of the blood coagulated.

I have also seen blood effused from the vaginal coat of the testicle, and part of this was coagulated.

The vaginal coat was, at the same time, evidently thickened and indurated, so that the disease was mistaken for scirrhus of the testicle.

SECTION X.

FUNGUS HÆMATODES OF THE PERITONEUM.

THIS organic derangement is very rare, and is sometimes connected with a similar disease of the liver. The first description of fungus hæmatodes, was given by Dr MONRO *primus*, who met with the disease in the leg: he called it an *anomalous tumour* †.

* Epist. XXXV. Case of LÆLIO LÆDII.

† Vide Quarto Edition of his Works.

SECTION XI.

ACCIDENTAL DEVELOPEMENT OF SEROUS MEMBRANES.

Cysts are found not only in the cellular tissue, but also frequently connected with serous membranes. I have seen such connected with the pia mater, choroid plexus, pericardium, peritoneum proper to the liver, omentum, uterus, Fallopian tubes, and ovaria, and also with the tunica vaginalis testis. These are frequently small, but sometimes of considerable size. There is one, nearly six inches long, preserved in the Museum of the University, which was found in the pericardium, by my assistant Mr Mackenzie.

The heart was of enormous size. The patient had laboured for some time under the usual symptoms of enlargement of that organ *.

Hydatids are also frequently connected with serous membranes †.

SECTION XII.

OF THE ORGANIC DISEASES OF THE MUCOUS GLANDS OF THE INTESTINES.

In some instances, the mucous follicles are involved in the organic derangements of the coats of the alimentary canal, but there are also some diseases proper to the mucous follicles; and inflammation beginning in these, sometimes passes on to ulceration, which is defined, and distinct. Professor Burns observes, "that when the groundwork or layer in which they (the mucous follicles) are lodged, is abraded or greatly destroyed, they for a time resist and remain distinct, perhaps insulated.

* In page 214, mention has been made of a large serous cyst and hydatids, which were extracted from the liver. This, as far as I know, was the first operation of the kind which had been performed in Britain.

† Vide page 199, *et seq.*

But even when inflamed, they are not affected in the same degree as the rest of the texture, so that while the mucous coat is destroyed, they still remain organized. It is only in the highest degree that they partake of the common ruin *."

In several of the organic derangements which have been already described, the mucous glands are much enlarged, inflamed, and ulcerated, and more especially in dysentery, in fever and phthisis pulmonalis.

There is every reason to suppose that the mucous glands are the primary seat of scirrhus and cancer, diseases which are observed in such parts of the alimentary canal, as are most largely supplied with these glands.

It has been above observed, that cancer begins in these follicles, and, in proof of it, their enlargement is sometimes accompanied with that burning pain in the stomach, which is so characteristic of cancer.

The enlargement of these mucous glands, and the symptoms thereby occasioned, have been described at great length, by Roederer and Wagler, in a treatise, entitled De Morbo Mucoso, and these authors have also fully explained the analogy which they suppose to exist between the morbus mucosus, intermittent fever, and dysentery.

There are also instances in which the mucous glands are much enlarged, where there are no traces of any disease of the intestinal coats.

When the mucous follicles of the stomach become much enlarged in the above diseases: the enlargement is either general or partial, and, on minute examination, a cavity may be observed in the centre of each.

The symptoms attending this morbid state have been very ably described by Dr Stark, whose statement is subjoined:—

"A woman, aged 27, was, after an irregular intermittent, seized with severe purging, accompanied with excruciating pains of the bowels. What she voided was a thin olive-coloured fluid, with many small portions of a clear glutinous substance

* Vide Principles of Surgery, vol. i. p. 55. London, 1829.

floating in it; they somewhat resembled drops of oil; her pulse beat commonly about 90 in a minute, and was small; her tongue was commonly dry. No considerable remission having happened, she died in about six weeks after the purging began.

"A man, aged 56, some months after a tedious fever, in which his strength had been greatly impaired, was seized with a purging, which, though sometimes violent, frequently remitted, but never wholly stopped. Pain of the bowels commonly preceded each fit of purging; what he voided, in the beginning, had been often mixed with blood, but afterwards it was mixed with small masses of a clear glutinous substance, coagulable by heat, or by alcohol, and sometimes it wholly consisted of that substance. Part of the food, especially liquids, passed through the body unaltered; his pulse beat about 90; his tongue was dry. The disorder was constant and violent for above a month before his death, which happened in eleven months after the purging began *."

Dr ABERCROMBIE's cases 96 and 97, appear to me to be good illustrations of ulceration of the mucous glands of the intestines †.

At page 332 of this work, I mentioned a disease, denominated by Dr W. E. HORNER, of Philadelphia, Infantile Follicular Inflammation of the Gastro-Intestinal Mucous Membrane. He has described it as being "entirely American," and as proving fatal annually to 200 or to 270 infants in the city of Philadelphia; and adds, "that it may be considered to increase proportionably to the approximation to the Equator." In this disease the alvine discharges "cease to be natural and well-elaborated fæces; but consist in articles of aliment discharged in very much the same state in which they were swallowed;—in the mucus of the bowels in unusual quantities, frequently tinged in places green by bile, and holding, if the child have been fed on milk (or small masses of food), the pieces of curd or food in clusters, in the mode of their connexion resem-

* *Vide* STARK's Works, p. 6.

† Vide his Researches on Diseases of the Stomach and Intestinal Canal. Edinburgh, 1828.

bling the spawn of frogs;—in serum in large quantities, coming either from the exhalants of the intestines, or from the muciparous glands, and augmented perhaps by the watery drinks of the patient,—and in bloody stools, which are also spoken of by writers, but are comparatively unfrequent *."

A fatal cholera lately broke out in a school at Clapham, " in which the appearance of the matters vomited was somewhat various in different individuals, depending probably upon the liquids previously taken. In some instances it was tinged with green bile, and was of a subacid smell, but, in the great majority of cases, it was colourless and inodorous. The stools also varied in appearance, but they were for the most part pale, consisting of mucus and muco-purulent matter, slightly streaked with scarlet blood.

" The pulse varied also very much in different individuals: in the early stages of collapse it was very frequent, but so feeble as to be scarcely perceptible. When reaction took place, it had of course more force, but less frequency. The skin was in most instances cold and clammy throughout; in a few cases it was for a short time hot, and the face was, in these, occasionally flushed. There was a low delirium in some advanced cases, with dilated pupils; but the sensorium was not affected in the greater number of them. None of the little patients complained of pain in the stomach or bowels, beyond the griping which preceded the stools. There was, however, in a few of them, slight tenderness and some tension of the abdomen; and, as far as the exact course of the symptoms could be ascertained in such a scene of confusion, it may be said generally that the disease seemed to come on very much like the tropical cholera, with a short obscure stage of excitement, which was immediately followed by a state of extreme collapse; and that this, under the use of stimulants, was succeeded, in those cases which were of the best aspect, by a stage of warmth, gentle moisture, and general reaction. We have mentioned that the disease was accompanied pretty generally with convulsive action of the muscles; but it may be of importance to remark that this, which amounted ra-

* American Journal of the Medical Sciences for February 1829.

ther to a kind of twitch, or subsultus, than to cramp, was confined to the upper extremities *."

In two fatal cases, the mucous glands of the duodenum and ileum were found generally enlarged, and the mucous membrane covering them in many places ulcerated.

The mesenteric and mesocolic glands were enlarged, and more vascular than natural.

The contents of the intestines were nearly colourless.

This disease was imputed to the effluvia arising from the contents of a cess-pool, which had been opened for the purpose of letting off stagnant water from the play-ground.

" It is remarkable that the younger boys were most severely affected, and that a man who actually fell into the cess-pool escaped altogether †."

In short, the mucous follicles are liable to some vesicular and pustular diseases, and hence the mucous membrane sometimes appears to be studded over with deeply excavated ulcers, with rounded elevated borders, like chancres, or like pustules occasioned by smallpox, whilst the intervening mucous membrane is in a healthy state. Such ulcers occur both in the acute and chronic organic derangements of the mucous membrane.

Lastly, Landini (Vide Observations Sur la Dothinentirite) ‡, does not seem to me to have established his favourite opinion, that every variety of fever, intermittent, remittent, and continued, proceeds from an inflammation of the mucous glands of Peyer and Bruner, and that, as the fever advances, these glands become ulcerated. Such is an occasional, but by no means a constant, concomitant of fever; and, in the fatal instances of this disease, is characterized by the usual symptoms of fever, to which are superadded, tenderness of the abdomen, diarrhœa, and great emaciation.

* London Medical Gazette, August 22. 1829.

† Medical Gazette, August 29. 1829.

‡ Revue Medicale, 1826.

NOTE.

SINCE the preceding sheets were cast off, my pupil Mr ROBERT SPITTAL (who at my request was so obliging as to compare the different colours of the mucous membrane of the alimentary canal in different diseases, with Mr SYME'S tabular view of colours), has requested it to be noticed, " that the colour mentioned in the table at pp. 316-319, is the *general* colour, or that which formed the greatest part of the whole."

It is also necessary here to state, that an important case, which I received from Mr LISTON, was omitted to be inserted in its proper place, and of which the following are the particulars :

The patient, a man, aged thirty-five, had an extensive abscess on the left side of his neck ; it passed beneath the sterno-mastoid muscle, and had given way a little above the sternum. Liquids, and also occasionally particles of solid food, escaped through the opening in the abscess. For about two months there was a communication between it and the gullet.

He was ordered a more generous diet, a counter opening was made into the abscess, stimulating injections were used, and at length he obtained a cure, and no difficulty in deglutition remained.

P. NEILL, Printer.

CORRIGENDA.

The foot notes in page 215 *should have been placed at page* 214.

Page 225 *line* 6, *after the words*, The worms above described, *add* Hydatids and the Fasciola hepatica excepted,

Page 360 *line* 5 *from the bottom*, *for* sarcoma *read* sarcomata

Page 463 *line* 4 *from the bottom*, *for* pulvis *read* pelvis

DIRECTIONS TO THE BINDER.

Plate I. to face p. 151
II. ——— 152
III. ——— 179
IV. ——— 229
V. ——— 438
VI. ——— 474