

Pharmacologia; comprehending the art of prescribing upon fixed and scientific principles; together with the history of medicinal substances / By J.A. Paris, with notes and additions.

Contributors

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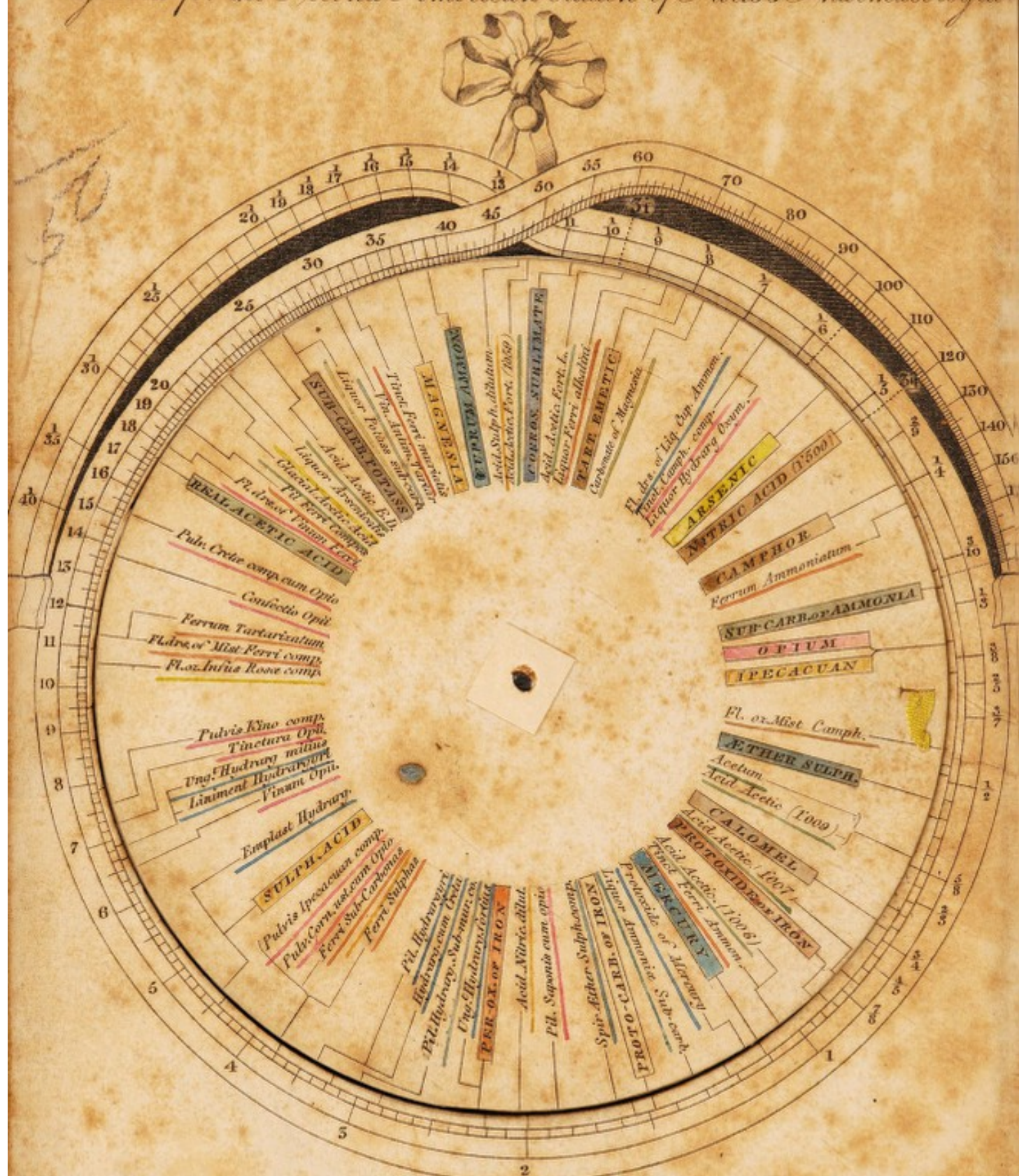
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Pharm. Pharmacologia III

172
MEDICINAL DYNAMETER
AND
SCALE OF EQUIVALENTS.

Engraved for the Second American Edition of Paris's Pharmacologia



EXPLANATION.

This Instrument will shew on bare inspection, the quantity of active matter contained in any given weight or measure (according as it is solid or liquid) of any Official compound, and the dose of any preparation which will be equivalent in strength to any given quantity of any other of the same class. The active principles, or Medicinal Bases, are distinguished by capital letters, placed in coloured squares; and each Official Preparation is marked by a line corresponding in colour with that of its active ingredient. If we require the quantity of active matter in any given dose of an Official Preparation, we have only to bring such preparation to the number in question, and the figure opposite the active ingredient answers the question, while those opposite to the other compounds of the same class denote the equivalent quantities. Unless otherwise expressed, the figures denote Grains for the solids, and Minims for the liquids.

39706/3

PHARMACOLOGIA:

THIRD AMERICAN,
FROM THE SIXTH LONDON EDITION.

CORRECTED AND EXTENDED, IN ACCORDANCE WITH THE LONDON
PHARMACOPŒIA OF 1824, AND WITH THE GENERALLY
ADVANCED STATE OF CHEMICAL SCIENCE.

BY

J. A. PARIS, M.D. F.R.S. F.L.S.

Fellow of the Royal College of Physicians of London;
Honorary Member of the Board of Agriculture; Fellow of the Philosophical Society
of Cambridge; and of the Royal Medical Society of Edinburgh; and
late Senior Physician to the Westminster Hospital.

WITH

Notes and Additions.

Quis Pharmacopœo dabit leges, ignarus ipse agendorum?—Vix profecto dici potest, quantum
hæc ignorantia rei medicæ interat detrimentum.

GAUB: METHOD: CONCINN: FORMUL.

NEW-YORK.

E. DUYCKINCK, COLLINS & CO., COLLINS & HANNAY, O. A. ROORBACH,
AND WILLIAM BURGESS JUN.

1828.

MATERIA MEDICA: Texts: 19cent.

MATERIA MEDICA



307799

Southern District of New-York, ss.

BE IT REMEMBERED, That on the 13th day of October, A. D. 1825, in the 50th year of the Independence of the United States of America, WILLIAM E. DEAN, of the said District, hath deposited in this office the title of a book, the right whereof he claims as proprietor in the words following, to wit :

“ Pharmacologia ; third American, from the sixth London edition, corrected and extended, in accordance with the London Pharmacopœia of 1824, and with the generally advanced state of Chemical Science, by J. A. Paris, M. D. F. R. S. F. L. S. Fellow of the Royal College of Physicians of London ; Honorary Member of the board of Agriculture ; Fellow of the Philosophical Society of Cambridge ; and of the Royal Medical Society of Edinburgh ; and late Senior Physician to the Westminster Hospital. With Notes and Additions.

Quis Pharmacopœo dabit leges, ignarus ipse agendorum ?—Vix profecto dici potest, quantum hæc ignorantia rei medicæ inferat detrimentum. Gaub : Method : Conciinn : Formul.”

In conformity to the Act of Congress of the United States, entitled “ An Act for the encouragement of learning, by securing the copies of maps, charts, and books to the authors and proprietors of such copies, during the time therein mentioned.” And also to an Act, entitled “ An Act, supplementary to an Act, entitled An Act for the encouragement of learning, by securing the copies of maps, charts, and books, to the authors and proprietors of such copies during the times therein mentioned, and extending the benefits thereof to the arts of designing, engraving, and etching historical and other prints.”

JAMES DILL,
Clerk of the Southern District of New-York.

TO

WILLIAM GEORGE MATON, M.D. F.R.S.

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS,

VICE-PRESIDENT OF THE LINNÆAN SOCIETY,

&c. &c. &c.

MY DEAR SIR,

THERE is not an individual in the whole circle of the profession, to whom I could with greater satisfaction, or with so much propriety, dedicate this work, as to yourself.

Ardent and zealous in the advancement of our science, you must deeply deplore the prejudices that retard its progress ;—eminently enlightened in Natural History, you can justly appreciate the importance of its applications to Medicine ; while your well known earnestness in upholding the dignity, and in encouraging the legitimate exercise of our profession, marks you as the most proper patron of a work, the aim of which is to extinguish the false lights of empiricism, and to substitute a steady beacon on the solid and permanent basis of truth and science : at the same time, the extensive practice which your talents and urbanity so justly command in this metropolis, must long since have taught you the full extent of that empiricism which it has been my endeavour to expose, and the practical mischief of that ignorance which it has been my object to enlighten.

Nor let me omit to mention the claims of that friendship which has for many years subsisted between us ; be assured that I am gratefully sensible of those personal obligations which so fully justify this pub-

DEDICATION.

lic avowal of them; confidently trusting that you will not measure the gratitude which your kindness has inspired, by the merits of the offering by which it is acknowledged, but rather by the truth and sincerity of the Dedication, by which I am enabled to express

My respect for your talents ;

esteem for your virtues ;

and wishes for your happiness ;

JOHN AYRTON PARIS.

Dover-street, February, 1825.


ADVERTISEMENT TO THE SIXTH EDITION.

WHEN it is stated that upwards of TEN THOUSAND copies of this work have been sold within a very few years, I trust I shall be acquitted of any charge, to which I might otherwise be exposed, for the unnecessary and vexatious multiplication of its editions. The truth is that the extent of its sale has far surpassed the most sanguine opinion that a partial author could have formed. On the present occasion I have ventured to add several thousand copies to those already in circulation; and the necessity of another edition, at least until the lapse of several years, can scarcely fall within the scope of rational expectation. This edition will be found to contain much new matter, derived from the extended views of vegetable chemistry, and such modifications as must necessarily attend the accumulations of experience. The bulk of the work, however, has not been materially increased, in consequence of the adoption of a smaller type for the notes. Having thus made an acknowledgment which I considered due to the medical profession, I have to perform a duty, equally imperative, to my publisher;—to offer him my public and unfeigned thanks for the judicious and liberal manner in which he has conducted all the details involved in the publication.

As an explanation of those chemical principles which establish the combinations of bodies could not fall within the limits of this work, I have published a volume, which may be obtained separately, under the title of “Elements of Chemistry; embracing only those branches of Chemical Science which are calculated to illustrate or explain the different objects of Medicine; and to furnish a Chemical Grammar to the author’s *Pharmacologia* :” a plan which has been long considered a desideratum by the profession.

J. A. P.

Dover-street, January, 1825.



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PREFACE.

THE Public are already in possession of many pharmaceutical compendiums and epitomes of plausible pretensions, composed with the view of directing the practice of the junior, and of relieving the occasional embarrassments of the more experienced practitioner. Nothing is farther from my intention than to disparage their several merits, or to question their claims to professional utility; but in truth and justice it must be confessed that, as far as these works relate to the art of composing scientific prescriptions, their authors have not escaped the too common error of supposing that the reader is already grounded in the first principles of the science; or, to borrow the figurative illustration of a popular writer, *that while they are in the ship of science, they forget the disciple cannot arrive without a boat.* I am not acquainted with any book that is calculated to furnish such assistance, or which professes to teach the GRAMMAR and groundwork of this important branch of medical knowledge. Numerous are the works which present us with the detail, but no one with the philosophy of the subject. We have copious catalogues of formal recipes, and many of unexceptionable propriety; but the compilers do not venture to discuss the principles upon which they were constructed, nor do they explain the part which each ingredient is supposed to perform in the general scheme of the formula: they cannot therefore lead to any useful generalization, and the young practitioner, without a beacon that can direct his course in safety, is abandoned to the alternative of two great evils—a feeble and servile routine on one hand, or a wild and lawless empiricism on the other. The present volume is an attempt to supply this deficiency; and while I am anxious to ‘catch the ideas which lead from ignorance to knowledge,’ it is not without hope that I may also be able to suggest the means by which our already acquired knowledge may be more widely and usefully extended; and, by offering a collective and arranged view of the objects and resources of medicinal combination, to establish its practice upon the basis of science, and thereby to render its future career of improvement progressive with that of the other branches of medicine; or, to follow up the figurative illustration already introduced, *to furnish a boat, which may not only convey the disciple to the ship, but which may also assist in piloting the ship herself from her shallow and treacherous moorings.* That the design however of the present work may not be mistaken, it is essential to remark that it is elementary only in reference to the art of prescribing, for it is presumed that the student is already acquainted with the common manipulations of pharmacy, and with the first principles of chemistry. When any allusions are made to the processes of the Pharmacopœia, they are to be understood as being

only supplementary, or as explanatory of their nature, in reference to the application or medicinal powers of the substance in question. The term PHARMACOLOGIA, as applied to the present work, may therefore be considered as contradistinctive to that of PHARMACOPŒIA; for while the latter denotes the processes for *preparing*, the former comprehends the scientific methods of *administering* medicinal bodies, and explains the objects and theory of their operation. The articles of the *Materia Medica* have been arranged in alphabetical order, not only as being that best calculated for reference, but one which, in an elementary work at least, is less likely to mislead than any arrangement founded on their medicinal powers; for in consequence of the difficulty of discriminating in every case between the primary and secondary effects of a medicine, substances very dissimilar in their nature, have been enlisted into the same artificial group, and when several of such bodies have, from a reliance upon their unity of action, been associated together in a medicinal mixture, it has too often happened that, like the armed men of Cadmus, they have opposed and destroyed each other. The object and application of the black marginal letters, to which the name of *Key Letters* has been given, are fully explained in the First Part of the work, and it is hoped, that the scheme possesses a more substantial claim to notice than that of mere novelty: it will be perceived that in the enumeration of the officinal formulæ these letters are also occasionally introduced, to express the manner in which the particular substance, under the head of which it stands operates in the combination. If any apology be necessary for the introduction of the medicinal formulæ it may be offered in the words of Quintillian, who very justly observes, "*In omnibus fere minus valent præcepto quam exempla*;" or in the language of Seneca; "*Longum est iter per præcepta, breve et efficax per exempla*." Under the history of each article, I have endeavoured to concentrate all that is required to be known for its efficacious administration, such as, 1. *Its sensible qualities.* 2. *Its chemical composition,* or the constituents in which its medicinal activity resides. 3. *Its relative solubility in different menstrua, and the proportions in which it should be mixed, or combined with different bodies, in order to produce suspension, or saturation.* 4. *The Incompatible Substances*; that is to say, those substances which are capable of destroying its properties, or of rendering its flavour or aspect unpleasant or disgusting. 5. *The most eligible forms in which it can be exhibited.* 6. *Its specific doses.* 7. *Its Medicinal Uses and Effects.* 8. *Its Preparations, Officinal as well as Extemporaneous.* 9. *Its Adulterations.* That such information is indispensable for the elegant and successful exhibition of a remedy, must be sufficiently apparent; the injurious changes and modifications which substances undergo when they are improperly combined by the ignorant practitioner, are not, as some have supposed, imaginary, the mere *deliramenta doctrinæ*, or the whimsical suggestions of theoretical refinement, but they are really such as to render their powers unavailing, or to impart a dangerous violence to their operation. "*Unda dabit flammam et dabit ignis aquas.*"

In the history of the different medicinal preparations, the pharmacopœia of the London College is the standard to which I have always referred, although it will be perceived that I have frequently availed myself of the resources with which the pharmacopœias of Edinburgh and Dublin abound. To a knowledge of the numerous adulterations to which each article is so shamefully exposed, too much importance can be

scarcely attached; and under this palpable source of medicinal fallacy and failure, may be fairly included those secret and illegitimate deviations from the acknowledged modes of preparation, as laid down in the pharmacopœia, whether practised as expedients to obtain a lucrative notoriety, or from a conceit of their being improvements upon the ordinary processes; for instance, we have lately heard of a wholesale chemist who professes to supply a syrup of roses of very superior beauty, and who for this purpose, substitutes the petals of the *red* (*rosa gallica*) for those of the *damask* rose (*rosa centifolia*); we need not be told, that a preparation of a more exquisite colour may be thus afforded, but allow me to ask if this *underhanded* substitution be not a manifest act of injustice to the medical practitioner, who, instead of a laxative syrup, receives one which is marked by the opposite character of astringency. These observations will not apply, of course, to those articles which are *avowedly* prepared by a new process; for in that case the practitioner is enabled to make his election, and either to adopt or refuse them at his discretion. Thus has Mr. Barry applied his ingenious patent apparatus for boiling *in vacuo*, to the purpose of making Extracts; we might almost say *a priori*, that the results must be more active than those obtained in the ordinary way, but they must pass the ordeal of experience before they can be admitted into practice. As a brief notice of the most notorious *Quack Medicines* may be acceptable, the formulæ for their preparation have been appended in notes, each being placed at the foot of the particular article which constitutes its prominent ingredient; indeed it is essential that the practitioner should be acquainted with their composition, for although he would refuse to superintend the operation of a boasted *panacea*, it is but too probable that he may be called upon to counteract its baneful influence.

The *Historical Introduction*, comprehending the substance of the lectures delivered before the Royal College of Physicians of London, from the recently established chair of *Materia Medica*, has been prefixed to the work, at the desire of several of the auditors; and I confess my readiness to comply with this request, as it enabled me at once to obviate any misconception or unjust representation of those remarks which I felt it my bounden duty to offer to the College.

It will be observed that the work itself is divided into two separate and very distinct parts, the *First* comprehending the principles of the art of combination, — the *Second*, the medicinal history, and chemical habitudes of the bodies which are the subjects of such combination. These comprise every legitimate source of instruction, and to the young and industrious student, they are at once the *LOOM* and the *RAW MATERIAL*. Let him therefore abandon those flimsy and ill adapted textures, that are kept ready fabricated for the service of ignorance and indolence, and by actuating the machinery himself, weave the materials with which he is here presented into the forms and objects that may best fulfil his intentions, and meet the various exigencies of each particular occasion.

J. A. P.

Dover-street, January, 1820.

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HISTORICAL INTRODUCTION.

COMPREHENDING

THE

SUBSTANCE OF SEVERAL LECTURES

DELIVERED BY THE AUTHOR,

BEFORE THE

ROYAL COLLEGE OF PHYSICIANS,

FROM THE

CHAIR OF MATERIA MEDICA,

In the Years 1819—20 and 21.

“ It has been very justly observed that there is a certain maturity of the human mind acquired from generation to generation, in the MASS, as there is in the different stages of life in the INDIVIDUAL man ; —What is history when thus philosophically studied, but the faithful record of this progress? pointing out for our instruction the various causes which have retarded or accelerated it in different ages and countries.”

Historical Introduction, p. 4.

THE HISTORY OF THE
CITY OF BOSTON
FROM THE FIRST SETTLEMENT
TO THE PRESENT TIME

The city of Boston, situated on a neck of land between the harbor and the bay, was first settled in 1630 by a company of Puritan settlers from England. The city grew rapidly, and by 1690 it was the largest city in New England. In 1703, the city was incorporated as a city, and in 1780 it became the capital of the Commonwealth of Massachusetts. The city has a long and rich history, and it is one of the most important cities in the United States. The city is known for its many historic sites, including the Freedom Trail, the USS Constitution, and the Bunker Hill Monument. The city is also known for its many famous people, including John F. Kennedy, Martin Luther King Jr., and many others. The city is a vibrant and diverse community, and it is a place where people from all over the world come to live and work. The city is a place of great beauty, and it is a place where people can enjoy the best of both worlds. The city is a place where people can find a sense of community and belonging, and it is a place where people can make a difference in the world.

HISTORICAL INTRODUCTION.

AN ANALYTICAL INQUIRY INTO THE MORE REMARKABLE CAUSES WHICH HAVE, IN DIFFERENT AGES AND COUNTRIES, OPERATED IN PRODUCING THE REVOLUTIONS THAT CHARACTERIZE THE HISTORY OF MEDICINAL SUBSTANCES.

"Historia quoquo modo scripta delectat."

Before I proceed to discuss the particular views which I am prepared to submit to the College, on the important but obscure subject of medicinal combination, I propose to take a sweeping and rapid sketch of the different moral and physical causes which have operated in producing extraordinary vicissitudes, so eminently characteristic of the history of *Materia Medica*. Such an introduction is naturally suggested by the first glance at the extensive and motly assemblage of substances with which our cabinets* are overwhelmed. It is impossible to cast our eyes over such multiplied groups, without being forcibly struck with the palpable absurdity of some—the disgusting and loathsome nature of others—the total want of activity in many—and the uncertain and precarious reputation of all—or, without feeling an eager curiosity to enquire, from the combination of what causes it can have happened, that substances, at one period in the highest esteem, and of generally acknowledged utility, have fallen into total neglect and disrepute;—why others, of humble pretensions and little significance, have maintained their ground for so many centuries; and on what account, materials of no energy whatever, have received the indisputable sanction and unqualified support of the best and wisest practitioners of the age. That such fluctuations in opinion and versatility in practice should have produced, even in the most candid and learned observers, an unfavourable impression with regard to the general efficacy of medicines, can hardly excite our astonishment, much less our indignation; nor can we be surprised to find, that another portion of mankind

* The College of Physicians may now be said to possess one of the most complete collections of *Materia Medica* in Europe. That collected by Dr. Burgess, and presented to the College after his death by Mr. Brande, to whom it was bequeathed, has lately been collated with the cabinet of Dr. Coombe, purchased for that purpose. Its arrangement has been directed by a feeling of convenience for reference, rather than by any theoretical views relative to the natural, chemical, and medicinal histories of its constituent parts. Under proper regulations, it is accessible to the studious and respectable members of the profession.

has at once arraigned Physic as a fallacious art, or derided it as a composition of error and fraud.* They ask—and it must be confessed that they ask with reason—what pledge can be afforded them, that the boasted remedies of the present day will not, like their predecessors, fall into disrepute, and in their turn serve only as humiliating memorials of the credulity and infatuation of the physicians who commended and prescribed them? There is surely no question connected with our subject which can be more interesting and important, no one which requires a more cool and dispassionate inquiry, and certainly not any which can be more appropriate for a lecture introductory to the history of *Materia Medica*. I shall therefore proceed to examine with some attention the revolutions which have thus taken place in the opinions and belief of mankind, with regard to the efficacy and powers of different medicinal agents: such an inquiry, by referring them to causes capable of a philosophical investigation is calculated to remove many of the unjust prejudices which have been executed, to quiet the doubts and alarms which have been so industriously propagated, and, at the same time, to obviate the recurrence of several sources of error and disappointment.

This moral view of events, without any regard to chronological minutiae, may be denominated the *PHILOSOPHY* or *HISTORY*, and should be carefully distinguished from that technical and barren erudition, which consists in a mere knowledge of *names* and *dates*, and which is perused by the medical student with as much apathy, and as little profit, as the monk counts his bead-roll. It has been very justly observed, that there is a certain maturity of the human mind, acquired from generation to generation, in the *mass*, as there is in different stages of life, in the *individual* man; what is history, when thus philosophically studied, but the faithful record of this progress? pointing out for instruction the various causes which have retarded or accelerated it in different ages and countries.

In tracing the history of the *Materia Medica* to its earliest periods, we shall find that its progress towards its present advanced state, has been very slow and unequal, very unlike the steady and successive improvement which has attended other branches of natural knowledge; we shall perceive even that its advancement has been continually arrested, and often entirely subverted, by the caprices, prejudices, superstitions, and knavery of mankind; unlike too the other branches of science, it is incapable of successful generalization; in the progress of the history of remedies, when are we able to produce a discovery or improvement, which has been the result of that happy combination of Observation, Analogy, and Experiment,† which has so eminently rewarded the labours of modern science? Thus, *OBSERVATION* led Newton to discover that the refractive power of transparent substances was, in general, in the ratio of

* A late foreign writer impressed with this sentiment has given the following flattering definition of our profession: 'Physic is the art of amusing the patient, while Nature cures the disease.' This is a sarcasm which can only be equalled by the churlish and ill-humoured apostrophe of our own Dr. Samuel Johnson, who, in speaking of the profession of physic, exclaims 'It is a melancholy attendance on misery; a mean submission to peevishness; and a continual interruption of pleasure.'

† Observation, says professor Leslie, is the close inspection and attentive examination of those phenomena which arise in the course of Nature; Experiment, as the term implies, consists in a kind of trial, or artificial selection and combination of circumstances, for the purpose of searching after the remote results.

their density, but that, of substances of equal density, those which possessed the refractive power in a higher degree were inflammable.* *ANALOGY* induced him to conclude that, on this account, water must contain an inflammable principle, and *EXPERIMENT* enabled Cavendish and Lavoisier to demonstrate the surprising truth of Newton's induction in their immortal discovery of the chemical composition of that fluid.

The history of Astronomy furnishes another illustration equally beautiful and instructive.—The Astronomer *observed* certain oscillations in the motions of Saturn and Jupiter; by *Analogy* he conjectured that this phenomenon was produced by the influence of a planet still more remote: a supposition which was happily confirmed by a telescopic *experiment*, in the discovery of Uranus, by Herschel.

But it is clear that such principles of research, and combination of methods, can rarely be applied in the investigation of remedies, for every problem which involves the phenomena of life is unavoidably embarrassed by circumstances, so complicated in their nature, and fluctuating in their operation, as to set at defiance every attempt to appreciate their influence; thus an observation or experiment upon the effects of a medicine is liable to a thousand fallacies, unless it be carefully repeated under the various circumstances of health and disease, in different climates, and on different constitutions. We all know how very differently opium or mercury will act upon different individuals, or even upon the same individuals, at different times, or under different circumstances; the effect of a stimulant upon the living body is not in the ratio of the intensity of its impulse, but in proportion to the degree of excitement, or vital susceptibility of the individual to whom it is applied. This is illustrated in a clear and familiar manner, by the very different sensations of heat which the same temperature will produce under different circumstances. In the road over the Andes, at about half way between the foot and the summit, there is a cottage in which the ascending and descending travellers meet; the former, who have just quitted the sultry vallies at the base, are so relaxed, that the sudden diminution of temperature produces in them the feeling of intense cold, whilst the latter, who have left the frozen summits of the mountain, are overcome by the distressing sensation of extreme heat.

But we need not climb the Andes for an illustration; if we plunge one hand into a basin of hot, and the other into one of cold water, and then mix the contents of each vessel, and replace both hands in the mixture, we shall experience the sensation of heat and cold, from one and the same medium; the hand, that had been previously in the hot, will feel cold, whilst that which had been immersed in the cold water, will experience a sensation of heat. Upon the same principle, ardent spirits will produce very opposite effects upon different constitutions and temperaments, and we are thus enabled to reconcile the conflicting testimonies respecting the powers of opium in the cure of fever: aliments, also, which under ordinary circumstances would occasion but little effect, may in certain conditions of the system, act as powerful stimulants; a fact which is well exemplified by the history of persons who have been enclosed in coal mines for several days without food, from the accidental falling in of the

* The refractive power of an inflammable body bears also a proportion to its perfection, whence it may be sometimes used as a test of its purity; thus Dr. Wollaston found that genuine Oil of Cloves had a refractive power of 1.535, while that of an inferior quality did not exceed 1.498.

surrounding strata, when they have been as much intoxicated by a basin of broth, as a person, in common circumstances, would have been by two or more bottles of wines.* Many instances will suggest themselves to the practitioner in farther illustration of these views, and I shall have occasion to recur to the subject at a future period.

To such causes we must attribute the barren labours of the ancient empirics, who saw without discerning, administered without discriminating, and concluded without reasoning; nor should we be surprised at the very imperfect state of the *materia medica*, as far as it depends upon what is commonly called experience, complicated as this subject is by its numberless relations with Physiology, Pathology, and Chemistry. John Ray attempted to enumerate the virtues of plants from *experience*, and the system serves only to commemorate his failure. Vogel likewise professed to assign to substances those powers which had been learnt from accumulated experience; and he speaks of *Roasted toad* † as a specific for the pains of gout, and asserts that a person may secure himself for the whole year from augina by eating a roasted swallow! Such must ever be the case, when medicines derive their origin from false experience, and their reputation from blind credulity.

ANALOGY has undoubtedly been a powerful instrument in the improvement, extension, and correction of the *materia medica*, but it has been chiefly confined to modern times; for in the earlier ages, Chemistry had not so far unfolded the composition of bodies, as to furnish any just idea of their relations to each other, nor had the science of Botany taught us the value and importance of the natural affinities which exist in the vegetable kingdom.

With respect to the fallacies to which such analogies are exposed, I shall hereafter speak at some length, and examine the pretensions of those *ultra* chemists of the present day who have upon every occasion arraigned, at their self-constituted tribunal, the propriety of our medicinal combinations, and the validity of our national pharmacopœias.

In addition to the obstacles already enumerated, the progress of our knowledge respecting the virtues of medicines has met with others of a moral character, which have deprived us in a great degree of another obvious method of research, and rendered our dependance upon testimony uncertain, and often entirely fallacious. The human understanding, as Lord Bacon justly remarks, is not a mere faculty of apprehension, but is affected more or less, by the will and the passions; what man wishes to be true that he too easily believes to be so, and I conceive that physic has, of all the sciences, the least pretensions to proclaim itself independent of the empire of the passions.

* Elizabeth Woodcock, who was buried in the snow for the space of eight days, in the neighbourhood of Cambridge, and whom I frequently visited, died in consequence of the stimulants which she could not resist, and which in her peculiar state of excitement she was unable to bear. In the first volume of the *Memoirs of the Philosophical Society of Manchester*, a case of a Miner is recorded, who after remaining for eight days without food, was killed by being placed in a warm bed, and fed with chicken-broth.

† For this purpose it appears that the toad was baked alive. The following is the receipt in Colborne's *Dispensatory*; '*Bufo Præparatus.*' Put the toads alive into a earthen pot, and dry them in an oven moderately heated, till they become fit to be powdered."

In our researches to discover and fix the period when remedies were first applied for the alleviation of bodily suffering, we are soon lost in conjecture, or involved in fable; we are unable to reach the period in any country, when the inhabitants were destitute of medical resources, and we find among the most uncultivated tribes, that medicine is cherished as a blessing and practised as an art, as by the inhabitants of New Holland and New Zealand, by those of Lapland and Greenland, of North America, and of the interior of Africa. The personal feelings of the sufferer, and the anxiety of those about him, must, in the rudest state of society, have incited a spirit of industry and research to procure alleviation, the modification of heat and cold, of moisture and dryness, and the regulation and change of diet and habit, must have intuitively suggested themselves for the relief of pain;* and when these resources failed, charms, amulets, and incantations,† were the natural expedients of the barbarian, ever more inclined to indulge the delusive hope of superstition, than to listen to the voice of sober reason. Traces of amulets may be discovered in very early history. The learned Dr. Warburton is evidently mistaken, when he assigns the origin of these magical instruments to the age of the Ptolemies, which was not more than 300 years before Christ; this is at once refuted by the testimony of Galen, who tells us that the Egyptian king, Nechepsus, who lived 630 years before the Christian era, had written, that a green jasper cut into the form of a dragon surrounded with rays, if applied externally, would strengthen the stomach and organs of digestion.‡ We have moreover the authority of the Scriptures in support of this opinion; for what were the ear-rings which Jacob buried under the oak of Sechem, as related in Genesis, but amulets? and we are informed by Josephus, in his Antiquities of the Jews,§ that Solomon discovered a plant efficacious in the cure of Epilepsy, and that he employed the aid of a charm or spell for the purpose of assisting its virtues; the root of the herb was concealed in a ring, which was applied to the nostrils of the Demoniac, and Josephus remarks that he himself saw a Jewish Priest practise the art of Solomon with complete success in the presence of Vespasian, his sons, and the tribunes of the Roman army.|| Nor were such means confined to dark and barbarous ages; Theophrastus pronounced Pericles to be insane, because he discovered that he wore an amulet about his neck; and,

* The application of the reeking entrails of a recently slain animal, appears to have been one of the earliest methods adopted for the relief of pain.

† The words 'Incantation,' and 'Charm,' appear to have been derived from the ancient practice of curing diseases by Poetry and Music. (Carmen.) Thus Cœlius Aurelianus, *de curat. loca Dolentia*. Democritus says that many diseases are capable of being cured by the sound of a flute, when properly played. Marianus Capellus assures us, that fevers may be cured by appropriate songs; Asclepades actually employed the trumpet, for the relief of Sciatica, and tells us that it is to be continued until the fibres of the part begin to palpitate, when the pain will vanish.

‡ A similar superstition is still practised by the Indians. There is a species of green jasper found in many parts of America, particularly in New Spain, to which the Spaniards have given the name of *Piedra de la Hyada*, and is used for curing the Colic, by being applied to the navel.

§ Lib. viii. c. 2. 5.

|| From this Art of Solomon, exhibited through the medium of a ring, or seal, we have the eastern stories which celebrate the SEAL OF SOLOMON, and record the potency of its sway over the various orders of Demons, or of Genii, who are supposed to be the invisible tormentors or benefactors of the human race.

in the declining era of the Roman empire, we find that this superstitious custom was so general, that the Emperor Caracalla was induced to make a public edict ordaining that no man should wear any superstitious amulets about his person.

In the progress of civilization, various fortuitous incidents,* and even errors in the choice and preparation of aliments, must have gradually unfolded the remedial powers of many natural substances; these were recorded, and the authentic history of medicine may date its commencement from the period when such records began.

The Chaldeans and Babylonians, we are told by Herodotus, carried their sick to the public roads and markets, that travellers might converse with them, and communicate any remedies which had been successfully used in similar cases; this custom continued during many ages in Assyria; and Strabo states that it prevailed also amongst the ancient Lusitanians, or Portuguese: in this manner however the results of experience descended only by oral tradition; it was in the temple of Esculapius in Greece that medical information was first recorded; diseases and cures were there registered on durable tablets of marble; the priests † and priestesses, who were the guardians of the temple, prepared the remedies and directed their application, and thus commenced the profession of Physic. With respect to the actual nature of these remedies, it is useless to inquire; the lapse of ages, loss of records, change of language, and ambiguity of description, have rendered every learned research unsatisfactory; indeed we are in doubt with regard to many of the medicines which even Hippocrates employed. It is however clearly shown by the earliest records, that the ancients were in the possession of many powerful remedies; thus Melampus of Argos, the most ancient Greek physician with whom we are acquainted, is said to have cured one of the Argonauts of sterility, by administering the rust of iron in wine for ten days; and the same physician used hellebore as a purge, on the daughters of king Prætus, who were afflicted with melancholy. Venesection was also a remedy of very early origin; for Podalirius, on his return from the Trojan war, cured the daughter of Damethus, who had fallen from a height, by bleeding her in both arms. Opium, or a preparation of the poppy, was certainly known in the earliest ages; it was probably opium that Helen mixed with wine, and gave to the guests of Menelaus, under the expressive name of *nepenthe*, ‡ to drive away their cares, and increase their hilarity; and this conjecture receives much support from the fact, that the *nepenthe* of Homer was obtained from the Egyptian

* Let the tradition respecting the discovery of the virtues of the bark serve as an illustration. We are told, that an Indian being ill of a fever, quenched his thirst at a pool of water strongly impregnated with the bark from some trees having accidentally fallen into it, and that he was in consequence cured.

† As these persons were ambitious to pass for the descendants of Esculapius, they assumed the name of The ASCLEPIADES. The writings of Pausanias, Philostrates, and Plutarch, abound with the artifices of those early physicians. Aristophanes describes in a truly comic manner the craft and pious avarice of these godly men, and mentions the dexterity and promptitude with which they collected, and put into their bags, the offerings on the altar. The patients, during this period, reposed on the skins of sacrificed rams, in order that they might procure celestial visions. As soon as they were believed to be asleep, a priest, clothed in the dress of Esculapius, imitating his manners, and accompanied by the daughters of the god, that is, by young actresses, thoroughly instructed in their parts, entered and delivered a medical opinion.

‡ Odyss Δ,

Thebes;* and if we may credit the opinion of Dr. Darwin, the Cumæan Sibyl never sat on the portending tripod without first swallowing a few drops of the juice of the *Cherry-laurel*.†

“ At Phœbi nondum patiens, immanis in antro
Bacchatur Vates, magnum si pectore possit
Excussisse deum; tanto magis ille fatigat
Os rabidum, fera corda domans, fingitque premendo.”
ÆNEID, 1. vi. 78.

There is reason to believe that the Pagan priesthood were under the influence of some powerful narcotic during the display of their oracular powers, but the effects produced would seem to resemble rather those of Opium, or perhaps of Stramonium, than of the Prussic acid. Monardes tells us that the priests of the American Indians, whenever they were consulted by the chief gentlemen, or *casiques* as they are called, took certain leaves of the Tobacco, and cast them into the fire, and then received the smoke, which they thus produced, in their mouths, in consequence of which they fell down upon the ground; and that after having remained for some time in a stupor, they recovered, and delivered the answers which they pretended to have received, during their supposed intercourse with the world of spirits.

The sedative powers of the *Lactuca Sativa*, or Lettuce,‡ were known also in the earliest times; among the fables of antiquity, we read that after the death of Adonis, Venus threw herself on a bed of lettuces, to lull her grief, and repress her desires. The sea onion or *Squill*, was administered in cases of dropsy by the Egyptians, under the mystic title of the *Eye of Typhon*. The practices of incision and scarification were employed in the camp of the Greeks before Troy, and the application of spirit to wounds was also understood, for we find the experienced Nestor applying a cataplasm, composed of cheese, onion, and meal, mixed up with the wine of Pramnos, to the wounds of Machaon.§

The revolutions and vicissitudes which remedies have undergone, in medical as well as popular opinion, from the ignorance of some ages, the learning of others, the superstitions of the weak, and the designs of the crafty, afford ample subject for philosophical reflection; some of these revolutions I shall proceed to investigate, classing them under the prominent causes which have produced them, viz. Superstition—Credulity—Scepticism—False Theory—Devotion to Authority, and Established Routine—The assigning to Art that which was the effect of unassisted Nature—The assigning to peculiar substances Properties, deduced from Experiments made on inferior Animals—Ambiguity of Nomenclature—The progress of Botanical Science—The application, and misapplication of Chymical Philosophy—The Influence of Climate and Season on Diseases, as well as on the properties, and operations of their Remedies—The ignorant Preparation, or fraudulent Adulteration of Medicines—

* Hence the Tincture of Opium has been called *Thebæic Tincture*.

† The Laurel was sacred to Apollo, with plantations of which his temples were surrounded. Lucan informs us (*Pharsal. lib. v.*) that the speedy death of the priestess was often occasioned by the ceremony.

‡ Allusions to this plant frequently occur in the medical writings of antiquity; we are told that Galen, in the decline of life, suffered much from morbid vigilance, until he had recourse to eating a lettuce every evening, which cured him.

§ *Iliad* Δ.

The unseasonable collection of those remedies which are of vegetable origin,—and, the obscurity which has attended the operation of compound medicines.

SUPERSTITION.

A belief in the interposition of supernatural powers in the direction of earthly events, has prevailed in every age and country, in an inverse ratio with its state of civilization, or in the exact proportion to its want of knowledge. “In the opinion of the ignorant multitude,” says Lord Bacon, “witches and impostors have always held a competition with physicians.” Galen also complains of this circumstance, and observes that his patients were more obedient to the oracle in the temple of Esculapius, or to their own dreams, than they were to his prescriptions. The same popular imbecility is evidently allegorized in the mythology of the ancient poets, when they made both ESCULAPIUS and CIRCE the children of APOLLO; in truth, there is an unaccountable propensity in the human mind, unless subjected to a very long course of discipline, to indulge in the belief of what is improbable and supernatural: and this is perhaps more conspicuous with respect to physic than to any other affair of common life, both because the nature of diseases and the art of curing them are more obscure, and because disease necessarily awakens fear, and fear and ignorance are the natural parents of superstition; every disease therefore, the origin and cause of which did not immediately strike the senses, has in all ages been attributed by the ignorant to the wrath of heaven, to the resentment of some invisible demon, or to some malignant aspect of the stars;* and hence the introduction of a rabble of superstitious remedies, not a few of which were rather intended as expiations at the shrines of these offended spirits, than as natural agents possessing medicinal powers. The introduction of precious stones into the *materia medica*, arose from an Arabian superstition of this kind; indeed De Boot, who has written extensively upon the subject, does not pretend to account for the virtues of gems, upon any philosophical principle, but from their being the residence of spirits, and he adds that such substances, from their beauty, splendour, and value, are well adapted as receptacles for *good* spirits!†

* The Plague of London was supposed to have arisen from such a cause, as we learn from the writers of that period. I shall quote a passage from a pamphlet by W. Kemp, M. A. dedicated to Charles the Second. ‘One cause of breeding the pestilence is that corruption of the air, which is occasioned by the influence of the Stars, by the aspects, conjunctions, and oppositions of the Planets, by the eclipses of the Sun and Moon, and by the consequences of Comets. ‘*Astra regunt homines, sed regit astra Deus.*’ Hippocrates advises his son Thessalus to study numbers and geometry, (‘*Epist. ad Thessalum.*’) because, says he, the rising and setting of the Stars have a great effect upon Distempers. Citois, the historian of the celebrated Colic of Poitou (*Colica Pictonum*), which raged with such epidemic fury in that province during the Sixteenth century, drops a hint, apparently with a view to account for the origin of the disease, viz. that to the great astonishment of astrologers, ‘a new Star had in the same year made its appearance in the constellation of Cassiopeia, —(*Diatriba de novo et populari, apud Pictones, dolore colico bilioso.*)

† The precious stones were, at first, only used as Amulets, or external charms, but like many other articles of the *Materia Medica*, they passed, by a mistake in the mode of their application, from the outside to the inside of the body, and they were accordingly powdered and administered as specifics. An analogous case of the perverted administration of a popular remedy is afforded in the history of the Tench; which

Every substance whose origin is involved in mystery,* has at different times been eagerly applied to the purposes of medicine: not long since, one of those showers which are now known to consist of the excrement of insects, fell in the north of Italy; the inhabitants regarded it as Manna, or some supernatural panacea, and they swallowed it with such avidity, that it was only by extreme address, that a small quantity was obtained for a chymical examination.

A propensity to attribute every ordinary and natural effect to some extraordinary and unnatural cause, is one of the striking peculiarities of medical superstition; it seeks also explanations from the most preposterous agents, when obvious and natural ones are in readiness to solve the problem. Soranus, for instance, who was cotemporary with Galen, and wrote the life of Hippocrates! † tells us that honey proved an easy remedy for the aphthæ of children, but instead of at once referring the fact to the medical qualities of the honey, he very gravely explains it, from its having been taken from bees that hived near the tomb of Hippocrates! And even those salutary virtues which many herbs possess, were, in these times of superstitious delusion, attributed rather to the planet under whose ascendancy they were collected or prepared, than to any natural and intrinsic properties in the plants themselves; indeed such was the supposed importance of planetary influence, ‡ that it was usual to prefix to receipts a symbol of the planet under whose reign the ingredients were to be collected, and it is not perhaps generally known, that the character which we at this day place at the head of our prescriptions, and which is understood, and supposed to mean *Recipe*, is a relict of the astrological symbol of Jupiter, as may be seen in many of the older works on pharmacy, although it is at present so disguised by the addition of the down stroke, which converts it into the letter *R*, that were it not for its *cloven* foot, we might be led to question the fact of its superstitious origin.

Sennertus describes as a remedy capable of curing the Jaundice, which he allows is effected 'by secret attraction, and the power of amulets.' In the course of time, it became a reputed food in the cure of that disease, and Tench broth was prescribed upon all such occasions.

* Mystery is the very soul of Empiricism; withdraw the veil, and the confidence of the patient instantly languishes; thus Pliny, 'Minus credunt quæ ad suam salutem pertinent, si intelligunt.'

† It was this historian who said, that Medicine was invented by Apollo, improved by Esculapius, and brought to perfection by the physician of Cos.

‡ Paracelsus exclaims, 'Stellas terrenes esse Plantas, quæ celestes plantas, i. e. Stellas, respiciant, ita ut quævis planta suam habeat stellam specificam.'

The Druids of Gaul and Britain, who were both priests and physicians, gathered and cut the *Mistletoe* with a golden knife, only when the Moon was six days old, and being afterwards consecrated by certain forms, it was considered as an antidote to poisons, and a preventive of sterility. Plinii. Lib. xvi. c. 44.

The *Vervain*, (*Verbena Officinalis*), after libations of honey, was to be gathered at the rising of the dog-star, when neither sun nor moon shone, with the left-hand only; when thus prepared, it was said to vanquish fevers, and other distempers, was an antidote to the bite of serpents, and a charm to conciliate friendship. Plin. Lib. xxv. c. 9. I shall however hereafter show that the medicinal reputation of this herb derived its origin from a source more ancient even than that of Druidism. Magnenus (*Exercit. de Tabaco*), has given us the following precept,—'Tabacum seratur luna crescente, colligatur autem decrescente luna.'



A knowledge of this ancient and popular belief in sidereal influence, will enable us to explain many superstitions in Physic ; the custom, for instance, of administering cathartic medicines at stated periods and seasons, originated in an impression of their being more active at particular stages of the moon, or at certain conjunctions of the planets : a remnant of this superstition still exists to a considerable extent in Germany ; and the practice of bleeding at 'spring and fall,' so long observed in this country, owed its existence to a similar belief. It was in consequence of the same superstition, that the metals were first distinguished by the names and signs of the planets ; and as the latter was supposed to hold dominion over time, so were astrologers led to believe that some, more than others, had an influence on certain days of the week ; and, moreover, that they could impart to the corresponding metals considerable efficacy upon the particular days which were devoted to them ; * from the same belief, some bodies were only prepared on certain days in the year ; the celebrated earth of Lemnos was, as Galen describes, periodically dug with great ceremony, and it continued for many ages to be highly esteemed for its virtues ; even at this day, the pit in which the clay is found is annually opened, with solemn rites by the priests, on the sixth day of August, six hours after sunrising, when a quantity is taken out, washed, dried, and then sealed with the Grand Signior's seal, and sent to Constantinople. Formerly it was death to open the pit, or to seal the earth, on any other day in the year. In the botanical history of the middle ages, as more especially developed in Macer's Herbal, there was not a plant of medicinal use, that was not placed under the dominion of some planet, and must neither be gathered nor applied but with obser-

* In later times these heathen symbols were dropped, and others were adopted to propitiate the favour and assistance of heaven ; for this purpose the Alchemists stamped the figure of the cross upon the vessel in which they were to obtain their long sought for prize ; a superstitious practice, from which the term *crucible* derived its origin. I am well aware that another explanation has been given, and that the word has been derived from *Crucio*, since in the language of the Alchemists, the crucible was the vessel in which the metals were *tortured* to force them to assume the form of gold.

vances that savoured of the most absurd superstition, and which we find were preserved as late as the seventeenth century, by the astrological herbarists, Turner, Culpepper, and Lovel.

It is not the least extraordinary feature in the history of medical superstition, that it should so frequently involve in its trammels persons who, on every other occasion, would resent with indignation any attempt to talk them out of their reason, and still more so, to persuade them out of their senses; and yet we have continual proofs of its extensive influence over powerful and cultivated minds; in ancient times we may adduce the wise Cicero, and the no less philosophic Aurelius, while in modern days we need only call to our recollection the number of persons of superior rank and intelligence, who were actually persuaded to submit to the magnetising operations of Miss Prescott, and some of them were even induced to believe that a beneficial influence had been produced by the spells of this modern Circe.

Lord Bacon, with all his philosophy, betrayed a disposition to believe in the virtue of charms and amulets; and Boyle* seriously recommends the thigh bone of an executed criminal, as a powerful remedy in dysentery. Amongst the remedies of Sir Theodore Mayerne, known to commentators as the Doctor Caius of Shakspeare, who was physician to three English sovereigns, and who, by his personal authority, put an end to the distinctions of chymical and galenical practitioners in England, we shall find the secundines of a woman in her first labour with a male child; the bowels of a mole, cut open alive; mummy made of the lungs of a man who had died a violent death; with a variety of remedies, equally absurd, and alike disgusting.

It merits notice, that the medicinal celebrity of a substance has not unfrequently survived the tradition of its superstitious origin, in the same manner that many of our popular customs and rites have continued, through a series of years, to exact a respectful observance, although the circumstance which gave origin to them have been obscured and lost in the gloom of unrecorded ages. Does not the fond parent still suspend the coral toy around the neck of her infant, without being in the least aware of the superstitious belief† from which the custom originated? while the chorus of *derry down* is re-echoed by those who never heard of the Druids, much less of the coral hymns with which their groves resounded, at the time of their gathering the mistletoe; and how many a medical practitioner continues to administer this sacred plant (*Viscus Quercinus*) for the cure of his epileptic patients, without the lest sus-

* Mr. Boyle was pre-eminently credulous with respect to *specifics*, and contributed very greatly to the encouragement and diffusion of empiricism, by publishing many prescriptions as affording infallible remedies, which were communicated to him by a variety of persons, who either from ignorance or design vouched for their efficacy.

† The Soothsayers attributed many mystic properties to the Coral, and it was believed to be capable of giving protection against the influence of 'Evil Eyes;' it was even supposed that Coral would drive away Devils and Evil Spirits; hence arose the custom of wearing amulets composed of it, around the neck, and of making crowns of it. Pliny and Dioscorides are very loud in their praises of the medicinal properties of this substance, and Paracelsus says that it should be worn around the necks of infants as an admirable preservative against fits, sorcery, charms, and even against poison. It is a curious circumstance, that the same superstitious belief should exist among the Negroes of the West Indies, who affirm that the colour of Coral is always affected by the state of health of the wearer, it becoming paler in disease. In Sicily it is also commonly worn as an amulet.

picion that it owes its reputation to the same mysterious source of superstition and imposture? Nor is this the only faint vestige of druidism which can be abduced. Mr. Lightfoot states, with much plausibility, that in the highlands of Scotland, evidence still exists in proof of the high esteem in which those ancient Magi held the Quicken tree, or Mountain Ash, (*Sorbus Aucuparia*) for it is more frequently than any other, found planted in the neighbourhood of druidical circles of stones; and it is a curious fact, that it should be still believed that a small part of this tree, carried about a person, is a charm against all bodily evils,—the dairymaid drives the cattle with a switch of the *Roan* tree, for so it is called in the highlands; and in one part of Scotland, the sheep and lambs are, on the first May, ever made to pass through a hoop of *Roan* wood.

It is also necessary to state, that many of the practices which superstition has at different times suggested, have not been alike absurd; nay, some of them have even possessed, by accident, natural powers of considerable efficacy, whilst others, although ridiculous in themselves, have actually led to results and discoveries of great practical importance. The most remarkable instance of this kind upon record is that of the *Sympathetic* powder of Sir Kenelm Digby,* Knight of Montpelier. Whenever any wound had been inflicted, this powder was applied to the weapon that had inflicted it, which was, moreover, covered with ointment, and dressed two or three times a-day.† The wound itself in the meantime was di-

* See "Sir Kenelm Digby's Discourse upon the cure by Sympathy, pronounced at Montpelier, before an assembly of Nobles and learned men. Translated into English, by R. White, Gentleman, and published in 1658." King James the First obtained from Sir Kenelm the discovery of his secret, which he pretended had been taught him by a Carmelite Friar, who had learned it in America or Persia.

The *Sympathetic Powder* was, as we learn from cotemporary physicians, '*calcined green vitriol*.'

† This superstitious practice is repeatedly alluded to by the poets; thus Sir Walter Scott, in the *Lay of the Last Minstrel*—

"But she has ta'en the broken lance,
And wash'd it from the clotted gore,
And salved the splinter o'er and o'er,
William of Deloraine, in trance,
Whene'er she turn'd it round and round,
Twisted, as if she gall'd his wound,
Then to her maidens she did say,
That he should be whole man and sound."

Canto iii. St. xxiii.

Dryden has also introduced the same superstition in his *Enchanted Island*. Act v. Scene ii.

Ariel. Anoint the sword which pierced him with this
Weapon salve, and wrap it close from air
Till I have time to visit it again.

Again, in Scene 4th, Miranda enters with Hippolito's sword, wrapt up:—

Hip. O my wounds pain me,

[*She unwraps the sword.*]

Mir. I am come to ease you.

Hip. Alas I feel the cold air come to me;]
My wound shoots worse than ever.

Mir. Does it still grieve you?

[*She wipes and anoints the sword.*]

Hip. Now, methinks, there's something laid just upon it:

Mir. Do you find no ease?

Hip. Yes, Yes; upon the sudden all this pain
Is leaving me—Sweet heaven, how am I eased

rected to be brought together, and carefully bound up with clean linen rags, but, ABOVE ALL, TO BE LET ALONE for seven days; at the end of which period the bandages were removed, when the wound was generally found perfectly united. The triumph of the cure was decreed to the mysterious agency of the sympathetic powder which had been so assiduously applied to the weapon; whereas, it is hardly necessary to observe, that the promptness of the cure depended upon the total exclusion of air from the wound, and upon the sanative operations of nature not having received any disturbance from the officious interference of art: the result, beyond all doubt, furnished the first hint, which led surgeons to the improved practice of healing wounds by what is technically called the *first intention*.

The rust of the spear of Telephus, mentioned in Homer as a cure for the wounds which that weapon inflicted, was probably *Verdegris*, and led to the discovery of its use as a surgical application.

Soon after the introduction of Gunpowder, *cold water* was very generally employed throughout Italy, as a dressing to gunshot wounds; not however from any theory connected with the influence of diminished temperature or of moisture, but from a belief in a supernatural agency imparted to it by certain mysterious and magical ceremonies, which were duly performed immediately previous to its application: the continuance of the practice, however, threw some light upon the surgical treatment of these wounds, and led to a more rational management of them.

The inoculation of the smallpox in India, Turkey, and Wales, observes Sir Gilbert Blane, was practised on a superstitious principle, long before it was introduced as a rational practice into this country. The superstition consisted in buying it—for the efficacy of the operation, in giving safety, was supposed to depend upon a piece of money being left by the person who took it for insertion. The members of the National Vaccine Establishment, during the period I had a seat at the board, received from Mr. Dubois, a missionary in India, a very interesting account of the services, derived from superstitious influence, in propagating the practice of vaccination through that uncivilized part of the globe. It appears from this document, that the greatest obstacle which vaccination encountered was a belief that the natural smallpox was a dispensation of a mischievous deity among them, whom they called MAH-RY UMMA, or rather, that this disease was an incarnation of the dire Goddess herself, into the person who was infected with it; the fear of irritating her, and of exposing themselves to her resentment, necessarily rendered the natives of the East decidedly averse to vaccination, until a superstitious impression, equally powerful with respect to the new practice, was happily effected; this was no other than a belief, that the Goddess MAH-RY UMMA had spontaneously chosen this new and milder mode of manifesting herself to her votaries, and that she might be worshipped with equal respect under this new shape.

HYDROMANCY is another superstition which has incidentally led to the discovery of the medicinal virtues of many mineral waters; a belief in the divining nature of certain springs and fountains is, perhaps, the most ancient and universal of all superstitions. The Castalian fountain, and many others amongst the Grecians, were supposed to be of a prophetic nature; by dipping a fair mirror into a well, the Patræans of Greece received, as they imagined, some notice of ensuing sickness or health. At this very

day, the sick and lame are attracted to various hallowed springs ; and to this practice, which has been observed for so many ages, and in such different countries, we are no doubt indebted for a knowledge of the sanative powers of many mineral waters. There can be no doubt, moreover, but that in many cases, by affording encouragement and confidence to a dejected patient, and serenity to his mind, whether by the aid of reason or the influence of superstition, much benefit may arise ; for the salutary and curative efforts of nature, in such a state of mind, must be much more likely to succeed ; equally evident is it, that the most powerful effects may be induced by the administration of remedies which, from their disgusting nature, are calculated to excite strong and painful sensations of the mind.* Celsus mentions, with confidence, several medicines of this kind for the cure of Epilepsy, as *the warm blood of a recently slain Gladiator*, or a certain portion of *human, or horse flesh* ! and we find that remedies of this description were actually exhibited, and with success, by Kaw Boerhaave, in the cure of Epileptics in the poor house at Haerlem. The powerful influence of confidence in the cure and prevention of disease was well understood by the sages of antiquity ; the Romans, in times of pestilence, elected a dictator with great solemnity, for the sole purpose of driving a nail into the wall of the temple of Jupiter—the effect was generally instantaneous—and while they thus imagined that they propitiated an offended deity, they in truth did but diminish the susceptibility to disease, by appeasing their own fears. Nor are there wanting in modern times, striking examples of the progress of an epidemic disease having been suddenly arrested by some exhilarating impression made upon the mass of the population.

In the celebrated siege of Breda, in 1625, by Spinola, the garrison suffered extreme distress from the ravages of Scurvy, and the Prince of Orange, being unable to relieve the place, sent in, by a confidential messenger, a preparation which was directed to be added to a very large quantity of water, and to be given as a specific for the epidemic ; the remedy was administered, and the garrison recovered its health, when it was afterwards acknowledged, that the substance in question was no other than a little colouring matter.

Amongst the numerous instances which have been cited to show the power of faith over disease, or of the mind over the body, the *cures performed by Royal Touch* † have been generally selected ; but it would appear, upon the authority of Wiseman, that the cures which were thus

* At the same time it must be acknowledged that many of these revolting applications have actually produced benefit by a physical operation ; we need only mention the nauseous remedies recommended by many writers on Midwifery to expedite delivery, which induced the desired effect by producing nausea, or vomiting. Hartman says (*Opera*. Fol. p. 72) he has often witnessed amongst the poor, that difficult labour has been accelerated by a draught of the husband's urine ! and, he adds, that horse dung infused in wine is efficacious in expelling the Placenta. Sarah Stone, a midwife, who published some cases in 1737, mentions several instances of women in labour, to whom was given the juice of leeks, mixed with their husband's urine, in order to strengthen the pains. Nauseous remedies have always enjoyed the confidence of the vulgar ; this prejudice would seem to be the result of a species of false reasoning, by no means uncommon, that as every thing medicinal is nauseous, so must every thing that is nauseous be consequently medicinal.

† Edward the Confessor was the first English king who *touched* for the Evil, but the foolish superstition has been wisely laid aside, ever since the accession of the House of Hanover.

effected, were in reality produced by a very different cause; for he states, that part of the duty of the Royal Physicians and Serjeant Surgeons was to select such patients, afflicted with scrofula, as evinced a tendency towards recovery, and that they took especial care to choose those who approached the age of puberty; in short, those only were produced whom nature had shown a disposition to cure; and as the touch of the king, like the sympathetic powder of Digby, secured the patient from the mischievous importunities of art, so were the efforts of nature left free and uncontrolled, and the cure of the disease was not retarded or opposed, by the operation of adverse remedies. The wonderful cures of Valentine Greatracks, performed in 1666, which were witnessed by cotemporary prelates, members of parliament, and fellows of the royal society, amongst whom was the celebrated Mr. Boyle, would probably upon investigation admit of a similar explanation; it deserves, however, to be noticed, that in all records of extraordinary cures performed by mysterious agents, there is a great desire to conceal the remedies and other curative means, which were simultaneously administered with them; thus Oribasius commends in high terms a necklace of *Pæony root*, for the cure of Epilepsy; but we learn that he always took care to accompany its use with copious evacuations, although he assigns to them no share of credit in the cure. In later times we have a good specimen of this species of deception presented to us in a work on Scrofula, by Mr. Morley, written, as we are informed, for the sole purpose of restoring the much injured character and use of the *Vervain*; in which the author directs the root of this plant to be tied with a *yard of white satin ribband*, around the neck, where it is to remain until the patient is cured; but mark,—during this interval he calls to his aid the most active medicines in the materia medica!

The advantages which I have stated to have occasionally arisen from superstitious influence, must be understood as being generally accidental; indeed, in the history of superstitious practices, we do not find that their application was exclusively commended in cases likely to be influenced by the powers of faith or of the imagination, but, on the contrary, that they were as frequently directed in affections that were entirely placed beyond the control of the mind. Homer tells us, for instance, that the bleeding of Ulysses was stopped by a charm;* and Cato the censor has favoured us with an incantation for the reduction of a dislocated limb.

* This superstitious notion is not confined to the ancients, but is even cherished at this day, in some of the more remote districts of the kingdom; and we find frequent allusions to it in the popular poetry of the seventeenth century.

“Tom Pots was but a serving man,
But yet he was a doctor good;
He bound his kerchief on the wound,
And with some kind words he stanch'd the blood.”

Sir Walter Scott, in his “Lay of the last Minstrel”—

“She drew the splinter from the wound,
And with a charm she stanch'd the blood.”

The reader will also find the enumeration of several charms for this purpose, in Reginald Scott's *Discovery of Witchcraft*, p. 273.

We learn also from Sennertus, that the older Surgeons had recourse to prayers and magic for the extraction of foreign bodies from wounds; a very interesting summary of their superstitions, and peculiar notions concerning wounds, will be found in this author, under the head, “*De Rebus alienis e vulnere eximendis*.” Lib. v. Pars. iv. *Practicæ Medicinæ*.

In certain instances, however, we are certainly bound to admit that the pagan priesthood, with their characteristic cunning, were careful to perform their superstitious incantations, in such cases only as were likely to receive the sanative assistance of Nature, so that they might attribute the fortunate results of her efforts, to the potent influence of their own arts. The extraordinary success which is related to have attended various superstitious ceremonials will thus find a plausible explanation; the miraculous gift, attributed by Herodotus to the Priestesses of Helen, is one amongst many others of this kind that might be adduced; the Grecian historian relates, that when the heads of ugly infants were adjusted on the altar of this temple, the individuals so treated acquired comeliness, and even beauty, as they advanced in growth: but is not such a change the ordinary and unassisted result of natural developement? Those large and prominent outlines which impart an unpleasing physiognomy to the infant, when proportioned and matured by growth, will generally assume features of intelligence in the adult face.

I shall conclude these observations, by remarking that, in the history of religious ceremonials, we sometimes discover that they were intended to preserve useful customs or to conceal important truths; which, had they not been thus *embalmed* by superstition, could never have been perpetuated for the use and advantage of posterity. I shall illustrate this assertion by one or two examples. Whenever the ancients proposed to build a town, or to pitch a camp, a sacrifice was offered to the gods, and the Soothsayer declared, *from the appearance of the entrails*, whether they were propitious or not to the design. What was this but a physiological inquiry into the salubrity of the situation, and the purity of the waters that supplied it? for we well know that in unwholesome districts, especially when swampy, the cattle will uniformly present an appearance of disease in the viscera, which an experienced eye can readily detect; and when we reflect upon the age and climate in which these ceremonies were performed, we cannot but believe that their introduction was suggested by principles of wise and useful policy. In the same manner, *Bathing*, which at one period of the world, was essentially necessary, to prevent the diffusion of Leprosy, and other infectious diseases, was wisely converted into an act of religion, and the priests persuaded the people that they could only obtain absolution on washing away their sins by frequent ablutions; but since the use of linen shirts has become general, and every one has provided for the cleanliness of his own person, the frequent bath ceases to be so essential, and therefore no evil has arisen from the change of religious belief respecting its connexion with the welfare and purity of the soul. Among the religious impurities and rules of purification of the Hindoos, we shall be able to discern the same principle, although distorted by the grossest superstition. The ancient custom of erecting "*Acerræ*" or Altars, near the bed of the deceased, in order that his friends might daily *burn Incense* until his burial, was long practised by the Romans. The Chinese observe a similar custom: they place upon the altar thus erected an image of the dead person, to which every one who approaches it bows four times, and offers oblations and *perfumes*. Can there be any difficulty in recognizing, in this tribute to the dead, a wise provision for the preservation of the living? The original intention was, beyond doubt, to overcome any offensive smell, and to obviate the dangers that might arise from the emanations of the corpse.

These instances are sufficient to show the justness of my position; if time and space would allow, many others of a striking and interesting character might be adduced.*

CREDULITY;

Although it is nearly allied to Superstition, yet it differs very widely from it. Credulity is an unbounded belief in what is possible, although destitute of proof and perhaps of probability; but superstition is a belief in what is wholly repugnant to the laws of the physical and moral world. Thus, if we believe that an inert plant possesses any remedial power, we are *credulous*; but if we were to fancy that, by carrying it about with us, we should become invulnerable, we should in that case be *superstitious*. Credulity is a far greater source of error than superstition; for the latter must be always more limited in its influence, and can exist only, to any considerable extent, in the most ignorant portion of society; whereas the former diffuses itself through the minds of all classes, by which the rank and dignity of science are degraded, its valuable labours confounded with the vain pretensions of empiricism, and ignorance is enabled to claim for itself the prescriptive right of delivering oracles, amidst all the triumphs of truth, and the progress of philosophy. This is very lamentable; and yet, if it were even possible to remove the film that thus obscures the public discernment, I question whether the adoption of such a plan would not be outvoted by the majority of our own profession. In Chili, says Zimmerman, the physicians blow around the beds of their patients to drive away diseases, and as the people in that country believe that physic consists wholly in this wind, their doctors would take it very ill of any person who should attempt to make the method of cure more difficult—they think they know enough, when they know how to blow.

But this mental imbecility is not characteristic of any age or country. England has, indeed, by a late continental writer,† been accused of possessing a larger share of credulity than its neighbours, and it has been emphatically called "*the Paradise of Quacks*," but with as little truth as candour. If we refer to the works of *Ætius*, written more than 1300 years ago, we shall discover the existence a similar infirmity with regard to physic. This author has collected a multitude of receipts, particularly those that had been celebrated, or used as *Nostrums*,‡ many of which he mentions with no other view than to expose their folly, and to inform us at what an extravagant price they were purchased. We accordingly learn from him that the collyrium of Danaus was sold at Constantinople for 120 numismata, and the colical antidote of Nicostratus for two talents; in short, we shall find an unbounded credulity with respect to the powers of inert medicines, from the elixir and *alkahest* of Paracelsus and Van-Helmont, to the tar water of bishop Berkeley, the metallic tractors of Perkins, the animal magnetism of Miss Prescott, and

* The reader will find this subject treated more fully in the Introduction to our work on "*MEDICAL JURISPRUDENCE*."

† See a Tour through England, by Dr. Nernich of Hamburg.

‡ *Nostrum*, (our own.) This word, as its original meaning implies, is very significant of this characteristic attribute of quackery. See the note under the article '*Liquor Opii Sedativus*,' in vol. 2.

may I not add, with equal justice, to the nitro-muriatic acid bath of Dr. Scott? The description of Thessalus, the Roman empiric in the reign of Nero, as drawn by Galen, applies with equal fidelity and force to the medical Charlatan of the present day; and, if we examine the writings of Scribonius Largus, we shall obtain ample evidence that the same ungenerous selfishness of keeping medicines secret, prevailed in ancient no less than in modern times; while we have only to read the sacred orations of Aristides to be satisfied, that the flagrant conduct of the Asclepiades, from which he so severely suffered,* was the very prototype of the cruel and remorseless frauds, so wickedly practised by the unprincipled Quack Doctors and advertising "*Medical Boards*" of our own times: and I challenge the apologist of ancient purity to produce a more glaring instance of empirical effrontery and success, in the annals of the nineteenth century, than that of the sacred impostor described in the *Alexander* of Lucian, who established himself in the deserted temple of Esculapius, and entrapped in his snares some of the most eminent of the Roman senators.

SCEPTICISM.

Credulity has been justly defined, *Belief without Reason*. Scepticism is its opposite, *Reason without Belief*, and is the natural and invariable consequence of credulity: for it may be generally observed, that men who believe without reason, are succeeded by others whom no reasoning can convince; a fact which has occasioned many extraordinary and violent revolutions in the *Materia Medica*, and a knowledge of it will enable us to explain the otherwise unaccountable rise and fall of many useless, as well as important articles. It will also suggest to the reflecting practitioner, a caution of great moment, to avoid the dangerous fault imputed to Galen by Dioscorides, of ascribing too many and too great virtues to one and the same medicine. *By bestowing unworthy and extravagant praise upon a remedy, we in reality do but detract from its reputation,† and run the risk of banishing it from practice*; for when the sober practitioner discovers by experience that a medicine falls so far short of the efficacy ascribed to it, he abandons its use in disgust, and is even unwilling to concede to it that degree of merit to which in truth and jus-

* Aristides was the dupe and victim of the Asclepiades for ten successive years; he was alternately purged, vomited, and blistered; made to walk barefooted, under a burning sun in summer, and in winter he was doomed to seek for the return of health, by bathing his feeble and emaciated body in the river. All this severity, he was made to believe, was exercised towards him by the express directions of Esculapius himself, with whom he was persuaded to fancy that he conversed in his dreams, and frequently beheld in nocturnal visions. Upon one occasion, the god, fatigued with the importunities of his votary, ordered him to lose 120 lbs. of blood; the unhappy man not having so much in his body, wisely took the liberty of interpreting the oracle in his own way, and parted with no more than he could conveniently spare.

† As we are here investigating the follies of Physic, it will not be foreign to the subject to state, that the above observation may with as much truth and force be applied to medical writings as to medical substances. Nothing is more fatal to the permanent success and character of an author, than the extravagant and unmerited encomiums of timeserving reviewers. It would be invidious to illustrate this truth by examples, or we might adduce some striking instances where the inappropriate wreath has strangled the object which it was intended to adorn. It is a matter of deep regret that the *Magnates* of our profession do not combine in supporting a respectable medical Review.—'Munus Apolline dignum.'

tice it may be entitled; the inflated eulogiums bestowed upon the operation of *Digitalis* in pulmonary diseases, excited, for a time, a very unfair impression against its use; and the injudicious manner in which the antisphyilitic powers of *Nitric Acid* have been aggrandized, had very nearly exploded a valuable auxiliary from modern practice.

It is well known with what avidity the public embraced the expectations given by *Stöerk* of Vienna in 1760, with respect to the efficacy of *Hemlock*; every body, says Dr. Fothergill, made the extract, and every body prescribed it, but finding that it would not perform the wonders ascribed to it, and that a multitude of discordant diseases refused to yield, as it was asserted they would, to its narcotic powers, practitioners fell into the opposite extreme of absurdity, and declaring that it could do nothing at all, dismissed it at once as inert and useless. Can we not then predict the fate of the *Cubebs*, which has been lately restored to notice with such extravagant praise and unqualified approbation? May the sanguine advocates for the virtues of the *Colchicum* derive a useful lesson of practical caution from these precepts: it would be a matter of regret that a remedy which, under skilful management, certainly possesses considerable virtue, should again fall into obscurity and neglect from the disgust excited by the extravagant zeal of its supporters.

There are, moreover, those who cherish a spirit of scepticism, from an idea that it denotes the exercise of a superior intellect; it must be admitted, that at that period in the history of Europe, when reason first began to throw off the yoke of authority, it required superiority of understanding as well as intrepidity of conduct, to resist the powers of that superstition which had so long held it in captivity; but in the present age, observes Mr. Dugald Stewart, "*unlimited scepticism is as much the child of imbecility as implicit credulity.*" "He who at the end of the eighteenth century," says Rousseau, "has brought himself to abandon all his early principles, without discrimination, would probably have been a bigot in the days of the league."

FALSE THEORIES, AND ABSURD CONCEITS.

He who is governed by preconceived opinions, may be compared to a spectator who views the surrounding objects through coloured glasses, each assuming a tinge similar to that of the glass employed; thus have crowds of inert and insignificant drugs been indebted to an ephemeral popularity, from the prevalence of a false theory; the celebrated hypothesis of Galen respecting the virtues and operation of medicines, may serve as an example; it is a web of philosophical fiction, which was never surpassed in absurdity. He conceives that the properties of all medicines are derived from what he calls their elementary or *cardinal* qualities, HEAT, COLD, MOISTURE, and DRYNESS. Each of these qualities is again subdivided into four degrees, and a plant or medicine, according to his notion, is cold or hot, in the first, second, third, or fourth gradation; if the disease be hot, or cold in any of these four stages, a medicine possessed of a contrary quality, and in the same proportionate degree of elementary heat or cold, must be prescribed. Saltiness, bitterness, and acridness depend, in his idea, upon the relative degrees of heat

and dryness in different bodies. It will be easily seen how a belief in such an hypothesis must have multiplied the list of inert articles in the *materia medica*, and have corrupted the practice of physic. The variety of seeds derived its origin from this source, and until lately, medical writers in the true jargon of Galen, spoke of the *four* greater and lesser *hot* and *cold* seeds; and in the London Dispensatory of 1721, we find the powders of *hot* and *cold* precious stones, and those of the *hot* and *cold* compound powders of pearl. Several of the ancient combinations of opium, with various aromatics, are also indebted to Galen for their origin, and to the blind influence of his authority for their existence and lasting reputation. Galen asserted that opium was *cold in the fourth degree*, and must therefore require some corresponding hot medicine to moderate its frigidity. *

THE METHODIC SECT, which was founded by the Roman physician Themison, † a disciple of Asclepiades, as they conceived all diseases to depend upon *overbracing*, or on *relaxation*, so did they class all medicines under the head of *relaxing* and *bracing* remedies; and although this theory has been long since banished from the schools, yet it continues at this day to exert a secret influence on medical practice, and to preserve from neglect some unimportant medicines. The general belief in the relaxing effect of the *warm*, and the equally strengthening influence of the *cold* bath, may be traced to conclusions deduced from the operations of hot and cold water upon parchment and other inert bodies. ‡

THE STAHLIANS, under the impression of their ideal system, introduced *Archæal* remedies, and many of a superstitious and inert kind; whilst, as they on all occasions trusted to the constant attention and wisdom of nature, so did they zealously oppose the use of some of the most efficacious instruments of art, as the Peruvian bark; and few physicians were so reserved in the use of general remedies, as bleeding, vomiting, and the like; their practice was therefore imbecile, and it has been aptly enough denominated, "*a meditation upon death*." They were however vigilant in observation and acute in discernment, and we are indebted to them for some faithful and minute descriptions.

THE MECHANICAL THEORY, which recognized "*lentos and morbid viscosity of the blood*," as the principal cause of all diseases, introduced attenuant and diluent medicines, or substances endued with some mechanical force; thus Fourcroy explained the operation of mercury by its specific gravity, § and the advocates of this doctrine favoured the general introduction of the preparations of iron, especially in schirrus of the

* This theory is still cherished in the preservation of the formula for *Pilulæ Opia-tæ*, in the Edinburgh Pharmacopœia.

† The practice of this physician does not appear to have been very successful, if we may credit Juvenal.—

"Quot Themison ægros autumnis occiderit uno."

‡ See 'An Experimental Inquiry into the effect of Tonics, and other Medicines, on the cohesion of the Animal fibre.' By Dr. Crawford.

§ Van Swieten, in his Commentaries on the Venereal disease, has an aphorism founded on the same hypothesis, 'Render the blood and lymph more fluid, and you will have destroyed the virus.' Sect. 1477.

In the first volume of the Transactions of the Royal College of Physicians, there is a paper to the same effect, entitled, 'On the Operation of Mercury, in different diseases and constitutions, by Edward Barry, M. D. F. R. S.' Read at the College, July 13, 1767.

spleen or liver, upon the same hypothetical principle ; for, say they, whatever is most forcible in removing the obstruction, must be the most proper instrument of cure ; such is *Steel*, which, besides the attenuating power with which it is furnished, has still a greater force in this case from the *gravity* of its particles, which, being seven times specifically heavier than any vegetable, acts in proportion with a stronger impulse, and therefore is a more powerful deobstruent. This may be taken as a specimen of the style in which these mechanical physicians reasoned and practised.

THE CHYMISTS, as they acknowledge no source of disease but the presence of some hostile acid or alkali, or some deranged condition in the chymical composition of the fluid or solid parts, so they conceived all remedies must act by producing chymical changes in the body. We find Tournefort busily engaged in testing every vegetable juice, in order to discover in it some traces of an acid or alkaline ingredient, which might confer upon it medicinal activity. The fatal errors into which such an hypothesis was liable to betray the practitioner, receive an awful illustration in the history of the memorable fever that raged at Leyden in the year 1699, and which consigned two thirds of the population of that city to an untimely grave ; an event which, in a great measure, depended upon the Professor Sylvius de la Boe, who, having just embraced the chymical doctrines of Van Helmont, assigned the origin of the distemper to a prevailing acid, and declared that its cure could alone be effected by the copious administration of absorbent and testaceous medicines ; an extravagance into which Van Helmont himself would hardly have been betrayed :—but thus it is in philosophy, as in politics, that the partisans of a popular leader are always more sanguine, and less reasonable, than their master ; they are not only ready to delude the world, but most anxious to deceive themselves, and while they warmly defend their favourite system from the attacks of those that may assail it, they willingly close their own eyes, and conceal from themselves the different points that are untenable ; or, to borrow the figurative language of a French writer, they are like the pious children of Noah,* who went backwards, that they might not see the nakedness which they approached for the purpose of covering.

Unlike the mechanical physicians, the chymists explain the beneficial operation of iron by supposing that it increases the proportion of red globules in the blood, on the erroneous † hypothesis that iron constitutes the principal element of these bodies. Thus has iron, from its acknowledged powers, been enlisted into the service of every prevailing hypothesis ; and it is not a little singular, as a late writer has justly observed, that theories, however different, and even adverse, do nevertheless often coincide in matters of practice, as well with each other as with long established empirical usages, each bending as it were, and conforming, in order to do homage to truth and experience. And yet iron, whose medicinal virtues have been so generally allowed, has not escaped those vicissitudes in reputation which almost every valuable remedy has been doom-

* Genesis ix. 23.

† The animal nature of the colouring matter of the blood was first pointed out by Dr. Wells, but Fourcroy and Vauquelin considered it to be owing to subphosphate of iron. Mr. Brande, in 1812, demonstrated the fallacy of this opinion, and proved, by satisfactory experiments, its title to be considered as a peculiar animal principle ; the subsequent experiments of M. Vauquelin have confirmed Mr. Brande's results.

ed to suffer : at one period the ancients imagined that wounds inflicted by iron instruments, were never disposed to heal, for which reason Por-senna, after the expulsion of the Tarquins, actually stipulated with the Romans that they should not use iron, except in agriculture : and Avicenna was so alarmed at the idea of its internal use as a remedy, when given in substance, that he seriously advised the exhibition of a magnet* after it to prevent any direful consequences. The fame even of Peruvian bark has been occasionally obscured by the clouds of false theory ; some condemned its use altogether, " because it did not evacuate the morbid matter," " others, because it bred obstructions in the viscera," others again, " because it only bound up the spirits, and stopped the paroxysms for a time, and favoured the translation of the peccant matter into the more noble parts." Thus we learn from Morton,† that Oliver Cromwell fell a victim to an intermittent fever, because the physicians were too timid to make a trial of the bark. It was sold first by the Jesuits for its weight in silver;‡ and Condamine relates that in 1690, about thirty years afterwards, several thousand pounds of it lay at Piura and Payta for want of a purchaser.

Nor has Sugar escaped the venom of fanciful hypothesis. Dr. Willis raised a popular outcry against its domestic use, declaring that it " contained within its particles a secret acid—a dangerous sharpness,—which caused scurvies, consumptions, and other dreadful diseases." §

Although I profess to offer merely a few illustrations of those doctrines whose perverted applications have influenced the history of the *Materia Medica*, I cannot pass over in silence that of John Brown, " the child of genius and misfortune." As he generalized diseases, and brought all within the compass of two grand classes, those of *increased* and *diminished* excitement, so did he abridge our remedies, maintaining, that every agent which could operate on the human body was a *stimulant*, having an identity of action, and differing only in the degree of its force ; so that according to his views, the lancet and the brandy bottle were but the opposite extremes of one and the same class : the mischievous tendency of such a doctrine is too obvious to require a comment.

But the most absurd and preposterous hypothesis that has disgraced the annals of medicine, and bestowed medicinal reputation upon substances of no intrinsic worth, is that of the DOCTRINE OF SIGNATURES, as it has been called, which is no less than a belief that *every natural substance which possesses any medicinal virtue, indicates by an obvious and well-marked external character, the disease for which it is a remedy, or the*

* The Magnet, or Loadstone, in powder, entered also as an ingredient in several plasters, to draw bullets, and heads of arrows, out of the body, as in the 'emplastrum Divinum Nicolai,' the 'Emplastrum Nigrum' of Augsburg, the 'Opodeldock' and 'Attractivum' of Paracelsus, with several other preparations, to be found in the Dispensatory of Wecker, and in the practice of Senertus.

† PYRETOLOGIA, p. 17, A. D. 1692.

‡ Sturmius, in his 'Febrifugi Peruviani Vindiciæ,' published in 1658, observes that he saw twenty doses of the powder sold at Brussels for sixty florins, in order to be sent to Paris, and that he would willingly have been a purchaser of some doses, even at that price ; but the Apothecary was unable to supply him : an anecdote not more illustrative of the reputation of the bark, than of the honesty of the vender.

§ This produced a pamphlet from Dr. Slare, entitled 'A Vindication of Sugars against the charge of Dr. Willis and others : dedicated to the ladies.' 1715.

object for which it should be employed !* This extraordinary monster of the fancy has been principally adopted and cherished by Paracelsus, Baptista Porta, and Crollius, although traces of its existence may be certainly discovered in very ancient authors. The root of the *Mandrake*, from its supposed resemblance to the human form, was esteemed as a remedy for sterility : thus did Rachel demand from her sister the *Mandrakes* (*Dudaim*) which Reuben had gathered in the field ; impressed, as it would appear, with a belief in the efficacy of that plant against barrenness.† There would moreover appear in this case to have been some idea of additional virtue arising from the person who gathered it, for great stress was laid upon this circumstance, “ *my son’s Mandrakes :*” such a notion is by no means uncommon in the history of charms. The supposed virtues of the *Lapis Ætites*, or *Eagle-Stone*,‡ described by Dioscorides, Ætius, and Pliny, who assert that if tied to the arm it will prevent abortion, and if fixed to the thigh forward delivery, were, as we learn from ancient authority, solely suggested by the manner in which the nodule contained within the stone moves and rattles, whenever it is shaken. “ *Ætites lapis agitatus, sonitum edit, velut ex altero lapide prægnans.*” The conceit however did not assume the importance of a theory until the end of the fourteenth century, at which period we find several authors engaged in the support of its truth, and it will not be unamusing to offer a specimen of their sophistry ; they affirm, that since man is the lord of the creation, all other creatures are designed for his use, and therefore, that their beneficial qualities and excellencies must be expressed by such characters as can be seen and understood by every one ; and as man discovers his reason by speech, and brutes their sensations by various sounds, motions, and gestures, so the vast variety and diversity of figures, colours, and consistencies, observable in inanimate creatures, is certainly designed for some wise purpose. It *must be*, in order to manifest these peculiar qualities and excellencies, which could not be so effectually done in any other way, not even by speech, since no language is universal. Thus the lungs of a fox must be a specific for asthma, because that animal is remarkable for its strong powers of respiration. *Turmeric* has a brilliant yellow colour, which indicates that it has the power of curing the jaundice ; by the same rule, *Poppies* must relieve diseases of the head ; *Agaricus* those of the bladder ; *Cassia fistula* the affections of the intestines, and *Aristolochia* the disorders of the uterus : the polished surface and stony hardness which so eminently characterise the seeds of the *Lithospermum Officinale* (Common Gromwell) were deemed a certain indication of their efficacy in calculous and gravelly disorders ; for a similar reason the roots of the *Saxifraga Granulata* (White Saxifrage) gained reputation in the cure of the same disease ; and the *Euphrasia* (Eye-bright) acquired fame, as an application in complaints of the eye, because it exhibits a black spot in the corolla resembling the pupil.

In the curious work of *Chrysostom Magnenus*, we meet with a whimsical account of the *Signature* of Tobacco. “ In the first place,” says

* This conceit did not escape the notice of the metaphysical poets of the seventeenth century ; Cowley frequently availed himself of it to embellish his verse.

† Genesis xxx. 14.

‡ This mineral derives its name from the ancient belief that it was found in the nest of the eagle. It is a variety of iron ore.

he, "the manner in which the flowers adhere to the head of the plant indicates the *Infundibulum Cerebri*, and *Pituitary Gland*. In the next place, the three membranes of which its leaves are composed announce their value to the stomach which has three membranes."*

The blood-stone, the *Heliotropium* of the ancients, from the occasional small specks or points of a blood red colour exhibited on its green surface, is even at this day employed in many parts of England and Scotland, to stop a bleeding from the nose; and nettle-tea continues a popular remedy for the cure of *Urticaria*. It is also asserted that some substances bear the SIGNATURES of the humours, as the petals of the red rose that of the blood, and the roots of rhubarb and the flowers of saffron, that of the bile.†

I apprehend that John of Gaddesden, in the fourteenth century, celebrated by Chaucer, must have been directed by some remote analogy of this kind when he ordered the son of Edward the First, who was dangerously ill with the smallpox, to be wrapped in scarlet cloth, as well as all those who attended upon him, or came into his presence, and even the bed and room in which he was laid were covered with the same drapery; and so completely did it answer, say the credulous historians of that day, that the Prince was cured without having so much as a single mark left upon him.

In enumerating the conceits of Physic, as relating to the *Materia Medica*, we must not pass over the idea, so prevalent at one period, that *all poisonous substances possess a powerful and mutual elective attraction for each other*; and that, consequently, if a substance of this kind were suspended round the neck, it would, by intercepting and absorbing every noxious particle, preserve the body from the virulence of contagious matter. Angelus Sala, accordingly, gives us a formula for what he terms his *Magnes Arsenicalis*, which he asserts will not only defend the body from the influence of poison, but will, from its powers of attraction, draw out the venom from an infected person. In the celebrated plague of London, we are informed that amulets of arsenic were upon this principle suspended over the region of the heart, as a preservative against infection.

There is yet to be mentioned another absurd conceit which long existed respecting the subject of Antidotes,—a belief that every natural poison carried within itself its own antidote; thus we learn from the writings of Dioscorides, Galen, and Pliny, that the *virus* of the *Cantharis Vesicatoria* existed in the body of the fly, and that the head, feet, and wings, contained its antidote; for the same potent reason were the hairs of the rabid dog esteemed the true specific for Hydrophobia.‡

* 'Chrysost. Magneni Exercit. de Tabaco.'

† For a further account of this conceit, see Crollius, in a work appended to his '*BASILICA CHYMICA*,' entitled, '*De Signaturis internis rerum, seu de vera et viva Anatomia majoris et minoris mundi*.'

‡ In various black-letter works on Dæmonology we are assured that three scruples of the ashes of the witch, when she has been *well and carefully burnt* at a stake, is a sure Catholicon against all the evil effects of witchcraft! The popular author of *WAVERLEY* alludes to this superstition in his *ABBOT*.

DEVOTION TO AUTHORITY, AND ESTABLISHED ROUTINE.

This has always been the means of opposing the progress of reason—the advancement of natural truths—and the prosecution of new discoveries; whilst, with effects no less baneful, has it perpetuated many of the stupendous errors which have been already enumerated, as well as others no less weighty, and which are reserved for future discussion.

To give general currency to a hypothetical opinion, or medical reputation of an inert substance, requires only the talismanic aid of a few great names; when once established upon such a basis, ingenuity, argument, and even experiment, may open their ineffectual batteries. The laconic sentiment of the Roman Satirist is ever opposed to our remonstrance—"Marcus dixit?—ita est."

"Did Marcus say 'twas fact? then fact it is,
No proof so valid as a word of his."

A physician cannot err, in the opinion of the public, if he implicitly obeys the dogmas of authority; in the most barbarous ages of ancient Egypt, he was punished or rewarded according to the extent of his success, but to escape the former, it was only necessary to show that an orthodox plan of cure had been followed, such as was prescribed in the acknowledged writings of Hermes. It is an instinct in our nature to follow the track pointed out by a few leaders; we are gregarious animals, in a moral as well as a physical sense, and we are addicted to routine, because it is always easier to follow the opinions of others than to reason and judge for ourselves. "The mass of mankind," as Dr. Paley observes, "act more from habit than reflection." What, but such a temper, could have upheld the preposterous system of Galen for more than thirteen centuries; and have enabled it to give universal laws in medicine to Europe—Africa—and part of Asia? What, but authority, could have inspired a general belief, that the sooty washings of rosin † would act as a universal remedy? What, but a blind devotion to authority, or an insuperable attachment to established custom and routine, could have so long preserved from oblivion the absurd medicines which abound in our earliest dispensatories? for example, the "*Decoctum ad Ictericos*," of the Edinburgh College, which never had any other foundation than the doctrine of Signatures, in favour of the *Curcuma* and *Chelidonium Majus*; ‡ and it is only within a

* Massaria, a learned Professor of Pavia in the sixteenth century, absolutely declares that he would rather err with Galen than be in the right with any other physician!

† This practice of Bishop Berkeley has been ridiculed with great point and effect, in a pamphlet entitled 'A Cure for the Epidemical madness of drinking Tar Water,' by Mr. Reeve; in which, addressing the Bishop, he says, "thus, in your younger days, my Lord, you made the surprising discovery of the unreality of matter, and now in your riper age, you have undertaken to prove the reality of a universal remedy; an attempt to talk men out of their reason, did of right, belong to that author who had first tried to persuade them out of their senses." Tar water was also at one period considered to possess very considerable efficacy in Syphilis.

‡ The *Euphrasia Officinalis*, or eye-bright, which is indebted for its celebrity to the doctrine of Signatures, as before stated, is actually employed at this time in cases of dimness of sight. See a Paper upon the efficacy of this plant by Dr. Jackson, in the London Medical and Physical Journal, vol. 23, p. 104.

few years, that the *Theriaca Andromachi*, in its ancient absurd form, has been dismissed from the British Pharmacopœia.* The CODEX MEDICAMENTARIUS of Paris, recently edited, still cherishes this many-headed † monster of pharmacy, in all its pristine deformity, under the appropriate title of "*Electuarium Opiatum Polupharmacum*."

It is, however, evidently indebted for this unexpected rescue from oblivion to a cause very remote from that which may be at first imagined; not from any belief in its powers or reliance upon its efficacy, but from a disinclination to oppose the torrent of popular prejudice, and to reject what has been established by authority and sanctioned by time. For the same reason, and in violation of their better judgment, the editors have retained the absurd formula of Diest for the preparation of an extract of opium; which, after directing various successive operations, concludes by ordering the decoction to be boiled incessantly for six months, supplying the waste of water at intervals! Many of the compound formulæ in this new CODEX, it is frankly allowed, possess an unnecessary and unmeaning, if not an injurious complexity; and yet, such force has habit, and so paramount are the *verba magistri* that the editors are satisfied in distinguishing the more important ingredients by printing them in *Italics*, leaving the rest to be supplied at the whim and caprice of the dispenser, and thus are the grand objects and use of a national Pharmacopœia defeated, which should above all things insure uniformity in the strength and composition of its officinal preparations.

* Its rejection was proposed by the late Dr. Heberden, and upon the College dividing on the question, there were found to be *thirteen* votes for retaining, and *fourteen*, for rejecting it.

† This preparation consists of 72 ingredients, which are arranged under 13 heads—viz. ACRIA, of which there are 5 species. AMARA, of which there are 8. STYPTICA vulgo ASTRINGENTIA, 5 in number. AROMATICA EXOTICA, 14. AROMATICA INDIGENA, 10. AROMATICA EX UMBELLIFERIS, 7. RESINOSA ET BALSAMA, 8. GRAVE-OLENTIA, 6. VIROSA *seu quæ Narcosin inducunt*, under which head there is but one species, viz. Opium. TERREA INSIPIDA ET INERTIA; this comprises only the *Lemnian Earth*. GUMMOSA, AMYLACEA, &c. 4 species. DULCIA, *liquorice and honey*. VINUM, *Spanish*.

Upon no principle of combination can this heterogeneous farrago be vindicated. It has, however, enjoyed the confidence of physicians for many ages, and is therefore entitled to some notice. It was supposed to have been invented by Mithridates, the famous king of Pontus, the receipt for which was said to have been found among his papers after his defeat by Pompey, at which time it was published in Rome under the title of "*Antidotum Mithridaticum*," but the probability is, says Dr. Heberden, that Mithridates was as much a stranger to his own antidote as several eminent physicians have since been to the medicines that are daily advertised under their names. It was asserted, that whoever took a proper quantity in the morning, was insured from poison during the whole of that day, (Galen de Antidot. Lib. 1.) and it was further stated, that Mithridates, himself was so fortified against all baneful drugs, that none would produce any effect when he attempted to destroy himself. (Celsus, lib. 5. c. 23.) In the course of ages it has undergone numerous alterations. According to Celsus, who first described it, it contained only 35 simples; Andromachus, Physician to Nero, added vipers, and increased the number of ingredients to 75; and when thus reformed, he called it *βαλάνη*—but in Trajan's time it obtained the name of *Theriaca*, either from the vipers in it, or from its supposed effect in curing the bites of venomous animals. Damocrates gave a receipt for it in Greek iambics, which has been preserved by Galen. It appears then that its composition has hardly remained the same for a hundred years; it is, says Dr. Heberden, a farrago that has no better title to the name of Mithridates than, as it so well resembles the numerous undisciplined forces of a barbarous king, made up of a dissonant crowd collected from different countries, mighty in appearance, but in reality, an ineffective multitude, that only hinder each other. ANTIΘΗΡΙΑΚΑ, by W. Heberden, M. D. 1745.

The same devotion to authority which induces us to retain an accustomed remedy for pertinacity, will always oppose the introduction of a novel practice with asperity, unless indeed it be supported by authority of still greater weight and consideration. The history of various articles of diet and medicine will prove in a striking manner, how greatly their reputation and fate have depended upon authority. It was not until many years after *Ipecacuan* had been imported into Europe, that Helvetius, under the patronage of Louis XIV. succeeded in introducing it into practice: and to the eulogy of Katharine, queen of Charles II, we are indebted for the general introduction of Tea into England.*

That most extraordinary plant,† *Tobacco*, notwithstanding its powers

* The consumption of Tea has greatly increased in England during the last thirty years. In 1787 the total amounted to sixteen millions of pounds, whereas in 1821, it exceeded twenty-two millions.

† Hernandez de Toledo sent this plant into Spain and Portugal in 1559, when Jean Nicot was ambassador at the Court of Lisbon from Francis II. and he transmitted, or carried either the seed, or the plant to Catherine de Medicis: it was then considered as one of the wonders of the new world, and was supposed to possess very extraordinary virtues: this seems to be the first authentic record of the introduction of this plant into Europe. In 1589 the Cardinal Sante Croce, returning from his nunciature in Spain and Portugal to Italy, carried thither with him Tobacco, and we may form some notion of the enthusiasm with which its introduction was hailed, from a perusal of the poetry which the subject inspired; the poets compare the exploit of the holy Cardinal with that of his progenitor who brought home the wood of the true cross.

—————“Herb of immortal fame!
Which hither first with Santa Croce came,
When he, his time of nunciature expired,
Back from the Court of Portugal retired;
Even as his predecessors, great and good,
Brought home the cross.”—————

In England, it is said that the smoking Tobacco was first introduced by Sir Walter Raleigh on his return from America. James the First wrote a philippic against it, entitled a “*COUNTERBLASTE TO TOBACCO*,” in which the royal author, with more prejudice than dignity, informs his loving subjects that ‘it is a custom loathsome to the eye, hateful to the nose, harmful to the brain, dangerous to the lungs; and in the black stinking fume thereof, nearest resembling the horrible Stygian smoke of the pit that is bottomless.’ In 1604 this monarch endeavoured by means of heavy imposts to abolish its use in this country, and in 1619 he commanded that no planter in Virginia should cultivate more than 100 lbs. It must be confessed that some legislative enactment was necessary at this period for restricting the custom of smoking Tobacco, for we are told in the *Counterblaste*, that many persons expended as much as five hundred pounds per annum in the purchase of this article, which in those days was an enormous amount.

In 1624 Pope Urban the VIIIth published a decree of excommunication against all who took snuff in the church. Ten years after this, smoking was forbidden in Russia, under the pain of having the nose cut off: in 1653 the Council of the Canton of Appenzel cited smokers before them, whom they punished, and they ordered all innkeepers to inform against such as were found smoking in their houses. The police regulations of Bern made in 1661 was divided according to the Ten Commandments, in which the prohibition of smoking stands immediately beneath the command against adultery; this prohibition was renewed in 1675, and the Tribunal instituted to put it into execution—viz.; *CHAMBREAU TABAC*—continued to the middle of the eighteenth century, Pope Innocent the XIIth, in 1690, excommunicated all those who were found taking snuff or tobacco in the church of St. Peter at Rome; even so late as 1719 the Senate of Strasburgh prohibited the cultivation of Tobacco from an apprehension that it would diminish the growth of corn; Amurath the IVth published an edict which made smoking Tobacco a capital offence; this was founded on an opinion that it rendered the people infertile. Those who are curious to learn more of the history of this extraordinary plant, I beg to refer to a very interesting paper by ‘*Medicus*,’ in the 24th volume of the ‘*London Medical and Physical Journal*,’ page 445.

of fascination, has suffered romantic vicissitudes in its fame and character; it has been successively opposed, and commended by physicians—condemned, and eulogised by priest and kings—and proscribed, and protected by governments; whilst at length this once insignificant production of a little island, or an obscure district, has succeeded in diffusing itself through every climate, and in subjecting the inhabitants of every country to its dominion. The Arab cultivates it in the burning desert—the Laplander and Esquimaux risk their lives to procure a refreshment so delicious in their wintry solitude—the seaman, grant him but this luxury, and he will endure with cheerfulness every other privation, and defy the fury of the raging elements; and in the higher walks of the civilized society, at the shrine of fashion, in the palace, and in the cottage, the fascinating influence of this singular plant commands an equal tribute of devotion and attachment. The history of the Potato is perhaps not less extraordinary, and is strikingly illustrative of the omnipotent influence of authority; the introduction of this valuable plant received, for more than two centuries, an unexampled opposition from vulgar prejudice, which all the philosophy of the age was unable to dissipate, until Louis the XVth wore a bunch of the flowers of the potato into the midst of his court, on a day of festivity; the people then for the first time obsequiously acknowledged its utility, and ventured to express their astonishment at the apathy which had so long prevailed with regard to its general cultivation; that which authority thus established, time and experience have fully ratified, and scientific research has extended the numerous resources which this plant is so wonderfully calculated to furnish; thus, its stalk, considered as a textile plant, produces in Austria a cottony flax—in Sweden, sugar is extracted from its root—by combustion its different parts yield a very considerable quantity of potass,—its apples, when ripe, ferment and yield vinegar by exposure, or spirit by distillation—its tubercles made into a pulp, are a substitute for soap in bleaching,—cooked by steam, the potato is the most wholesome and nutritious, and at the same time, the most economical of all vegetable aliments,*—by different manipulations it furnishes two kinds of flour, a gruel, and a parenchyma, which in times of scarcity may be made into bread, or applied to increase the bulk of bread made from grain,—to the invalid it furnishes both aliment and medicine: its starch is not in the least inferior to the Indian arrow root, and Dr. Latham has lately shown that an extract may be prepared from its leaves and flowers, which possesses valuable properties as an anodyne remedy. †

The history of the warm bath‡ presents us with another curious instance of the vicissitudes to which the reputation of our valuable resources are so universally exposed; that which for so many ages was es-

* What other discovery or invention ever produced such political consequences as the introduction of the potato as an article of food? From its operation as the main constituent of national sustenance the population of Ireland has advanced from little more than one million to near seven millions, within the last century and a half!

† Med. Trans. of the College of Physicians, vol. vi. p. 92.

‡ That the *warm* and not the *cold* bath was esteemed by the ancient Greeks, for its invigorating properties may be inferred from a dialogue of Aristophanes, in which one of the characters says, 'I think none of the sons of the gods ever exceeded Hercules in bodily and mental force,'—upon which the other asks 'Where didst thou ever see a *cold* bath dedicated to Hercules?'

teemed the greatest luxury in health,* and the most efficacious remedy in disease, fell into total disrepute in the reign of Augustus, for no other reason than because Antonius Musa had cured the Emperor of a dangerous malady by the use of the cold bath. The most frigid water that could be procured was, in consequence, recommended on every occasion: thus Horace in his epistle to Vala, exclaims—

“——Caput ac stomachum supponere fontibus audent,
Clusinis, gabiosque petunt, et frigida rura.”

Epist. xv. Lib. 1.

This practice, however, was doomed but to an ephemeral popularity, for although it had restored the Emperor to health, it shortly afterwards killed his nephew and son-in-law, Marcellus; an event which at once deprived the remedy of its credit, and the physician of his popularity.

The history of the Peruvian Bark would furnish a very curious illustration of the overbearing influence of authority in giving celebrity to a medicine, or in depriving it of that reputation to which its virtues entitle it. This heroic remedy was first brought to Spain in the year 1632, and we learn from Villerobel that it remained for seven years in that country before any trial was made of its powers; a certain ecclesiastic of Alcala being the first person in Spain to whom it was administered in the year 1639; but even at this period its use was limited, and it would have sunk into oblivion but for the supreme power of the Roman church, by whose auspices it was enabled to gain a temporary triumph over the passions and prejudices which opposed its introduction; Innocent the Tenth, at the intercession of Cardinal de Lugo, who was formerly a Spanish Jesuit, ordered that the nature and effects of it should be duly examined, and upon being reported as both innocent and salutary, it immediately rose into public notice; † its career, however, was suddenly stopped by its having unfortunately failed in the autumn of 1652 to cure Leopold, Archduke of Austria, of a Quartan Intermittent; this disappointment kindled the resentment of the prince's principal physician, Chieffletius, who published a violent philippic against the virtues of Peruvian Bark, which so fomented the prejudices against its use, that it had nearly fallen into total neglect and disrepute.

Thus there exists a fashion in medicine, as in the other affairs of life, regulated by the caprice and supported by the authority of a few leading practitioners, which has been frequently the occasion of dismissing from practice valuable medicines, and of substituting others less certain in their effects and more questionable in their nature. As years and fashions revolve, so have these neglected remedies, each in its turn, risen again into favour and notice, whilst old receipts, like old almanacks, are abandoned until the period may arrive, that will once more adapt them to the spirit and fashion of the times. Thus it happens that most of our “*New Discoveries*” in the *Materia Medica* have turned out to be no more than the revival and adaptation of ancient practices. In the last century, the root of the *Aspidium Filix*, the male Fern, was retail-

* The prohibition of the bath was numbered amongst the mortifications to which certain priestesses in Greece were bound by the rigid rules of their order.

† T. Bartholini Hist. Anat. et Med. cent. v. Hafniæ. Med. Transactions, vol. 3. p. 177.

ed as a secret nostrum by Madame Nouffleur, a French empiric, for the cure of tape worm; the secret was purchased for a considerable sum of money by Louis XV. and the physicians then discovered that the same remedy had been administered in that complaint by Galen.*

The history of popular medicines for the cure of Gout, will also furnish us with ample matter for the illustration of the subject. The celebrated Duke of Portland's Powder was no other than the *Diacentaurion* of Cælius Aurelianus, or the *Antidotos ex duobus Centaureæ generibus* of Ætius,† the receipt for which a friend of his Grace brought from Switzerland; into which country it had been probably introduced by the early medical writers, who had transcribed its virtues from the Greek volumes soon after their arrival into the western parts of Europe. The active ingredient of a no less celebrated remedy for the same disease, the *Eau Medicinale*,‡ has been discovered to be the *Colchicum Autumnale* or Meadow Saffron; upon investigating the properties of this medicine, it was observed that similar effects in the cure of the gout were ascribed to a certain plant, called *Hermodactyllus*,§ by Oribasius and Ætius, but more particularly by Alexander of Tralles,|| a physician of Asia Minor in the fourth century; an inquiry was accordingly instituted after this unknown plant, and upon procuring a specimen of it from Constantinople, it was actually found to be a species of *Colchicum*.

The use of Prussic acid in the cure of Phthisis, which has been lately proposed by Dr. Majendie, and introduced into the *Codex Medicamentarius* of Paris, is little else than the revival of the Dutch practice in this complaint; for Linnæus informs us, in the fourth volume of his "*Amanitates Academicæ*," that distilled Laurel water was frequently used in Holland for the cure of pulmonary consumption.

The celebrated fever powder of Dr. James was evidently not his original composition, but an Italian nostrum invented by a person of the name of Lisle, a receipt for the preparation of which is to be found at length in *Colborne's Complete English Dispensatory for the year 1756*.

The various secret preparations of Opium, which have been extolled as the invention of modern times, may be recognized in the works of ancient authors; for instance, Wedelius in his *Opiologia* describes an acetic solution; and the *Magisterium* of Ludovicus, as noticed by Etmuller, was a preparation made by dissolving Opium in vinegar, and precipitating

* MADAME NOUFFLEUR'S RECEIPT is as follows: Three drachms of the root of the *Male Fern*, reduced to a fine powder, and mixed with water—this constitutes one dose. Two hours after taking the powder, a bolus of Calomel, Scammony, and Gamboge, is to be administered.

† DUKE OF PORTLAND'S POWDER FOR THE GOUT.—Equal quantities of the root of *Gentian*, and Birthwort, (*Aristolochia rotunda*,) the tops and leaves of German-der, (*chamædrys*,) Ground Pine, (*Chamæpitys*,) and lesser Centaury, (*Chironea Centaurium*,) powdered and mixed together.—As this is a combination of bitters, it might, without doubt, be serviceable in certain cases of Gout.

‡ This medicine was brought into vogue by M. Husson, a military officer in the service of France, about fifty years ago.

§ So popular was this plant that it acquired the title of '*Anima articulorum*.' It formed the basis of the *Dia Articulorum*, the *Pulvis Arthriticus Turneri*, and the *Vienna Gout Decoction*.

|| Alexander's Prescription consisted of *Hermodactylls*, Ginger, Pepper, Cummin seed, Anniseed, and Scammony; which, says he, will enable those who take it to walk immediately.

with Salt of Tartar:* Van Helmont recommends a preparation, similar to the black drop, under the title of *Laudanum Cydoniatum*: then again we have Langelott's Laudanum, and Le Mort's "*Extract out of rain water*," preparations which owe their mildness to the abstraction of the resinous element of opium.

The works of Glauber contain accounts of many discoveries that have been claimed by the chymists of our own day; he recommends the use of muriatic acid in sea scurvy, and describes an apparatus for its preparation exactly similar to that which has been extolled as the invention of Wolff; he also notices the production of *Pyro-acetic Acid* under the title of "*Vinegar of Wood*," so that the fact of the identity of this acid and vinegar, so lately announced by Vauquelin as a *new discovery*, was evidently known to Glauber nearly two centuries ago.

We have within the last few years heard much of the efficacy of Henbane fumigations in the toothach, an application which may be easily shown to be the revival only of a very ancient practice.†

But while we might thus proceed to annul many other claims for originality, we ought not to close our eyes to the fallacies to which such investigations are peculiarly exposed. Nothing is more easy than to invest the doubtful sentence of an obscure author with an interpretation best adapted for the support of a favourite theory, and instances might be adduced where the medical antiquarian ‡ has by violence and distortion forced the most contradictory passages into his service; treating, in short, the oracles of physic just as Lord Peter treated his father's will in the *Tale of a Tub*,—determined to discover the word "*Shoulder Knots*," he picks it out, letter by letter, and is even at last obliged to substitute c for κ in the orthography.

Nor has fashion confined her baneful interference to the selection of remedies; she has ventured even to decide upon the nature of diseases, and to change and modify their appellations according to the whim and caprice by which she is governed. The Princess, afterwards Queen Anne,

* "*Magisterium Opii fit solvendo Opium in aceto, et præcipitando cum sale tartari.*——"

† This was the favourite remedy of Dr. Andrew Boorde, who practised physic in Hampshire, and in his work printed in the black letter in London, entitled a '*Breviary of Health*,' he advises for a toothach depending upon worms, 'a candell of waxe with Heubane seeds, which must be lighted so that the perfume of the candell do enter into the tooth.' This said Dr. Andrew Boorde is too important a personage to be passed over without some farther notice in this place, being no less than the Founder of that dignified class of the medical fraternity, better known by the name of *Merry Andrews*. Dr. Andrew Boorde lived in the reigns of Henry VIII, Edward VI, and Queen Mary, and was in the constant habit of frequenting fairs and markets, at which he harangued the populace publicly: his speeches were extremely humorous and occasioned considerable mirth; his successors in this same line naturally endeavoured to imitate his bright example, and hence this class of itinerant quacks obtained the generic appellation of MERRY ANDREWS. Since the humiliating triumph of Quackery displayed at the Freemason's tavern, under the presidency of the member for Coventry, and more recently at Margate, there is reason to believe that this class of itinerant mountebanks will assume a new and more dignified appellation, and that in commemoration of the services of their *philosophical* president, the worthy member above stated, they will in future be designated by the name of RANTING PETERS.

‡ I have been lately much amused with the lucubrations of a classical friend, who by way of casting ridicule upon such researches, undertakes to prove to my satisfaction, that WARREN'S BLACKING is no other than the *γασμος μελαυαυγης*, "*Black flowing Splendour*," described in the Hecuba of Euripides.

was subject to hypochondriacal attacks, which her physicians pronounced to be *Spleen*, *Vapours*, or *Hyp*, and recommended Rawleigh's Confection, and Pearl Cordial, for its cure: this circumstance was sufficient to render both the disease and remedy *fashionable*; no other complaint was ever heard of in the precincts of the court but that of the *Vapours*, nor any medicine esteemed but that of Rawleigh. Some years afterwards, in consequence of Dr. Whytt's publication on "*Nervous diseases*," a lady of fashion was pronounced to be *nervous*—the term became general, and the disease *fashionable*; and *Spleen*, *Vapours*, and *Hyp* were consigned to oblivion: the reign of Nervous Diseases, however, did not long continue, for a popular work appeared on Biliary Concretions, and all the world became *bilious*. We have not patience to pursue the history of these follies; a transient glance at the ephemeral productions of the last twenty years would furnish a sad display of the versatility of medical opinions, and of the instability of the practice which has been founded upon them; and they will no doubt furnish the future historian with strong and forcible illustrations.

THE ASSIGNING TO ART THAT WHICH WAS THE EFFECT OF UNASSISTED NATURE, OR THE CONSEQUENCE OF INCIDENTAL CHANGES OF HABIT, DIET, &c.

Our inability upon all occasions to appreciate the efforts of nature in the cure of disease, must always render our notions, with respect to the powers of art, liable to numerous errors and multiplied deceptions. Nothing is more natural, and at the same time more erroneous, than to attribute the cure of a disease to the last medicine that had been employed; the advocates of amulets and charms* have even been thus enabled to appeal to the testimony of what they call experience, in justification of their superstitions; and cases which, in truth and justice, ought to be considered most luckily escapes, have been triumphantly pronounced as skilful cures; and thus have medicines and practitioners alike acquired unmerited praise, or unjust censure. Upon Mrs. Stephens offering her remedy for the stone to Parliament,† a committee of professional men was nominated to ascertain its efficacy; a patient with stone was selected, and he took the remedy: his sufferings were soon relieved, and upon examining the bladder in the usual way, no stone could be felt, it was therefore agreed that the patient had been cured, and that the stone had been dissolved; some time afterwards this patient died, and on being opened, a large stone was found in a pouch, formed by a part of the bladder, and which communicated with it. When the yellow fever raged in America, the practitioners trusted exclusively to the copious use of mercury; at

* This species of delusion, from mistaking the *Post hoc*, for the *Propter hoc*, always reminds me of the story of the Florentine Quack, who gave the countryman six pills which were to enable him to discover his lost Ass,—the pills beginning to operate on his road home, obliged him to retire into a wood, where he found his ass. The clown soon spread a report of the wonderful success of the empiric, who in consequence, no doubt, reaped an ample reward from the proprietors of strayed cattle.

† The grant of £5,000 to Joanna Stephens, for her discovery of certain medicines for the cure of the Stone, is notified in the London Gazette of June, A. D. 1739. See *Liquor Calcis*, in Vol. ii.

first, this plan was deemed so universally efficacious, that in the enthusiasm of the moment, it was triumphantly proclaimed that death never took place after the mercury had evinced its effect upon the system: all this was very true, but it furnished no proof of the efficacy of that metal, since the disease, in its aggravated form, was so rapid in its career, that it swept away its victims long before the system could be brought under mercurial influence, while in its milder shape it passed off equally well without any assistance from art.

Let us then, before we decree the honours of a cure to a favourite medicine, carefully and candidly ascertain the exact circumstances under which it was exhibited, or we shall rapidly accumulate examples of the fallacies to which our art is exposed; what has been more common than to attribute to the efficacy of a mineral water, those fortunate changes of constitution that have entirely or in a great measure, arisen from salubrity of situation, hilarity of mind, exercise of body, and regularity of habits, which have incidentally accompanied its potation. Thus, the celebrated John Wesley, while he commemorates the triumph of 'Sulphur and Supplication' over his bodily infirmity, forgets to appreciate the resuscitating influence of four months' repose from his apostolic labours; and such is the disposition of the human mind to place confidence in the operation of mysterious agents, that we find him more disposed to attribute his cure to a brown paper plaster of egg and brimstone, than to Dr. Fothergill's salutary prescription of country air, rest, ass's milk, and horse exercise.* The ancient physicians duly appreciated the influence of such agents; their temples, like our watering-places, were the resort of those whom medicine could not cure, and we are expressly told by Plutarch that these temples, especially that of Esculapius, were erected on elevated spots, with the most congenial aspects; a circumstance which when aided by the invigorating effects of hope, by the diversions which the patient experienced in his journey, and perhaps by the exercise to which he had been unaccustomed, certainly performed many cures. It follows then that in the recommendation of a *watering place*, something more than the composition of a mineral spring is to direct our choice,—the chymist will tell us, that the springs of Hampstead and Islington rival those of Tunbridge and Malvern, that the waters of Bagnigge Wells, as a chalybeate purgative, might supersede those of Cheltenham and Scarborough, and that an invalid would frequent the springs in the vicinity of the Dog and Duck, in St. George's Fields, with as much advantage as the celebrated Spa at Leamington; but the physician is well aware that by the adoption of such advice, he would deprive his patient of those most powerful auxiliaries to which I have alluded, and above all, lose the advantages of the "*Medicina Mentis*." On the other hand, the recommendation of change of air and habits will rarely inspire confidence, unless it be associated with some medicinal treatment; a truth which it is more easy and satisfactory to elucidate and enforce by examples than by precept—let the following story by Voltaire serve as an illustration.—"Ogul, a voluptuary who could be managed but with difficulty by his physician, on finding himself extremely ill from indolence and intemperance, requested advice:—'Eat a basilisk, stewed in rose-water,' replied the physician. In vain did the slaves search for a *basilisk*, until they met with Zadig, who, approaching Ogul, exclaimed, 'Behold that

* Wesley's Journal, vol. xxix. 290—293.

which thou desirest ;' 'but, my Lord,' continued he, 'it is not to be eaten ; all its virtues must enter through thy pores, I have therefore enclosed it in a little ball, blown up, and covered with a fine skin ; thou must strike this ball with all thy might, and I must strike it back again, for a considerable time, and by observing this regimen, and taking no other drink than rose-water for a few days, thou wilt see, and acknowledge, the effect of my art.' The first day Ogul was out of breath, and thought he should have died from fatigue ; the second he was less fatigued, and slept better : in eight days he recovered all his strength ; Zadig then said to him, 'There is no such thing in nature as a basilisk ! but *thou hast taken exercise and been temperate, and hast therefore recovered thy health !*' But the medical practitioner may perhaps receive more satisfaction from a modern illustration ; if so, the following anecdote, related by Sydenham, may not be unacceptable. This great physician having long attended a gentleman of fortune with little or no advantage, frankly avowed his inability to render him any further service, adding, at the same time, that there was a physician of the name of Robinson, at Inverness, who had distinguished himself by the performance of many remarkable cures of the same complaint as that under which his patient laboured, and expressing a conviction that, if he applied to him, he would come back cured. This was too encouraging a proposal to be rejected ; the gentleman received from Sydenham a statement of his case, with the necessary letter of introduction, and proceeded without delay to the place in question. On arriving at Inverness, and anxiously inquiring for the residence of Dr. Robinson, he found to his utter dismay and disappointment, that there was no physician of that name, nor ever had been in the memory of any person there. The gentleman returned, vowing eternal hostility to the peace of Sydenham ; and on his arrival at home, instantly expressed his indignation at having been sent on a journey of so many hundred miles for no purpose. "Well,"—replies Sydenham, "are you better in health?"—"Yes, I am now quite well, but no thanks to you."—"No," says Sydenham, "but you may thank Dr. Robinson for curing you. I wished to send you a journey with some object of interest in view ; I knew it would be of service to you ; in going you had Dr. Robinson and his wonderful cures in contemplation ; and in returning, you were equally engaged in thinking of scolding me."

AMBIGUITY OF NOMENCLATURE.

It has been already stated that we are to a great degree ignorant of the simples used by the ancient physicians ; we are often quite unable to determine what the plants are of which Dioscorides treats. It does not appear that out of the 700 plants of which his *Materia Medica* consists, that more than 400 are correctly ascertained ; and yet no labour has been spared to clear the subject of its difficulties : Cullen even laments that so much pains should have been bestowed upon so barren an occasion.* The early history of botany presents us with such a chaos of no-

* Soon after the invention of the art of Printing, the works of Dioscorides, Theophrastus, and Pliny, were published in various forms, and commentators swarmed like locusts. The eagerness with which this branch of knowledge was cultivated may

menclature, that it must have been impossible for the herbarist and physician to have communicated their mutual lights; every one was occupied with disputes upon words and names, and every useful inquiry was suspended, from an inability to decide what plant each author intended; thus, for instance, the *Herba Britannica* of Dioscorides and Pliny, so celebrated for the cure of the soldiers of Julius Cæsar on the Rhine, of a disease called '*Scelotyrbe*,' and supposed to resemble our sea scurvy, remains quite unknown, notwithstanding the labours of our most intelligent commentators.* It seems also very doubtful whether the plant which we denominate *Hemlock* was the poison usually administered at the Athenian executions,† and which deprived Socrates and Phocion of life. Pliny informs us that the word *Cicuta*, amongst the ancients, was not indicative of any particular species of plant, but of vegetable poisons in general; this is a circumstance to which I am particularly anxious to fix your attention; it is by no means uncommon to find a word which is used to express general characters, subsequently become the name of a specific substance in which such characters are predominant; and we shall find that some important anomalies in nomenclature may be thus explained. The term '*Αρσενικον*,' from which the word *Arsenic* is derived, was an ancient epithet, applied to those natural substances which possessed strong and acrimonious properties, and as the poisonous quality of arsenic was found to be remarkably powerful, the term was especially applied to Orpiment, the form in which this metal more usually occurred. So the term *Verbena* (quasi *Hebena*) originally denoted *all those* herbs that were held sacred on account of their being employed in the rites of sacrifice, as we learn from the poets:‡ but as *one* herb was usually adopted upon these occasions, the word *Verbena* came to denote that particular herb *only*, and it is transmitted to us to this day under the same

be conceived when it is stated that the Commentary of Matthioli or Dioscorides, which was first printed in 1554, passed through seventeen editions, and that 32,000 copies had been sold before the year 1561; and he tells us in this work, that he received in its execution the assistance and reward of emperors,—kings,—electors of the Roman Empire,—archdukes,—cardinals,—bishops,—dukes, and princes, 'which,' says he, 'gives greater credit to our labours than any thing that could be said.' In very many cases, however, says Dr. Pultney, 'this learned Commentator mistook the road to truth, and did but perplex the science he so industriously laboured to enlighten.'

* Turner, the father of English Botany, was of opinion, that it was the *Polygonum Bistorta*; Munting, a Dutch physician, that it was the *Hydrolapathum Magnum*, or *Rumex Aquaticus* or Great Water Dock, an opinion which received the sanction of Ray. Others have supposed it to have been *Polygonum Persicaria*, and some have considered it as the *Primula Auricula*. This one example is adduced to show the mortifying uncertainty that involves the history of ancient plants.

† Meade thinks that the Athenian poison was a combination of active substances,—perhaps that described by Theophrastus as the invention of Thrasyas, which, it was said, would cause death without pain, and into which *Cicuta* and Poppy entered as ingredients.

‡ "Verbenasque adole pingues, et Mascula Thura."

Virg. Eclog. viii.

"Ex Ara hac sume Verbenas tibi."

Terent. Andria.

"ara castis

vincta Verbenis."———*Hor. Od. xi. Lib. iv.*

It is a curious fact that in Tuscany the word *Vervena* is applied to denote *any* kind of slips, shoots, suckers or bundles of plants, at this very day.

title, viz. *Verbena* or *Vervain*, and indeed until lately it enjoyed the medical reputation which its sacred origin conferred upon it, for it was worn suspended around the neck as an amulet. *Vitriol*, in the original application of the word, denoted *any* crystalline body with a certain degree of transparency (*Vitrum* :) it is hardly necessary to observe that the term is now appropriated to a particular species; in the same manner, *Bark*, which is a general term, is applied to express *one* genus, and by way of eminence, it has the article, *The*, prefixed, as *The Bark*; the same observation will apply to the word *Opium*, which in its primitive sense signifies *any* juice (*οπος Succus*) while it now only denotes *one* species, viz. that of the Poppy. So again, *Elaterium* was used by Hippocrates, to signify various internal applications, especially purgatives of a violent and drastic nature (from the word 'Ελαυνω,' *agito, moveo, stimulo*,) but by succeeding authors it was *exclusively* applied to denote the active matter which subsides from the juice of the *wild cucumber*. The word *Fecula*, again, originally meant to imply *any* substance which was derived by spontaneous subsidence from a liquid, (from *fax*, the grounds or settlement of *any* liquor;) afterwards it was applied to *Starch*, which is deposited in this manner by agitating the flour of wheat in water; and lastly, it has been applied to a peculiar vegetable principle, which, like *Starch* * is insoluble in cold, but completely soluble in boiling water, with which it forms a gelatinous solution; this indefinite meaning of the word *fecula* has created numerous mistakes in pharmaceutic chymistry; *Elaterium*, for instance, is said to be a *fecula*, and in the original sense of the word it is properly so called, inasmuch as it is procured from a vegetable juice by spontaneous subsidence, but in the limited and modern acceptance of the term, it conveys an erroneous idea; for instead of the active principle of the juice residing in *fecula*, it is a peculiar proximate principle, *sui generis*, to which I have ventured to bestow the name of *Elatin*. For the same reason, much doubt and obscurity involve the meaning of the word *Extract*, because it is applied *generally* to any substance obtained by the evaporation of a vegetable solution, and *specifically* to a peculiar proximate principle, possessed of certain characters, by which it is distinguished from every other elementary body—See *Extracta*. On the other hand, we find that many words which were originally only used to denote particular substances, have, at length, become subservient to the expression of General Characters; thus the term *Alkali*, in its original sense, signified that particular residuum which was alone obtained by lixiviating the ashes of the plant named *Kali*, but the word is now so generalized that it denotes *any* body possessed of a certain number of definite properties.

Another source of botanical ambiguity and error is the circumstance of certain plants having acquired the names of others very different in their nature, but which were supposed to possess a similarity in external character; thus our *POTATO*,† (*Solanum Tuberosum*) when it was first

* *AMLYUM*, the Starch of wheat, originally denoted a powder that was obtained without the application of a mill, from *α*, not, and *μυλος*, a mill; thus Dioscorides "Αμυλον ονόμασαι δια το χαρις μυλε καλιστα κινεαζεσθαι"—i. e. *because it is prepared without a mill*.

† Gerard, in his *Herbal*, (1597) denominates it, by way of distinction, *Potato of Virginia*, and he recommends it to be eaten as a *delicate* dish, not as common food; indeed some time elapsed after its introduction before it became general, and it was cultivated as an article of diet in Ireland several years before it was common in England.

imported into England by the colonists in the reign of Queen Elizabeth, gained its appellation from its supposed resemblance to an esculent vegetable at that time in common use, under the name of the Sweet Potato (*Convolvulus Battatas*), and which, like *Eringo Root*, had the reputation of being able to restore decayed vigour, thus Falstaff—

“Let the sky rain potatoes, hail kissing comfits, and snow eringoes.”

Merry Wives of Windsor, Act 5, Scene 5.

A similar instance is presented to us in the culinary vegetable well known under the name of the JERUSALEM ARTICHOKE, which derived its appellation in consequence of its flavour having been considered like that of the common artichoke; it is hardly necessary to observe that it has no botanic relation whatever to such a plant, it being a heliotrope (*Heliotropium Tuberosum*), the epithet *Jerusalem* is a curious corruption of the Italian term *Gira-Sole*, that is, *turn-sun* in English, or *Heliotrope* in Greek. This instance of verbal corruption is not solitary in medical botany; CASTOR OIL will suggest itself as another example; this oil, from its supposed efficacy in curing and assuaging the unnatural heat of the body, and in soothing the passions, was called by the French *Agnus Castus*, whence the inhabitants of St. Kitt's in the West Indies, who were formerly blended with the French in that Island, called it *Castor oil*. In some cases again, a plant has received a modern name, compounded of two ancient ones; it appears from Pliny that the *Assarum* was not uncommonly confounded with the *Baccharis*; an English name was accordingly bestowed upon it, which is a curious compromise of the question, for it is a compound of both, viz. *Assarabacca*.

In some instances the most alarming mistakes have occurred from substances of a very different nature having been mentioned under similar names, *Arsenic*, for instance, has actually been inhaled,* together with the vapours of Frankincense, Myrrh, and those of other gums, during a paroxysm of Asthma! a practice of which arose from the practitioner having confounded the Gum Juniper, or *Vernix* of the Arabians, which was prescribed for fumigations under the name of *Sandarach*, with the *Σανδαράκη* of Aristotle, and which was a sulphuret of Arsenic. The gum which we know at the present day under the name of *Sanguis Draconis*, or *Dragon's blood*, was called by the ancient Greeks *Κίρρασαπὶ*, a term which has been incorrectly transferred to a Sulphuret of Mercury, for no other reason than because this mineral has the same red colour as the gum.

The advanced state of BOTANICAL SCIENCE will now prevent the recurrence of those doubts and difficulties which have formerly embarrassed the histories of vegetable remedies, by furnishing a strictly philosophical language, independent of all theory, and founded upon natural

* The inhalation of the fumes of *Orpiment* is a practice attributed to Galen: and one of the most distinguished of his disciples, Rhazes, recommends it to be inhaled by consumptive patients, in combination with stimulant and resinous substances, such as *Storax*, *Myrrh*, *Galbanum*, and *Aristolochia root*. Bennet recommends the same practice in such cases. Willis informs us that a similar custom prevailed among certain empirics of his day, and asserts that they took such pieces of carpet as were dyed with *Orpiment*, and having cut them into small pieces, exposed them to heat, and, by means of an inverted funnel, made the patients inhale the vapour. Sir Alexander Crichton seems disposed to believe that such applications might prove useful by changing the action of any ulcer to which they were applied.

structure, and therefore necessarily beyond the control of opinion; while the advancement of chymical knowledge, by enabling us better to distinguish and identify the different substances we employ, will also materially assist in preventing the confusion which has formerly oppressed us. At the same time, I am unwilling to join in the commendations so liberally bestowed upon our chymical nomenclature; nay, I am disposed to consider it as a matter of regret that the names of our medicinal compounds should have any relation to their chymical composition, for in the present unsettled state of this science, such a language must necessarily convey theory instead of truth, and opinions rather than facts; in short, it places us at the mercy and disposal of every new hypothesis, which may lay our boasted fabric in ruins, and in its place raise another superstructure, equally frail in its materials and ephemeral in its duration: thus CORROSIVE SUBLIMATE was a *muriate* of Mercury, or an *oxymuriate*, until Sir H. Davy established his new theory of chlorine, and then it became a *bi-chloride*; at some future period, Chlorine will be found to be a compound, and then it must have another name; for the same reason the term CALOMEL,* is surely to be preferred to *submuriate*, or *Chloride*. TARTARIZED ANTIMONY, again, has been called by our nomenclatural reformers the *Tartrate of Antimony and Potass*; but is it a triple compound? Gay Lussac thinks not, and considers it as a combination in which *Cream of Tartar* acts the part of a simple acid.

Again,—we have only to revert to the nomenclature of the Salts in our *Materia Medica* to discover the actual change in meaning which the same word has undergone in a very few years. It was originally understood that the term *Sub*, when prefixed to the generic name of a Salt, indicated the presence of certain qualities depending upon an excess of base; but now, forsooth, the term has reference only to atomic composition, without any regard to qualities.† That salt alone being acknowledged as a true *Sub-salt*, in which there is less than one atom of acid to each atom of base; thus our “*Sub-carbonate of Soda*,” is no longer considered a *Sub-salt*, for the reasons above stated; and, notwithstanding the predominance of its alkaline characters, it is known to chymists by the appellation of *Carbonate of Soda*. It is far from my intention to question the propriety of these changes, I only maintain that, amidst such chymical doubts, the Pharmaceutist is the last person who should become arbiter; let him await the issue in unobtrusive silence, and take care that the language of Pharmacy partakes of the same neutrality.

* Calomel.—There is some doubt respecting the original meaning of this word, it literally signifies, *fair, black*, καλός, μίλας. Sir Theodore Mayerne is said to have given the name to it, in consequence of his having had a favourite black servant who prepared it; but is it not more probable that its name was derived from the change of colour which it undergoes from *black* to *white*, during its preparation? Another explanation has been also given, viz. quòd nigro humori sit bonum—a good (καλός) remedy for *black* (μίλας) bile. This theory derives much support from the black appearance of the stools, which is usually produced by the use of Calomel, and which was erroneously attributed to the searching and efficacious nature of the purgative. The Calomel of Riverius was a compound of *Hydrargyri Sub-muriat*: ℞j and *Scammonæ* gr. vij, and Mr. Gray thinks that the term Calomel was first applied to this remedy, as being a mixture of a white and dark coloured powder.

† For further information upon this subject the reader may consult my work on “*The Elements of Medical Chymistry*.”

Such was the feeling of the Committee appointed by the College for the revision of the late London Pharmacopœia, and it sufficiently explains why the nomenclature of the alkaline salts has been left unchanged in the present edition of that work.

The French, in their new *Codex*, are absurdly extravagant in their application of chymical nomenclature; thus, the sub-carbonate of potass is called by them *sub-deuto-carbonas potassii*. The first part of this quadruple name indicates the comparative quantity of acid in the salt, the second that of oxygen contained in the base, the third announces the acid, and the fourth the basis of the base!

THE PROGRESS OF BOTANICAL SCIENCE.

It has just been stated, that we have derived from botanical science a philosophical language, which enables us to describe the structure and habits of any plant, with a luminous brevity and an unerring perspicuity; but we are moreover indebted to botany for another service no less important to the successful investigation of the *Materia Medica*,—that of throwing into well defined groups, those plants which possess obvious natural affinities, and which will be found at the same time to present certain medicinal analogies; indeed, as a general rule, we may admit the axiom, "*Quæ genere conveniunt, virtute conveniunt.*"*

The *Umbelliferæ* which grow on dry ground are aromatic, whilst the aquatic species are among the most deadly poisons. The *Cruciform* plants are aromatic and acrid in their nature, containing essential oils, (hence the peculiar smell of cabbage-water, &c.) which are obtainable by distillation; and Linnæus asserts that "among all the *leguminous* or *papilionaceous* tribe there is no deleterious plant to be found:" this however is not exactly true. Some of the individuals in these natural orders, although very nearly related, do nevertheless possess various, and even opposite qualities; in the leguminous tribe above mentioned, which is as consistent as any one we possess, we have the *Cytisus Laburnum*, the seeds of which are violently emetic, and those of *Lathyrus Sativus*, which have been supposed at Florence to soften the bones and cause death.

In the subdivision even of a genus there is often a remarkable difference in the properties of the species; there are, for instance, *Solanums*, *Lettuces*, *Cucumbers*, and *Mushrooms*, both esculent and poison-

* Dr. Blair thinks that the ancients were led in many instances by the comparison of habit, to ascribe similar virtues to plants: there does not however appear to be a trace of what may be called System, in the writings of Theophrastus, Dioscorides, or Pliny. Cæsalpinus was the father of botanical system, and he was probably the first who suggested the idea that the virtues of plants were discoverable by their structure and alliance to each other. In his preface to his work, "*De Plantis*," he says, '*Quæ enim generis societate junguntur, plerumque et similes possident facultates.*' This idea was pursued by Petiver, an apothecary in the city of London, a name well known in the annals of Botany; there is a paper by him on this subject, in the 21st volume of the *Philosophical Transactions*, entitled, '*some attempts to prove that herbs of the same make and class, for the generality, have the like virtue, and tendency to work the same effects.*' Dr. Murray has adopted an arrangement founded upon natural character in his celebrated work, entitled, "*Apparatus Medicaminum.*"

ous. The *Digitalis* or Foxglove, and the *Verbascum*, or common Mullein of our fields, are included in the same natural family, and yet the one is as active, as the other is mild in its effects; the plants of the natural family of *Contortæ* abound with a highly acrid milky juice, but Dr. Afzelius met with a shrub of this order at Sierra Leone, the milk of whose fruit was so sweet, as well as copious, as to be used instead of cream for tea; this is certainly what no one could have guessed from analogy. The same individual will vary from culture or other circumstances, as much as any two plants which have no botanic affinity; the Chamomile, *Anthemis Nobilis*, with which we are well acquainted, may have its whole disk changed, by cultivation, to ligulate white florets, destitute of medicinal properties. But what is more embarrassing, the different parts of the same plant have often very different powers: a fact which is beautifully exemplified in the *Podophyllum Peltatum*, or May Apple, the leaves of which are poisonous, the root powerfully cathartic, and the fruit agreeably esculent; so the leaves of the *Jatropha Manihot* are employed as a common esculent, while its root secretes a most virulent poison; but we need not seek further for an example than the fruit of the Lemon, the juice of which is acid, its seeds bitter, and its rind aromatic; in some instances it happens that the energy of a plant is concentrated in one particular part, and that all the rest is absolutely inert; thus the root of the *Convolvulus Scammonia*, is the only portion of that plant which possesses any medicinal quality;* and the tree which yields the drastic *Camboge*, presents at the same time an esculent fruit, which is eaten by the natives with as much impunity as the orange; yet, notwithstanding all these difficulties, botany is capable of furnishing us with analogies which will lead to important conclusions with respect to the medicinal properties of different vegetables.

The system of Linnæus, although in a great degree artificial, corresponds in a surprising manner with the natural properties of plants; thus a plant whose calyx is a double valved glume, with three stamina, two pistils, and one naked seed, bears seeds of a farinaceous and nutritious quality; a flower with twelve, or more stamina, all of which are inserted in the internal side of the calyx, will furnish a wholesome fruit; whereas a plant whose flower has five stamina, one pistil, one petal, and whose fruit is of the berry kind, may at once be pronounced as poisonous.

It is also in a great degree true that the sensible qualities of plants, such as colour, taste, and smell, have an intimate relation to their properties, and may often lead by analogy to an indication of their powers; we have an example of this in the dark and gloomy aspect of the *Luridæ*, which is indicative of their narcotic and very dangerous qualities, as *Datura*, *Hyoscyamus*, *Atropa*, and *Nicotiana*. Colour is certainly in many cases a test of activity; the deepest coloured flowers of the *Digitalis*, for example, are the most active, and when the leaves of powerful plants lose their green hue, we may conclude that a corresponding deterioration has taken place with respect to their virtues; but Linnæus ascribed too much importance to such an indication, and his aphorisms are unsupported by facts; for instance, he says, "Color pallidus insipidum, viridis crudum, luteus amarum, ruber acidum, albus dulce, niger ingratum, in-

* Russell's Nat. Hist. of Aleppo.

dicat.”* A peculiar heavy odour, which is well known, but is with difficulty defined, is a sure indication of narcotic properties. Bitterness, when not extreme, denotes a tonic quality which will stimulate the stomach and intestines, and promote the process of digestion. When the bitterness is more intense and pungent,† as in *Aloes*, *Colocynth*, &c. we may infer that such substances will produce a more active effect upon the *primæ viæ*, and that catharsis will follow their administration.

Botanical, like human physiognomy, may frequently afford an insight into character, but it is very often a fallacious index. With regard to the indications of *smell* and *taste*, it may be observed that in the examination of an unknown substance we instinctively apply to these senses for information respecting its properties. It is certainly reasonable to suppose, that those bodies which produce upon the organs of taste a sensible, astringent, or pungent effect, may occasion an impression, corresponding in degree upon the stomach or intestines, which are but an extension of the same structure. But what numerous exceptions are there to such a law? nay, some of the most poisonous substances affect in a very slight degree the organs of taste, especially those that belong to the mineral kingdom, as *Arsenious Acid*, *Oxyd of Antimony*, *Calomel*, &c. : yet some of these are, perhaps, but apparent exceptions, depending upon the degree of solubility which they possess, in consequence of which their energies are not developed until they have traversed a considerable portion of mucous surface. Nor ought it to be forgotten, that cultivation and artificial habits may have blunted the natural susceptibility of our organs, and in some instances changed and depraved their functions: certain qualities for instance are so strongly connected with each other by the chain of association, that by presenting only one to the mind, the other links follow in succession.‡ It has been remarked, that persons in social life, are more effected by vegetable odours, while the savage smells better the putrid and fœtid exhalations of animal bodies:§ thus the people of Kamskatcha, did not smell the perfume of a vegetable Essence (*Equa Melissa*.) but they discovered by their olfactory sense, a rotten

* The student will find an interesting dissertation upon this subject in a late work, entitled “L’Histoire Naturelle des Medicamens.” Par. J. J. Virey. 1820.

† Lord Bacon attributes the operation of purgatives to three causes, viz. 1, to *extreme bitterness*, as in *Aloes*; 2, to *loathsomeness and horrible taste*, as in *Agaric* and black *Hellebore*; and 3, to a *secret malignity*, as in *Antimony*, &c.

‡ This might be illustrated by the recital of numerous fallacies to which our most simple perceptions are exposed from the powers of association, but I will relate an anecdote, which to my mind elucidates the nature and extent of such fallacies more strikingly than any example which could be adduced. Shortly after Sir Humphry Davy had succeeded in decomposing the fixed alkalies, a portion of *Potassium* was placed in the hands of one of our most distinguished chymists, with a query as to its nature? the philosopher observing its aspect and splendour, did not hesitate in pronouncing it to be metallic, and uniting at once the idea of weight with that of metal, the evidence of his senses was even insufficient to dis sever ideas so inseparably associated in his mind, and, balancing the specimen on his fingers, he exclaimed, “it is certainly metallic, and *very ponderous*!” Now this anecdote is not related in disparagement to the philosopher in question. Who could have been prepared to meet with a substance, so novel and anomalous as to overturn every preconceived notion?—A METAL SO LIGHT AS TO SWIM UPON WATER, AND SO INFLAMMABLE AS TO CATCH FIRE BY THE CONTACT OF ICE!

§ Virey, “Essai d’Histoire Naturelle et Physicolog : sur la perfectibilité de l’homme.”

fish, or a stranded whale, at a considerable distance.* There is no sense more under the dominion of imagination, or more liable to be perverted by education, than those of taste and smell; we are also liable to form unjust prejudices from the indications of colour; for particular colours, from the influence of hidden associations, are not unfrequently the exciting cause of agreeable or unpleasant impressions. I have met with a person who regards green food, if it be of an animal nature, with unconquerable aversion and disgust; indeed an idea of unwholesomeness has not unfrequently been attached to this colour, without the least foundation of truth; the bones of the Gar fish, or Sea Nettle, (*Esox Helone*,) have been deemed unwholesome from the circumstance of their turning green on being boiled, although not a single instance can be adduced in which that fish ever occasioned any harm. I have met with persons who have been made violently sick from eating the green part of the oyster;† an effect which can have no other cause than that of unjust prejudice; these examples are sufficient to show, with what caution such indications respecting the medicinal qualities of bodies are to be received.

THE APPLICATION AND MISAPPLICATION OF CHYMICAL SCIENCE.

Amongst the researches of different authors, who, animated with a sacred zeal for ancient learning, have endeavoured to establish the antiquity of chymical science, we find many conclusions deduced from an ingenious interpretation of the mythological fables‡ which are supposed to have been transmitted by the Egyptians; who, previous to the invention of letters, adopted this method of perpetuating their discoveries in natural philosophy. Thus, wherever Homer studiously describes the stolen embraces of Mars and Venus, they recognise some chymical secret, some combination of iron with copper, shadowed in the glowing ornaments of fiction. Lord Bacon§ conceived that the union of spirit and matter was allegorized in the fable of Proserpine being seized by Pluto as she was gathering flowers; an allusion, says Dr. Darwin, which is rendered more curiously exact by the late discovery, that pure air, (*oxygen*) is given out by vegetables, and that in this state it is greedily absorbed by inflammable bodies. The same ingenious poet supposes that the fable of Jupiter and Juno, by whose union the vernal showers were said to be pro-

* Second Voyage of Cook, vol. 4.

† The cause of the green colour of oysters is sometimes an operation of nature, but it is more generally produced by art, by placing them in situations where there is a green deposit from the sea, which appears to consist of the vegetating germs of marine *Conserve* and *Fuci*, and which impart their colour to the oysters. For this object the Dutch formerly took oysters from beds on our coasts, and deposited them on their own. Native oysters transported into the Colchester beds soon assume a green colour. It is unnecessary to refute the popular error which attributed this change of colour to the operation of copper.

‡ We must admit that some of these allegories are too obvious to be mistaken. Homer attributes the plague that prevailed in the Grecian camp to the darts of Apollo; what was meant by this, but that it arose from the action of a burning sun, upon the marshes and slimy shores of Troas? and what, again, can be more obvious than the allegory by which Echo is made the daughter of air and earth?

§ Bacon's works, vol. 5, p. 470, 4th Edit. London, 1778.

duced, was meant to pourtray the production of water by the combination of its two elements : an opinion which, says he, is strongly supported by the fact that, in the ancient mythology, the purer air, or *ether*, was always represented by Jupiter, and the inferior by Juno. Were the elegant author of the *Botanic Garden* now living, he would no doubt, with a taste and delicacy peculiarly his own, avail himself of the singular discovery of Mr. Smithson, who has detected in the juice of the mulberry *two* distinct species of colouring matter ;—the mingled blood of the unfortunate Pyramus and Thisbe :

“ Signa tene cædis : pullosque et luctibus aptos
Semper habet fœtus, *gemina monumenta cruoris.*”
Ovid. *Metamorph. Lib. iv.* 160.

Sir William Drummond, the learned apologist of Egyptian science, conceives that the laws of *latent* heat were even known to the philosophers of that ancient nation, and that caloric in such a state, was symbolically represented by VULCAN, while *free* or *sensible* caloric was as clearly described in the character of VESTA. Those who maintain the antiquity of chymistry, and suppose that the fabulous conceptions of the ancients were but a mysterious veil ingeniously thrown by philosophy between nature and the lower order of people, consider that the alchymical secret is metaphorically concealed in the fable of the GOLDEN FLEECE of the Argonauts, and reject the more probable solution of this story by Strabo, who says that the Iberians, near neighbours of the Colchians, used to receive the gold brought down from the high lands by the torrents, into sieves and sheep skins, and that from thence arose the fable of the golden fleece. Dionysius, of Mitylene, offers a different explanation of the fable, and supposes it to allude to a book *written on skins*, and containing an account of the process of *making gold* according to the art of alchemy.

Notwithstanding the confidence with which modern philosophers have claimed the discovery, the experimental mode of investigation was undoubtedly known and pursued by the ancients, who appear, says Mr. Leslie,* to have concealed their notions respecting it, under the veil of allegory. *Proteus* signified the mutable and changing forms of material objects, and the inquisitive philosopher was counselled by the poets † to watch their slippery demon when slumbering on the shore, to bind him, and compel the reluctant captive to reveal his secrets.—This, adds Mr. Leslie gives a lively picture of the cautious, but intrepid advances of the skilful experimenter ;—he tries to press nature into a corner,—he endeavours to separate the different principles of action,—he seeks to concentrate the predominant agent, and labours to exclude, as much as possible, every disturbing influence.

But with whatever ingenuity and success the antiquity of chymical knowledge may be advocated, as it relates to the various arts of life, yet it must be allowed that not the most remote trace of its application to physic can be discovered in the medical writers of Greece or Rome. The operation of distillation‡ is not even mentioned by Hippocrates or

* Leslie's Elements of Natural Philosophy.

† Virg. Georg. iv. 392—402.

‡ Dioscorides and Pliny describe a process, which may be considered that of distillation in its infancy ; it consists in obtaining oil from pitch, by spreading over it

Galen; and the waters of different plants, as described by some later authors, are to be understood, as we are informed by Gesner, merely as simple decoctions, and not as the products of any chymical process; while the Essences of Dioscorides, Galen, Oribasius, and others, were only the extracts produced by the evaporation of such infusions.

Upon the downfall of the Roman Empire, all the sciences, the arts, and literature, were overwhelmed in the general wreck, and the early Mahometans, in the first paroxysms of their fanaticism, endeavoured to destroy every record of the former progress of the human mind; consigning to destruction, by the conflagration of the Alexandrian library, no less than seven hundred thousand volumes, which comprised the most valuable works of science and literature.* It is not a little extraordinary that this same people were destined at a more advanced period, to rekindle the light of letters,† which they had taken such pains to extinguish, and to become the inventors and cultivators of a new science, boundless in its views, and inexhaustible in its applications. The medical profession too was more particularly selected as an object of reward and encouragement; and we may say with much truth, that our *Materia Medica* is more indebted to the zeal and industry of the Arabians, than to the learning of the Greeks, or to the refinement of the Romans. From this source we have acquired the milder purges of *Manna*, *Cassia*, *Senna*, *Rhubarb*, and many plants and oriental aromatics, amongst which we may notice *Musk*, *Nutmeg*, *Mace*, and *Cloves*; the introduction of which into medicine was greatly facilitated by the situation of Bagdat, and its connexion with India; and although Archigenes and Aretæus had long before applied *Blisters*, yet it is to the Arabian physicians that we are indebted for a practical acquaintance with their value, for in general, the Greeks and Romans prescribed acrid *Sinapisms* for such purpose. We are also indebted to the Arabians for our knowledge respecting Camphor, as its name imports, for the original word was *Cafur*, or *Canfur*.‡ They are also the first upon record, who speak of sugar, and sugar-candy, extracted from the sugar-cane, which they call *honey of cane*; and they ushered into practice *Syrups*, *Juleps*, and *Conserves*. At the same time, it is but just to allow, that from the disgusting ostentation of this people, and their strong attachment to the marvellous, many absurd medicines have been introduced. Gold, silver, bezoars, and precious stones were received into their materia medica, and surprising virtues were attributed to them. Amongst a people thus disposed to magnificence, and from the very spirit of their religion credulous and romantic, it is not a matter of surprise that their first researches into the nature of bodies should have raised a hope, and excited a belief, that the baser metals might be converted into gold.

while boiling, fleeces of wool, which receive the vapour and afterwards yield it by expression. In this country the art of distillation was unknown at the time when the Romans had possession of it. It is said to have been introduced in the early part of HENRY II.

* It was destroyed in the sixth century, by the CALIPH OMAR, the cotemporary and companion of Mahomet.

† The Saracens, in their treaty with the Greek emperors, demanded, by express articles, the work of the ancients.

‡ Garcias as well as Geoffroy and Hill say that *Ætius* mentions camphor, but it cannot be found, as Dr. Alston has observed, in that, or any other Greek author. There is a *Camphoræ herba* in *Myrepsus*; but this is evidently a very different thing.

They conceived that gold was the metallic element, in a state of perfect purity, and that all the other metals differed from it in proportion only to the extent of their individual contamination, and hence the origin of the epithet *base*, as applied to such metals; this hypothesis explains the origin of alchemy: but, in every history, we are informed that the earliest alchemists expected, by the same means that they hoped to convert the baser metals into gold, to produce a universal remedy, calculated to prolong indefinitely the span of human existence.

It is difficult to imagine what connexion could exist in their ideas between the "*Philosopher's Stone*," which was to transmute metals, and a remedy which could arrest the progress of bodily infirmity: upon searching into the writings of these times, it clearly appears that this conceit originated with alchemists from the application of false analogies, and that the error was subsequently diffused and exaggerated by a misconstruction of alchemical metaphors.*

An example of reasoning by false analogy is presented to us by Paracelsus, in his work *de vita longa*, wherein, speaking of anatomy, he exclaims, "*Sicut antimonium finit aurum, sic, eadem ratione et forma, corpus humanum purum reddit.*"

The processes of alchemy were always veiled in the most enigmatic and obscure language; the earliest alchemist whose name has reached posterity, is Geber, an Arabian prince of the seventh century, whose language was so proverbially obscure, that Dr. Johnson supposes the word gibberish or *geberish* to have been derived from this circumstance; sometimes the processes of alchemy were expressed by a figurative and metaphorical style of description; thus Geber exclaims, "*Bring me the six lepers that I may cleanse them;*" by which he implied the conversion of the six metals, † the only ones then known, into gold. From the works of later alchemists it also appears that they constantly represented gold as a sound, healthy, and durable man, the imperfect metals as diseased men, and the means or processes by which the latter were to be transmuted into the former, they designated by the name of *medicines*; and hence, those who were anxious to dive into the secrets of these magicians, or **Adepts**, as they termed themselves, without possessing a key to their language, supposed that these descriptions were to be understood in a literal sense, and that the imperfect metals might be changed into gold, and the bodies of sick persons into healthy ones, by one and the same chymical preparation.

The hieroglyphical style of writing adopted by the earlier alchemists, was in a great degree supported by the prevailing idea that the elements were under the dominion of spiritual beings, who might be submitted to

* The Records of Physic, if I am not deceived, will afford numerous instances of similar errors, from mistaking figurative expressions for literal truths. A knowledge of this species of fallacy will explain the origin of several very extraordinary receipts. I shall select the following instance, by way of illustration. In many of the ancient works on Physic, we find the *blood of the goat* extolled for its efficacy in dissolving stones, and, from this supposed lithontriptic virtue, it forms the principal ingredient of the **POWDER OF NICOLAUS**, and of the **ELECTUARY OF THE QUEEN OF COLEIN**. The expression which gave origin to this belief was evidently allegorical, signifying that the blood of the goat, by which our Saviour was typified, was capable of softening the stony hearts of his enemies, or according to others, that by his influence the stony rocks, and veil of the temple were shattered. *Browne's Vulgar Errors*.

† Silver, Mercury, Copper, Iron, Tin, Lead.

human power; and Sir Humphry Davy has observed that the notions of faries, and of genii, which have been depicted with so much vividness of fancy and liveliness of description in *THE THOUSAND AND ONE NIGHTS*, seem to have been connected with the pursuit of the science of transmutation, and the production of the elixir of life. That the *Arabian Nights' Entertainment* admits of a mystic interpretation, is an opinion which I have long entertained. How strikingly is the effect of fermented spirit, in banishing the pressure of the melancholy which occurs in solitude, depicted in the story of Sinbad when he encountered the withered and decrepid hag, on the uninhabited island—but, to return from this digression to the subject of medical chymistry.

It was not in fact until several years had elapsed in the delusive researches of alchymy, that the application of chymical knowledge became instrumental in the advancement of the medical art. RHASES and AVICENNA, who were the celebrated physicians of the age, are the first who introduced pharmaceutical preparations into their works, or made any improvement in the mode of conducting pharmaceutical processes. Avicenna describes, particularly, the method of conducting *Distillation*; he mentions also, for the first time, the three *Mineral Acids*, and distinguishes between the *vegetable* and *mineral Alkalies*; he speaks likewise of the *Distilled Water of Roses*, of *Sublimed Arsenic*, and of *Corrosive Sublimate*.

In the year 1226, ROGER BACON, a native of Ilchester in Somersetshire, and a Franciscan monk of Westminster Abbey, laid the foundations of chymical science in Europe; his discoveries were so extraordinary that he was excommunicated by the Pope, and imprisoned ten years for supposed dealings with the devil; it appears that he was a believer in a universal Elixir, for he proposed one to Pope Clement the Tenth, which he extolled highly, as the invention of Petro de Maharncourt.

This wonderful man was succeeded at the end of the same century by Arnoldus de Villa Nova, a Frenchman, or as others assert, a Spaniard, who deserves to be noticed on this occasion, as being the first to recommend the distilled spirit of wine, impregnated with certain herbs, as a valuable remedy; from which we may date the introduction of *Tinctures* into medical practice; for, although Thaddeus, a Florentine, who died in 1270, at the age of eighty, bestows great commendation upon the virtues of *Spirit of Wine*, yet he never used it as a solvent for active vegetable matter.

It was not however until the end of the thirteenth century, that Chymistry can be said to have added any considerable power to the arm of physic.

BASIL VALENTINE, a German Benedictine monk, led the way to the internal administration of metallic medicine, by a variety of experiments on the nature of *Antimony*, and in his "*Currus Triumphalis Antimonii*," a work written in High Dutch, he has described a number of the combinations of that metal. If however we may credit a vague tradition, he was extremely unfortunate in his first experiments upon his brother monks, all of whom he injured if not killed; those who have keen ears for etymological sounds will instantly recognize, in this circumstance, the origin of the word *Antimony*,—*ἀντί Μόνοχρως*.

It appears that the ancients were ignorant of the internal use and administration of the metals, with the exception of iron, although they frequently used them in external applications. Hippocrates recommends

Lead in several parts of his works, as an *epulotic* application, and for other external purposes. *Litharge of Gold* and *Cerusse* also entered the composition of several powders extolled by that ancient physician as possessing great efficacy in defluxions of the eyes. Oribasius and *Ætius* added "*Lithargyrium*" to several plasters, and the composition of the "*Snow-like plaster*," from *Minium*, was long preserved amongst their most valuable secrets. Whether antimony is the *Stimmi* or *Stibium* of the ancients has been a matter of conjecture; for Pliny, in speaking of its preparation observes, "*Ante omnia urendi modus necessarius, ne plumbum fiat.*" This *Plumbum* however was evidently the revived metal of *Antimony*, with which the ancients were unacquainted, and therefore mistook it for *Lead*; besides, the word *Plumbum*, like many others which I have before mentioned, was used as a general term; thus, according to Pliny, Tin was called *Plumbum album*; and Agricola calls *Lead* *Plumbum nigrum*.*

The question however is unimportant, for the *Stibium* was never used but as an external astringent, especially for the purpose of contracting the eyelids, and thereby of making the eyes appear very large, which has been considered from the most remote antiquity, as a feature of great beauty; thus the epithet *βοῶπις* is constantly applied by Homer to Juno. This practice appears also to have been followed by the Jews, for Jezebel is said to have painted her eyebrows to make the eyes appear big;† the expression also shows that the drug employed was the *Stimmi*. *Εστὶν μὲν σαλὸ τοῖς ὀφθαλμοῖς αὐτῆς*.

TO BASIL VALENTINE we are moreover indebted for the discovery of the *Volatile Alkali*, and of its preparation from *Sal Ammoniac*; he also first used mineral acids as solvents, and noticed the production of *Ether* from *Alcohol*; he seems also to have understood the virtues of *sulphate of iron*, for he says, when internally administered, it is tonic and comforting to a weak stomach, and that externally applied, it is astringent and styptic: he moreover recommended a *fixed alkali* made from vine twigs cut in the beginning of March, for the cure of gout and gravel.

In the year 1493, was born near Zurich in Switzerland, PARACELSUS, or as he termed himself, Philippus, Theophrastus, Bombastus, Paracelsus de Hohenheim, a man who was destined to produce a greater revolution in the *Materia Medica*, and a greater change in medical opinions and practice, than any person who had appeared since the days of Galen. He travelled all over the continent of Europe to obtain knowledge in Chymistry and Physic, and was a greater admirer of Basil Valentine, declaring that Antimony was not to be equalled for medicinal virtue, by any other substance in nature: this opinion however does not deserve our respect, for it was not founded upon observation and experiment, but on a fanciful analogy, derived from a property which this metal possesses of refining gold, as I have before related. He also used *Mercury* without reserve, and appears to have been the first who ventured to administer it internally;‡ for although Avicenna asserts that it was not so poisonous as the ancients had imagined, yet he does not attribute it to any

* Agricola de veteribus et novis metallis: Lib. 1.

† 2 Kings, chap. ix. verse 30.

‡ It has been already stated, that we are indebted to an Indian for the discovery of *Bark*, and it now appears we derived our knowledge of *Mercury* from the wildest of the

virtues; he merely says, "*Argentum quidem vivum, plurimi qui bibunt, non læduntur eo.*" Its effects, when applied externally, were well known to Theodoric the friar, afterwards Bishop of Cervia, in the twelfth century, who describes the salivation which mercurial frictions will produce. Paracelsus, moreover, employed lead internally in fevers,—"*Saturnus purgat febres,*" was one of his most favourite maxims. He also gives us directions for the preparation of *Red Precipitate* with *Mercury* and *Aqua fortis*.

Paracelsus, thus armed with opium, mercury, and antimony, remedies of no trifling importance, travelled in all directions and performed many extraordinary cures, amongst which was that of the famous printer Frobenius of Basil, a circumstance which immediately brought him acquainted with Erasmus,* and made him known to the magistracy of Basil, who elected him professor of chymistry in the year 1527, which was the first professorship that was established in Europe for the promotion and dissemination of chymical science. But notwithstanding this testimony of his success, if we may credit Libavius, he often, like our modern quacks, left his patients more diseased than he found them; and it is acknowledged by his own disciple Oporinus, that when he was sent for to any town, for the purpose of administering his remedies, he was rarely suffered to protract his visit, on account of the general resentment of the inhabitants.

While seated in his chair, he burnt with great solemnity the writings of Galen and Avicenna, and declared to his audience that if God would not impart the secrets of physic, it was not only allowable but even justifiable to consult the devil. His cotemporary physicians he treated with the most sottish vanity and illiberal insolence; in the preface to his work entitled "*Paragranum,*" he tells them "that the very down of his bald pate had more knowledge than all their writers, the buckles of his shoes more learning than Galen and Avicenna, and his beard more experience than all their Universities." With such a temper it could not be supposed that he would long retain his chair; in fact he quitted it in consequence of a quarrel with the magistrates, after which he continued to ramble about the country, generally intoxicated, and seldom changing his clothes, or even going to bed; and although he boasted of possessing a *panacea* which was capable of curing all diseases in an instant, and even of prolonging life to an indefinite length, yet this drunkard and prince of empirics died after a few hours' illness, in the forty-eighth year of his age, at Salzburg in Bavaria, with a bottle of his immortal *Catholicon* in his pocket.

In contemplating the career of this extraordinary man, it is difficult to say whether disgust or astonishment is the most predominant feeling; his insolence and unparalleled conceit, his insincerity and brutal singularities, and his habits of immorality and debauchery, are beyond all censure; whilst the important services he has rendered mankind, by oppos-

alchymists. May it not then be said that we are indebted to a *savage*, and a *mad-man*, for two of our most powerful remedies?

* Erasmus, the friend, the correspondent, and the patient of our own Linacre! Had not modern times, says Sir George Baker, furnished similar instances, it would have been a matter of astonishment to us to have heard that Erasmus should have deserted an accomplished physician whom he so greatly extols in his Epistles, in order to consult so wild and illiterate an enthusiast as Paracelsus.

ing the bigotry of the schools, and introducing powerful remedies into practice, cannot be recorded without feelings of gratitude and respect ; but in whatever estimation Paracelsus may be held, there can be no doubt but that his fame produced a very considerable influence on the character of the age, by exciting the envy of some, the emulation of others, and the industry of all.*

About a century after Paracelsus, VAN HELMONT took the lead in physic ; he was a man of most indefatigable industry, and spent fifty years in torturing by every chymical experiment he could devise, the various objects in the animal, vegetable, and mineral kingdoms. He was the first physician who applied *alum* in uterine hemorrhage, and he acquired a great reputation from the success of the practice.

SYLVIVS DE LA BOE, and OTHO TACHENIUS, followed in the track of of Van Helmont,

A prejudice in favour of chymical remedies having been thus introduced, the merited success which attended their operation, and the zeal and perseverance which distinguished the votaries of that science, soon kindled a more general enthusiasm in its favour. It is impossible to reduce into miniature the historical features of these chymical times, so as to bring them within the compass of a lecture : I must therefore rest satisfied with delineating a few of the more prominent outlines. The Galenists, who were in possession of the schools, and whose reasonings were fettered by the strongest predilection for their own doctrines, instantly took the alarm ; and the celebrated contest ensued between the *Galenical* and *Chymical* sects, which has given such a controversial tone to the writers of the fifteenth and sixteenth centuries. As this revolt from orthodox authority was in a great degree attributed to the mischievous introduction and unmerited success of Antimonial remedies, so were the preparations of this metal denounced with all the virulence of party spirit ;† and upon this occasion, in order to support their ground and oppress and persecute their adversaries, the Galenists actually solicited the assistance of secular power ; the Supreme Council of Paris accordingly prescribed its use by an edict in 1566, and Besnier was expelled the faculty of medicine in 1609, for having administered it to a patient. In 1637, *Antimonial wine* was by public authority received into the number of purgatives ; and in 1650, a new *arrêt* rescinded that of 1566, and again restored Antimony to public favour and general reputation ; and before we conclude our remarks upon the revolutionary history of this extraordinary metal, it deserves to be remarked, that this very same government that had with such great virulence, and so little justice, persecuted every practitioner who had shown any predilection for its use, in the year 1720 actually purchased the secret of an antimonial prepa-

* Paracelsus maintained that the human body is composed of salt, sulphur, and mercury, and that in these "*three first substances*," as he calls them, health and disease consist : that the mercury, in proportion to its volatility, produces tremors, mortifications in the ligaments, madness, phrensy, and delirium, and that fevers, phlegmons, and the jaundice, are the offspring of the *sulphureous* principle, while he supposed that the colic, stone, gravel, gout, and sciatica, derive their origin from *salt*.

† Amongst the writers engaged in this contest, no one was more animated with party spirit than GUY PATIN, who was profuse in his personalities against those who defended the use of Antimony ; he drew up a long register of the unsuccessful cases in which this medicine had been employed, which he published under the title of "*ANTIMONIAL MARTYROLOGY*."

ration called *Panacea Glauberiana*, and which has been since known by the title of *Kermes Mineral*, from a surgeon of the name La Legerie, who had acquired the secret from a pupil of Glauber. Before this period the invention of *Calomel* had taken place; this preparation is first mentioned, although very obscurely, by Oswald Crollius, in his *Basilica Chemica*, in 1608, and in the same year Beguin described it most fully and clearly under the title of *Draco Mitigatus*, in his *Tirocinium Chemicum*, which he published in Paris.

Chymistry, at this period,* took possession of the schools, and whilst it was gradually grafted into the theory of medicine, it soon became the only guide to its practice, the absurdity of which has been already dwelt upon.

In tracing the march of chymical improvement during the last century, we cannot but be struck with the new and powerful remedies which it has introduced, and the many unimportant and feeble articles which it has dismissed from medical practice.

In the present century, the rapid progress of Chymistry has outstripped the anticipations of its most sanguine votaries; and even in the department of vegetable analysis, a correctness has been attained, the very attempt at which had been abandoned by the most illustrious chymists of the former age as hopeless and chimerical; let us for instance only compare the results obtained by the Academicians of Paris, and published by Geoffroy, in their analyses of several hundred plants by the operation of heat, with the elegant and satisfactory researches in this branch of science lately conducted in the same country; whilst the former failed in establishing any distinction between the most inert and the most poisonous plants, the latter have succeeded in detecting, separating, and concentrating several of their most subtile constituents. *Opium* has been at length compelled to confess its secret source of action, and *Ipecacuan* to yield its emetic element in a state of perfect purity.

Our Pharmacopœias and Dispensatories† have cautiously kept pace with the scientific progress of the age; and in tracing them from their origin to the present time,‡ it is gratifying to observe the gradual influence of knowledge in reducing the number of their articles—simplifying the composition of their formulæ—and improving the processes for their

* In the year 1644 Schroeder published a *Chymico-medical Pharmacopœia*, which delineates with accuracy the pharmacy of these times, and enumerates almost all the chymical medicines that were known towards the close of this period.

† The Dispensatories of London and Edinburgh, the former by Mr. A. T. Thomson, and the latter by Dr. Duncan, are works which reflect credit on the age and country in which they were written.

‡ The first Pharmacopœia was published at Nuremburg, under the sanction of its Senate, in the year 1542; for this important act we are indebted to Valerius Cordus, a young student, who, during a transient visit at that place, accidentally produced a collection of medical receipts which he had selected from the works of the most esteemed writers, and with which the physicians of Nuremburg were so highly pleased that they urged him to print it for the benefit of the apothecaries, and obtained the sanction of the Senate to the undertaking; so casual was the circumstance to which we owe the institution of Pharmacopœias. The London College were among the last to frame a standard Code of Medicines; most cities in Europe having anticipated us in the performance of this task: our first Pharmacopœia was not published until the reign of James the First, A. D. 1618, exactly a century after the College had received their Charter from Henry. Successive editions appeared in the following years, viz. in 1650; 1677; 1721; 1746; 1787; 1809.

preparation.*—Chymistry has also been the means of establishing the identity of many bodies which were long considered as specifically different: thus an extensive list of animal substances has been discarded, since it is known that they owe their properties to one and the same common principle, as to *gelatine*, *albumen*, *carbonate of lime*, &c.; so again the fixed alkaline salt produced by the incineration of different vegetables, has been found to be potass, from whatever plant it may have been obtained, with the exception of sea plants, and perhaps some of the *Tetradynamia*, the former of which yield *Soda* and the latter *Ammonia*. Previous to the *Pharmacopœia* of 1745, every vegetable was supposed to yield a salt essentially different, and therefore a number of alkaline preparations were recommended, each bearing the name of the particular plant from which it had been procured, as salt of *Wormwood*—salt of *Broom*,—*Salt of Bean Stalks*, &c.

But, from the very nature and object of a *Pharmacopœia*, it cannot be supposed to proceed *pari passu* with the march of chymical science, indeed it would be dangerous that it should, for a chymical theory must receive the seal and stamp of experience before it can become current: a *Pharmacopœia*, however, is always an object of abuse, because it is a national work of authority, which is quite a sufficient reason why the ignorant and conceited should question its title to respect, and its claim to utility. "*Plures audiui*," says Huxham, "*totas blaterantes Pharmacopœias, qui tamen ne intellexerint quidem quid vel ipse pulsus significabat*."

It is very evident, that the greater number of these attacks has not been levelled with any view to elicit truth or to advance science, but to excite public attention, and to provoke unfair discussion, for individual and unworthy advantage; their obscure and presumptuous authors vainly hope, that they may gain for their ephemeral writings some share of importance, and for themselves some degree of reputation, if they can only obtain notoriety by provoking a discussion with the College or with some of its responsible members, though such a combat should be sure to terminate in their defeat. Like the Scythian Abaris, who upon being wounded by Apollo, plucked the arrow from his side, and heedless of the pain and disgrace of his wound, exclaimed in triumph that the weapon would in future enable him to deliver Oracles.

It is not to such persons that the observations which are contained in this work are addressed, for with them I am most anxious to avoid a contest, in which, as a worthy Fellow of our College expresses it "*Victory itself must be disgraceful*."

When, however, we are assailed upon every occasion by a gentleman whose talents entitle him to respect, and whose public situation

* What would be the surprise and gratification of the pharmacist who lived a hundred years ago, if he could now visit Apothecaries Hall? The application of steam for the various purposes of pharmacy, and for actuating machinery, for levigation, trituration, and other mechanical purposes, is no less useful, in ensuring uniform results, than it is in abridging labour and economising time. The greatest credit is due to the gentlemen under whose guidance this national laboratory is conducted, and more especially to their worthy and public spirited Treasurer, William Simons, Esq. whose zeal and liberality suggested and promoted the fitting up of the Steam Laboratory, as well as the ingenious machine for triturating mercury with lard, or conserve.

commands notice, I apprehend that an humble individual like myself, may, in the conscientious discharge of a public duty, deliver his sentiments from the chair to which he has been called by his professional brethren, without any risk of compromising the dignity of the College, or of drawing upon himself the charge of an unnecessary and injudicious interference.

The attack to which I chiefly allude, is contained in an historical preface by Mr. Professor Brande, to the *Supplement of the Fourth and Fifth Editions of the Encyclopædia Britannica*; in which, speaking of the writings of BOERHAAVE, he says, "The observations which he has made upon the usefulness of Chymistry, and of its necessity to the medical practitioner, may be well enforced at the present day; for, except in the schools of London and Edinburgh, Chymistry, as a branch of education, is either entirely neglected, or, what is perhaps worse, superficially and imperfectly taught; this is especially the case in the English Universities, and the London Pharmacopœia is a record of the want of chymical knowledge, where it is most imperiously required."

The learned Professor of Oxford, Dr. Kidd, naturally anxious to repel a charge which he considered individually unfair, and to vindicate his University from an aspersion which he felt to be generally unjust, published an animated, but at the same time, a cool and candid defence, to which I have much pleasure in referring you. With respect to the Sister University, my own *Alma Mater*, I feel that I should be the most ungrateful of her sons, were I, upon this occasion, to omit expressing similar sentiments with respect to the course of chymistry, and that of its collateral branches, which are annually delivered in the crowded schools at Cambridge. Is Mr. Brande acquainted with the discipline of our University?—Is he aware that the chymical chair has been successively filled by BISHOP WATSON—MILNER—WOLLASTON*—and the late lamented Mr. TENNANT?—"Master Builders in the Science." To say that such men have been the lecturers, is surely a sufficient testimony to show that the science of chymistry heretofore *could not* "have been neglected, or what perhaps is still worse, imperfectly taught;" and the zeal and ability displayed by the present Professor, ought to have shielded him from any such attack. Is Mr. Brande aware that the eloquent appeal of BISHOP WATSON from the chair at Cambridge,† on the gene-

* Since the publication of the last edition of this work, Mr. Archdeacon Wollaston has paid the debt of nature; his name will be cherished in grateful remembrance by those who had the good fortune to have been his pupils; as one of that number I will venture to say, that there never existed a lecturer on Experimental Philosophy, who was more eminently gifted with those qualifications, upon which the success of a public teacher must depend. He possessed a peculiar method of demonstration, a singular vivacity in the manner of conducting the experiments, and of keeping awake the attention of his auditors during their progress; while those details of manipulation which would have proved, in other hands, a source of tedium, he converted into subjects of the most lively interest.

† The Chymical Laboratory at Cambridge has produced some valuable discoveries. *Ex pede Herculem*, let me remind the chymist of the formation of Nitrous Acid, by passing a current of ammoniacal gas through the heated Oxyd of Manganese, for which we are indebted to Dr. Milner. I mention it merely as a whimsical circumstance, that the greatest degree of cold ever produced, was effected at Oxford, and the highest temperature, lately, at Cambridge. The researches of Dr. Clark are highly interesting and important, a succinct account of which has been published in

ral importance and utility of chymistry, gave the first impulse to that public taste for this science which so eminently distinguishes our Augustan age, and which has been the means of founding and supporting the Royal, and other Public Institutions in this metropolis, as well as in the other towns of the British Empire?

I need make no farther remark upon this part of Mr. Brande's assertion; the sequel, judging from the construction of the sentence, is evidently intended to be understood as a consequence, viz. and therefore "the London Pharmacopœia is a record of the want of chymical knowledge where it is most imperiously required," because *Oxford and Cambridge Physicians were its Editors*. Is not this the obvious construction?

It appears from Mr. Brande's laconic answer to Dr. Young, published in "*The Journal of Science and the Arts*," that his objections are those of Mr. Phillips, contained in his experimental examination of the Pharmacopœia; a work which, I confess, appears to me to furnish a testimony of the experimental tact, subtile ingenuity, and caustic style of criticism, which its author so eminently possesses, rather than a proof of any fatal or material inaccuracy in the Pharmacopœia; and I may urge this with greater force and propriety, when it is considered that, at the time of its publication, I was not a Fellow of the College, and therefore had no voice upon the subject of its composition, and consequently must be personally disinterested in its reputation.

I cannot conclude these observations upon Mr. Brande's attack, without expressing a deep feeling of regret, that a gentleman, whose deserved rank in society, and whose talents and acquirements must entitle him to our respect, should have condescended to countenance and encourage that vile and wretched taste of depreciating the value and importance of our most venerable institutions, and of bringing into contempt those acknowledged authorities which must always meet with the approbation of the best, and the sanction and support of the wisest portion of mankind.

And I shall here protest against the prevailing fashion of examining and deciding upon the pretensions of every medicinal compound to our confidence, by a mere chymical investigation of its composition, and of rejecting, as fallacious, every medical testimony which may appear contradictory to the results of the Laboratory; there is no subject in science to which the maxim of Cicero more strictly applies, than to the present case; let the *Ultra Chymist* therefore cherish it in his remembrance, and profit by its application—PRÆSTAT NATURE VOCE DOCERI, QUAM INGENIO SUO SAPERE.

Has not experience fully established the value of many medicinal combinations, which, at the time of their adoption, could not receive the sanction of any chymical law? We well remember the opposition, which on this ground was for a long time offered to the introduction of the *Anti-hectic Mixture* of Dr. Griffith,—the *Mistura Ferri Composita* of the present Pharmacopœia, and yet subsequent inquiry has confirmed upon scientific principles the justness of our former practical conclusion; for it has been shown that the chymical decompositions which constituted the objection to its use, are in fact the causes of its utility (see *Mist. Ferri*;) the explanation, moreover, has thrown additional light upon

a small work, entitled, "The Gas Blowpipe, or the Art of Fusion, by burning the Gaseous constituents of Water."

the theory of other preparations ; so true is the observation of the celebrated Morveau, that "*We never profit more than by those unexpected results of experiments, which contradict our analogies and preconceived theories.*"

Whenever a medicine is found by experience to be effectual, the practitioner should listen with great circumspection to any *chymical* advice for its correction or improvement. From a mistaken notion of this kind the *extractum colocynthides compositum*, with a view of making it chymically compatible with *Calomel*, has been deprived of the *Soap* which formerly entered into its composition, in consequence of which its solubility in the stomach is considerably modified, its activity is therefore impaired, and its mildness diminished.*

On the other hand, substances may be medically inconsistent, which are chymically compatible, as I shall have frequent opportunities of exemplifying. The stomach has a chymical code of its own, by which the usual affinities of bodies are frequently modified, often suspended, and sometimes entirely subverted ; this truth is illustrated in a very striking manner by the interesting experiments of M. Drouard, who found that Copper, swallowed in its metallic state, was not rendered poisonous by meeting with oils, or fatty bodies ; nor even with *Vinegar*, in the digestive organs. Other bodies, on the contrary, seem to possess the same habitudes in the stomach as in the laboratory, and are alike influenced in both situations by the chymical action of various bodies, many examples of which are to be found under the consideration of the influence which solubility exerts upon the medicinal activity of substances ; so again, acidity in the stomach is neutralized by *Alkalies*, and if a *Carbonate* be employed for that purpose, we have a copious disengagement of *Carbonic acid gas*, which has been frequently very distressing to the patient ; lastly, many bodies taken into the stomach undergo decompositions and changes *in transitu*, independent of any play of chymical affinities from the hidden powers of digestion, some of which we are enabled to appreciate, and they will accordingly form a subject of investigation in the course of the present work.

The powers of the stomach would seem to consist in decomposing the *Ingesta*, and reducing them into simpler forms, rather than in complicating them, by favouring new combinations.

But every rational physician must feel in its full force the absurdity of expecting to account for the phenomena of life upon principles deduced from the analogies of inert matter, and we therefore find that the most intelligent physiologists of modern times have been anxious to discourage the attempt and to deprecate its folly. Sir Gilbert Blane, in his luminous work on *MEDICAL LOGIC*, when speaking of the different theories of digestion, tells us that Dr. William Hunter, whose peculiar sagacity and precision of mind detected at a glance the hollowness of such delusive hypotheses, and saw the danger which theorists run in trusting themselves on such slippery ground, expressed himself in his public lectures, with that solidity of judgment combined with facetiousness of expression, which rendered him unparalleled as a public teacher. "Gentlemen,"

* These views have prevailed upon the committee of the College, and they have accordingly restored the Soap to the formula, in the present edition of the *Pharmacopœia* ; so that the above objection no longer exists.

said he, "Physiologists will have it that the stomach is a mill—others, that it is a fermenting-vat—others again, that it is a stew-pan,—but in my view of the matter, it is neither a mill, a fomenting-vat, nor a stew-pan—but a STOMACH, gentlemen, a STOMACH."

What can illustrate in a more familiar and striking manner the singular powers of *Gastric Chymistry*, than the fact of the shortness of time in which the aliment becomes acid in depraved digestion? A series of changes is thus produced in a few hours, which would require in the laboratory as many weeks,* while in acute affections of the alimentary canal the functions of the stomach are nearly suspended, and hence under such circumstances, whatever is introduced into this organ remains unchanged, even the nutritious mucilages are not digested.

From what has been said, it is very evident that the mere chymist can have no pretensions to the art of composing or discriminating remedies; whenever he arraigns the scientific propriety of our prescriptions, in direct contradiction to the deductions of true medical experience,—when ever he forsakes his laboratory for the bed-side, he forfeits all his claims to our respect, and his title to our confidence. It is amusing to see the ridiculous errors into which the chymist falls, when he turns physician; as soon as Seguin found that Peruvian bark contained a peculiar principle that precipitated *Tannin*, he immediately concluded that this *could not be any other than Gelatine*, and upon the faith of this blunder, the French, Italian, and German physicians,† gave their patients nothing but *clarified glue*, in intermittent fevers!—But I desist—not however without expressing a hope, in which I am sure my medical brethren will concur, that, should Mr. Brande again condescend to favour us with a commentary upon Boerhaave, he will select that passage in his work, where, alluding to the application of Chymistry to Physic, he emphatically exclaims, "EGREGIA ILLIUS ANCILLA EST, NON ALIA PEJOR DOMINA."

THE INFLUENCE OF SOIL, CULTURE, CLIMATE, AND SEASON.

The facts hitherto collected upon this subject are so scanty and unsatisfactory, that I introduce its consideration in this place, rather with a wish to excite farther inquiry, than with any hope of imparting much additional information.

There can be but little doubt, but that Soil, Culture, Climate, and Season,‡ may very materially influence the active properties of a medicinal plant; while the two latter of those causes may as essentially change the type and character of a disease, and modify the vital susceptibility of the patient; the natives of the south of Europe, for instance, do not bear bleeding, and other modes of depletion, so well as those of

* The only chymical phenomenon which in any manner resembles this, appears to be that of the rapid acetification of milk, and other fluids, by the agency of a thunder storm.

† This practice was introduced into France by Seguin, into Italy by Couticiri, and into Germany by Bischoff.

‡ A very ingenious Dissertation has been lately published by M. Virey, on the 'Degeneration of plants in foreign soils,' which he says may depend upon 1, *Climate* and *Station*: 2, *Nutriments*: 3, *Culture*: 4, *Factitious Mutilation*: 5, *Hybrid Generation*.

the north. This must be admitted to its full extent, or it will be extremely difficult to explain the contradictory and even opposite opinions, and to reconcile the conflicting testimonies of the physicians of different countries, with respect to the efficacy of the same remedy, in similar diseases.

THE INFLUENCE OF SOIL may be exemplified by many well known facts; thus, strongly smelling plants lose their odour in a sandy soil, and do not again recover it by transplantation into a richer one; a fact upon which Rozier founded his proposal for the improvement of Rape oil; so again, no management could induce the *Ricotia Egyptiaca* to flower, until Linnæus suggested the expediency of mixing clay with the earth in the pot; *Assafetida* is one of those plants that vary much according to station and soil, not only in the shape of the leaves, but in the peculiar nauseous quality of the juice which impregnates them, and Dr. Woodville states that it is frequently so modified that the leaves are eaten by goats; Gmelin informs us, on the authority of Steller, that the effects of the *Rhododendron* have been found to vary materially according to the "*solum natale*;" for example, that produced in a certain spot has proved uniformly *narcotic*, that in another, *cathartic*, while a sense of suffocation has been the only symptom occasioned by a third. Rhubarb as grown in England, will differ greatly in its purgative qualities, according to the soil in which it may have been cultivated; that produced in a dry gravel being more efficacious than that which is reared in a clayey one. Dr. Carter, in his account of the "*Principal Hospitals of France, Italy, and Switzerland*," tells us that at Nice, the *Digitalis* is commonly given in doses of a scruple in powder, or in that of half an ounce of the infusion made according to the London Pharmacopœia, every hour, and without any sensible effect; this fact he explains by stating that the *Digitalis*, in the neighbourhood of Nice, is much smaller, and is probably less powerful than the same plant as it grows in England.

CLIMATE also produces a powerful impression upon vegetable and animal life. It is probable that in southern countries some vegetables enjoy more energetic properties than in northern climes. The history of opium immediately countenances such an opinion; thus Egypt produces a stronger *opium* than any of the countries on the north side of the Mediterranean,—France, than England or Germany;—and Languedoc, than the northern parts of France;—while Smyrna, Natolia, Aleppo, and Apulia, furnish a juice far more narcotic than Languedoc; so again, *Senna* by transplantation from Arabia into the south of France (Provence) assumes a marked change in its physiognomy and virtues, its leaves are more obtuse, and its taste less bitter and nauseous than the pointed leaved variety, while its effects will be found to be less purgative. *Cruciform* plants degenerate within the tropics, but acquire increased energies, as *Antiscorbutics*, in cold regions; the *Menthae* have not so penetrating an essential oil in the south of Europe as in England and in the north of France. The relative proportions of gluten vary in the wheat of different countries, and as in the south of Europe, its quantity greatly predominates over the other principles, we at once discover the cause that gives such excellence to the Maccaroni of Italy. Many species of plants secrete juices in warmer regions, which are unknown in their œconomy, in colder climates; thus the Ash yields *Manna* in

Calabria, but loses that faculty as it advances towards the north. The influence of climate, in its relations to moisture and dryness, upon vegetable productions, is also worthy of investigation; in wet and cold seasons, our herbage is far less nutritive to cattle, and we accordingly find that they are constantly grazing, in order to compensate by quantity, for what is deficient in quality, whereas in dry seasons, a large proportion of their time is consumed in rumination: the same causes, however, that diminish the nutritive powers of plants, frequently increase the energy of those principles upon which their medicinal value depends: it is obvious that many herbs are more rank and virulent in wet and gloomy seasons: this would appear to be a wise and provident law, in order to apportion the natural condiment of the vegetable, to the deteriorated state of its nutritive elements, when the digestive organs must require more than the ordinary stimulus for the due exercise of their functions. It is hardly necessary to observe that plants, which in temperate climates are merely shrubs, have been developed into trees, by the hot and humid plains of Africa and Asia; while in the arid deserts of Nubia, or in the frigid plains of Siberia, vegetable life is confined to stunted shrubs and humble mosses: cold also suppresses the colour of flowers, and indeed even that of the leaves, as is witnessed in the *Cyclamen*, *Amaranthus*, and *Ranunculus* of Lapland and Siberia. But climate not only modifies the powers of a remedy by influencing its structure and composition, but it renders it more or less active, by increasing or diminishing the susceptibility of the body to its impression; can a more striking proof of this fact be adduced than the well known effects of perfumes at Rome? The inhabitants are unable to sustain the strong scent of flowers in that climate, without experiencing a sensation highly oppressive, and which in some cases is even succeeded by syncope,* and thus realizing the well known line of the poet,

“*Die of a rose, in aromatic pain.*”

As I have been favoured with some very interesting observations upon this subject by Dr. Richard Harrison, who resided for a considerable time in Italy, and was thus enabled to institute a satisfactory inquiry into this curious subject, I feel no hesitation in introducing a quotation from his letter to my readers.—“You ask me what experience I have had on the subject of climate, as affecting the powers and operation of remedies; I have no difficulty in asserting that Narcotics act with greater force even in smaller doses at Naples, where I had the advantages of much experience, than in England. I might adduce as an example the *Extract of Hyoscyamus*, which, when given to the extent of three grains thrice a day, produced in two patients a temporary amaurosis, which disappeared and again recurred on the alternate suspension and administration of this medicine; and it deserves particular notice that these very patients had been in the habit of taking similar doses of the same remedy in England, without any unpleasant result. Now that this depended upon an increased susceptibility of the patient, in the warmer climate, rather than an increased power in the remedy, is unquestionable, since the extract

* Women during the period of gestation frequently experience such an increased irritability as to be affected even in England by various odours, which at other times would produce no extraordinary impression.

which was administered in Italy had been procured from London; indeed, a high state of nervous irritation is the prevalent disorder of Naples. I treated several cases of Epilepsy in Italy with the *nitrate of silver*, and with complete success, while in England I certainly have not met with the same successful results. During my residence at Naples, I spent some time in the island of Ischia, so celebrated all over the continent for its baths; many of the patients, who were then trying their efficacy, had been attacked by Paralysis, Apoplexy, and almost every degree of loss of mental and muscular power, and among them I certainly witnessed what with propriety might be denominated a genuine case of *Nervous Apoplexy*. These complaints I was generally able to trace to the abuse of *Mercury*, whence we may, I think, very fairly conclude that this metal is more active in its effects in that country, than in our own. Before I quit this subject, I ought to mention that the doses of medicines, as seen in the prescriptions and works of English physicians, excite universal astonishment among the faculty of Italy. In fact, as I have just stated, the human constitution in this part of the continent is certainly more susceptible of nervous impression than in England; it is perfectly true that flowers or perfumes in a chamber, will frequently produce syncope in persons apparently strong and healthy, and the fact is so universally admitted, that the Italians avoid them with the greatest caution." On the other hand, it appears equally evident that some remedies succeed in cold climates, which produce little or no benefit in warmer latitudes. Soon after the publication of the first edition of my *Pharmacologia*, I received a letter from Dr. Halliday of Moscow, upon the subject of the "*Eau Medicinale*," and as it offers a striking proof of the efficacy of the *Rhododendron Chrysanthum* in curing the rheumatism of the North, whilst in this country the plant has been repeatedly tried without any signal proof of success, I shall here subjoin an extract from the letter of my correspondent; "In reading your account of the '*Eau Medicinale*,' I perceive that, upon the authority of Mr. James Moore, you state it to be a preparation of the *White Hellebore*; may I be allowed to suggest the probability of its being made from the leaves of the *Rhododendron Chrysanthum*? for so far as I can learn, the effects of the French medicine are precisely those which are experienced from an infusion of the above plant, which the Siberians and Russians regard as an infallible specific in the cure of chronic rheumatism and gout, and from which I myself, as well as other physicians in Russia, have witnessed the most desirable and decided effects, whenever we had it in our power to administer the remedy with confidence and courage. We have seldom given it in any other form or dose than that adopted by the Siberians themselves, which is to infuse in a warm place, generally near a furnace and during the night, two drachms of the fresh leaves in about twelve ounces of boiling water, taking care that the liquid never boils. This dose is to be taken in the morning upon an empty stomach, and during its nauseating operation, which generally commences within a quarter of an hour after it has been swallowed, neither solids nor liquids of any description are allowed; after an interval of three or four hours, I have seen the patient obtain a copious and black foetid stool, and get up free from pain. Should it happen that the patient does not recover from the first dose, another is administered on the succeeding day, and I have known it to be taken for three days in succession, when the severest fits

of gout have been removed.* Is it not then probable that some cunning Frenchman has availed himself of this Siberian specific, and concentrated it in such a form, as to defy the learned to find it out?"

Dr. Halliday adds, "The Siberians denominate the leaves of this plant when infused in water, *Intoxicating Tea*; and a weaker infusion is in daily use, especially for treating their neighbours, just as the Europeans do with tea from China."

Before we quit the consideration of Climate, as being capable of influencing the activity of a remedy, the important fact should not be overlooked, that in India, and other colonies of similar temperature, Mercurial Medicines, in order to produce their beneficial effects, require to be administered to an extent which would prove destructive to the inhabitants of this island.

But of all the circumstances that produce the greatest change in the aspect as well as the virtues of the vegetable creation, is CULTIVATION, which may either destroy the medicinal properties of a plant, or raise in it new and most valuable qualities: cultivation converts single into double flowers, by developing the stamens into petals, a change which in many cases destroys their efficacy, as in the chamomile, *Anthemis Nobilis*; for, since all the virtues of this flower reside in the disc florets, it is of course greatly deteriorated by being converted into the double-flowered variety: by the operation of *grafting* extraordinary changes may also be produced; Olivier, in his travels, informs us that a soft *Mastiche*, having all the qualities of that resin, except its consistence, which is that of turpentine, is procured by engrafting the Lintisk on the Chian Turpentine tree.

Buffon states that our wheat is a factitious production, raised to its present condition by the art of agriculture. M. Virey† observes, that by suppressing the growth of one part of a plant we may respectively give rise to an increased developement in others; thus are some vegetables rendered eunuchs, or are deprived of seeds by obliteration, and only propagate themselves by slips; such a condition is frequently produced by culture, continued through a long succession of generations; this is the case with the *Banana*, *Sugar Cane*, and other fruits that have carefully been made to deviate for a long series of years, from their original types, and having been continually transplanted by slips, suckers, or roots, at length only propagate themselves in this way, whereby the roots, as those of the common potato, become inordinately developed, drawing to themselves the succulence and nutrition originally possessed by the berries. It seems probable that we may thus have lost many vegetable species; the *Tuberes* of Pliny, for example, are supposed by Mr. Andrew Knight to have been intermediate productions, formed during the advancement of the Almond to the Peach, or in other words, that they were swollen almonds or imperfect peaches; if this conjecture be admitted, it will explain the fact stated by Columella, that the peach possessed deleterious qualities when it was first introduced from Persia into the Roman Empire. If there be any who feel sceptical upon the subject of such

* This plant was first described by Gmelin in his *Flora Siberica*, iv. 121. It has obtained a place in the Edinburgh Pharmacopœia. Besides the effects stated by Dr. Halliday, it is said by different authors to excite a peculiar creeping sensation in the pained part.

† Journal Complementary du Dict. des Sciences Medicales, tom. II.

metamorphoses, let him visit the fairy bowers of Horticulture, and he will there perceive that her magic wand has not only converted the tough, coriaceous covering of the almond into the soft and melting flesh of the peach, but that by her spells, the sour sloes has ripened into the delicious plum, and the austere crab of our woods into the golden pippin; that this again has been made to sport in endless variety, emulating in beauty of form and colour, in exuberance of fertility and in richness of flavour, the rarer productions of warmer regions, and more propitious climates! In our culinary vegetables the same progressive melioration and advancement may be traced; thus has the acrid and disagreeable *Apium graveolens* been changed into delicious *Celery*, and the common *Colewort*, by culture continued through many ages, appears under the improved and more useful forms of Cabbage, Savoy, and Cauliflower. It has been already observed that the alimentary and medicinal virtues are frequently in opposition to each other, and that while cultivation improves the former, it equally diminishes the latter; I shall have occasion to offer some additional facts upon this curious subject, under the consideration of *Bitter Extractive*; see *Note on this Extract, in the article "Tonics."*

THE IGNORANT PREPARATION AND FRAUDULENT ADULTERATION OF MEDICINES.

The circumstances comprehended under this head certainly deserve to be ranked among the more powerful causes, which have operated in affecting the reputation of many medicinal substances. The Peruvian Bark fell into total discredit in the year 1779, from its inability to cure the ague; and it was afterwards discovered to have been adulterated with bark of an inferior species; indeed Sydenham speaks of the adulteration of this substance before the year 1678; he tells us that he had never used to exceed two drachms of *Cinchona* in the cure of any intermittent, but that of late the drug was so inert, rotten, and adulterated, it became necessary to increase its dose to one, two, or three ounces. The subject is copious and full of importance, and I have taken considerable pains to collect very fully, the various modes in which our remedies are thus deprived of their most valuable properties, and to suggest the best tests by which such frauds may be discovered. Very few practitioners have an idea of the alarming extent to which this nefarious practice is carried, or of the systematic manner in which it is conducted: there can be no doubt but that the sophistication of medicines has been practised in some degree in all ages,* but the refinements of chymistry have enabled the manufacturers of the present day, not only to execute these frauds with great address, but unfortunately, at the same time, to vend them with less chance of detection. It will be scarcely credited, when I affirm that many hundred persons are supported in this metropolis by the art of adulterating drugs, besides a number of women and children who find ample employ-

* Dr. Murett in his "Short view of Frauds and Abuses," (A. D. 1669) charges the Apothecary with "falsifying medicines;" "They showed the Censors," says he, "*Myrtle leaves for senna; a Binder for a Purger; Mushrooms rubbed over with chalk for Agaric; Hemlock for Pæony; Sheep's lungs for Fox's lungs; and the bone of an Ox's heart for that of a Stag's heart.*"

ment and excellent profit in *counterfeiting* Cochineal with coloured dough, Isinglass with pieces of bladder and the dried skin of soles, and by filling up with powdered Sassafras the holes which are bored in spice and nutmegs, for the purposes of plundering their essential oils.

THE UNSEASONABLE COLLECTION OF VEGETABLE REMEDIES.

Vegetable physiology has demonstrated, that during the progress of vegetation most remarkable changes occur in succession, in the chymical composition, as well as in the sensible qualities of a plant; time will not allow me to be prodigal of examples, take therefore one which is familiar and striking,—the aromatic and spicy qualities of the unexpanded flowers of the *Caryophyllus Aromaticus* (Cloves) are well known to every body, but if the flower-bud be fully developed, it loses these properties altogether, and the fruit of the tree is not in the least degree aromatic; so the berries of Pimento, when they come to full maturity, lose their aromatic warmth and acquire a flavour very analagous to that of Juniper. The *Colchicum autumnale* may be cited as another example in which the medicinal properties of the vegetable are entirely changed during the natural progress of its developement. See also *Inspissated Juices*, under the article *Extract*.

THE OBSCURITY WHICH HAS ATTENDED THE OPERATION OF COMPOUND MEDICINES.

It is evident that the fallacies to which our observations and experience are liable with respect to the efficacy of certain bodies, as remedies, must be necessarily multiplied when such bodies are exhibited in a state of complicated combination, since it must be always difficult, and often impossible, to ascertain to which ingredient the effects produced ought to be attributed.

How many frivolous substances have from this cause alone gained a share of credit, which belonged exclusively to the medicines with which they happened to be accidentally administered? Numerous are the examples which I might adduce in proof of this assertion; the history of Bezoar † would in itself furnish a mass of striking evidence, indeed

* The editors of the *American Medical Recorder* (vol. 1, p. 471,) in descanting upon the efficacy of Prussic Acid, very gravely remark, that they are acquainted with a lady, subject to hysteric affections, who *always* derives relief from a dose of CHERRY BRANDY, in which Peach kernels have been digested; the stimulus of the brandy then goes for nothing with these blockheads! Zimmerman not unaptly compares a man who is intoxicated with a favourite opinion, to a passionate lover, who sees and hears nothing but his mistress.

† BEZOAR, (from *Pa-zahar*, Persian, a destroyer of poison.) A morbid concretion formed in the bodies of land animals. Several of them were formerly highly celebrated for their medicinal virtues; they were considered as powerful *Alexipharmics*, in so much so, that other medicines, possessed of alexipharmic powers, were called *Bezoardics*; so efficacious were these substances formerly considered, that they were bought for ten times their weight of gold. Avenzoar, an Arabian physician, who

the reputation of this absurd substance was maintained much longer than it otherwise would have been, by its exhibition having been frequently accompanied with that of more active articles. Monardes, for instance, extols the efficacy of the *Bezoar* as a vermifuge, but he states that it should be mixed with the seeds of *Wormwood*. Besides, in the exuberance of mixture, certain reactions and important changes are mutually produced, by which the identity of the original ingredients is destroyed; but this subject will be introduced for discussion in the first part of the *Pharmacologia*.

The practice of mixing together different medicinal substances, so as to form one remedy, may boast of very ancient origin, for most of the prescriptions which have descended from the Greek physicians are of this description; the uncertain and vague results of such a practice appear also to have been early felt, and often condemned, and even Erasistratus declaimed with great warmth against the complicated medicines which were administered in his time; the greater number of these compositions present a mass of incongruous materials, put together without any apparent order or intention; indeed it would almost appear as if they regarded a medical formula as a problem in *Permutation*, the only object of which was to discover and assign the number of changes that can be made in any given number of things all different from each other.

At the same time it must in justice be allowed, that some of the earlier physicians entertained just notions with regard to the use and abuse of combination, although their knowledge of the subject was of course extremely limited and imperfect.

ORIBASIOUS* recommends in high terms certain combinations of *Evacuant* and *Roborant* medicines, and the remarks of ALEXANDER TRALLIANUS on a remedy which he exhibited in paralysis, serve to show that he was well acquainted with the fact, that certain substances lose their efficacy when they stimulate the bowels to excess, for he cautions us against adding a greater proportion of *Scammony* to it: many, he observes, think that by so doing, they increase the force of the medicine, whereas in fact they made it *useless*, by carrying it immediately through the bowels, instead of suffering it to remain and be conveyed to the remote parts.

In modern Europe, the same attachment to luxuriancy of composition has been transmitted to our own times: there are several prescriptions of Huxham extant, which contain more than *four hundred* ingredients. I have already observed that all extravagant systems tend, in the course of time, to introduce practices of an opposite kind; this truth finds another powerful illustration in the history of medicinal combination, and it becomes a serious question, which it will be my duty to discuss, whether the disgust so justly excited by the *poly-pharmacy* of our predeces-

practised at Seville in Spain about the year One Thousand, first recommended it in medicine. A composition of *Bezoar* with absorbent powers, has been extensively used under the name of *Gascoigne powder*, and *Gascoigne's Ball*; but the real *Bezoar* was rarely used on this occasion; Gypsum, or pipe-clay tinged with ox-gall, proved a less expensive ingredient.

* ORIBASIOUS, a native of Sardes, lived in the fourth century; he was the friend and favourite of the Emperor Julian, under whom he had great authority, and acquired considerable wealth. It would be well for the profession of Physic, and for the public if crowned heads generally evinced as much discrimination in the appointment and patronage of physicians.

sors, may not have induced the physician of the present day to carry his ideas of simplicity *too far*, so as to neglect and lose the advantages which in many cases beyond all doubt may be obtained by scientific combinations. "To those," says Sir A. Crichton, "who think that the Science of Medicine is improved by an affected simplicity in prescribing, I would remark, that modern pharmacopœias are shorn so much of old and approved receipts,* on account of their being extraordinary compounds, as to be almost useless in some cases."

In the year 1799, Dr. FORDYCE, in a valuable paper published in the second volume of the Transactions of the Medical Society, investigated this subject with much perspicuity and success: unfortunately, however, this memoir terminates with the investigation of *similar* remedies, that is to say, of those which produce upon the body similar effects, and he is entirely silent upon the advantages which may be obtained by the combination of those medicines which possess *different*, or even *opposite* qualities; it must be also remembered that at the time this memoir was composed by its eminent author, Chymistry had scarcely extended its illuminating rays into the recesses of physic. Under such circumstances, I am induced to undertake the arduous task of inquiring into the several relations in which each article of a compound formula may be advantageously situated with respect to the others; and I am farther encouraged in this investigation, by a conviction of its practical importance, as well as by feeling that it has hitherto never received the share of attention which it merits. "I think," says Dr. Powell, "it may be asserted, without fear of contradiction, that no medicine compounded of five or six simple articles, has hitherto had its powers examined in a rational manner." If this attempt should be the means of directing the attention of future practitioners to the subject, and thereby of rendering the Art of Composition more efficient, by placing it upon the permanent basis of science, I shall feel that I have profitably devoted my time and attention to the most useful of all medical subjects. "*Res est maximi momenti in arte medendi, cum, Formula in se considerata, possit esse profecto mortis vel vitæ sententia.*"

* Three fourths at least of the QUACK MEDICINES of the present day are remedies of this description, and are compounded according to such receipts.

THE HISTORY OF THE
CITY OF BOSTON
FROM THE FIRST SETTLEMENT
TO THE PRESENT TIME
IN TWO VOLUMES
BY NATHANIEL BENTLEY
VOL. I.
BOSTON: PUBLISHED BY
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PHARMACOLOGIA.

ON THE
OPERATIONS OF MEDICINAL BODIES,
AND ON THE
CLASSIFICATIONS FOUNDED ON THEM.

"Medicos tandem tædet et pudet, diutius garrere de Remediis, Specificis, et Alexipharmicis, et cæteris, nisi eorum naturam et modum quo prosint, quodammodo ostendere et explanare possint."

CONSPECT. MED. THEOR.

THE LANCET

FRIDAY, JULY 1, 1892

THE LANCET'S REPORT ON THE

OF THE

OPERATIONS OF MEDICAL SOCIETIES

AND ON THE

The following is a summary of the operations of the Medical Societies of the United Kingdom, as reported by the LANCET. The report is based on the returns made to the Society of Medical Officers of Health, and is published for the purpose of providing a general view of the state of the medical profession in the country. The report is divided into two parts, the first dealing with the operations of the Medical Societies, and the second dealing with the operations of the Medical Officers of Health. The first part of the report is divided into three sections, the first dealing with the operations of the Medical Societies, the second dealing with the operations of the Medical Officers of Health, and the third dealing with the operations of the Medical Officers of Health. The second part of the report is divided into two sections, the first dealing with the operations of the Medical Officers of Health, and the second dealing with the operations of the Medical Officers of Health. The report is published for the purpose of providing a general view of the state of the medical profession in the country.

PHARMACOLOGIA.

ON THE

OPERATIONS OF MEDICINAL BODIES,

AND ON THE

CLASSIFICATIONS FOUNDED ON THEM.

MEDICINAL substances are those bodies, which, by due administration, are capable of producing certain changes in the condition of the living system, whereby its morbid actions may be entirely removed, or advantageously controlled.

In adopting this definition we intentionally exclude those alimentary substances which are more immediately subservient to the support of life, and to the repair of that diurnal waste, which the exercise of its functions so inevitably occasions.

It has been generally supposed, that substances whose application does not produce any sensible action upon the healthy system, cannot possess medicinal energy; and, on the contrary, that those bodies which occasion an apparent effect in health, must necessarily prove active in the cure or palliation of disease. Under certain limitations we may perhaps venture to assent to this general proposition; but it cannot be too forcibly or too frequently impressed upon the mind of the medical practitioner, that *Medicines are frequently but relative agents*, producing their effects in reference only to the state of the living frame; we must therefore concur with Sir Gilbert Blane in stating, that the virtues of medicines cannot be fairly essayed, or beneficially ascertained, by trying their effects on sound subjects, because that particular morbid condition does not exist which they may be exclusively calculated to remove;* thus in certain states of debility, *Tonics* may excite the system when languid, by their sympathetic influence upon the *primæ viæ*, while in a robust condition of the body, the effects of the same agents may be wholly inappreciable.

* Medical Logic. Edit. 2nd. p. 92.

The *MODUS OPERANDI* of remedies, or the general principle upon which they effect salutary changes in the morbid states of the body, is involved in considerable obscurity, and has given rise to much ingenious speculation and scientific controversy. It would seem that the immediate impression of a remedy, may depend upon mechanical, chymical, or vital agencies; and that the sanative impulse thus occasioned may either be Absolute, or Relative;—Primary, or Secondary;—Local, or General;—Direct, or Sympathetic; Permanent, or Transient;—thus certain purgatives will occasion intestinal excretions in every condition of the body, and may therefore be justly considered as *absolute* agents; while diuretics, since they generally require for their success, a certain state of the living system, may with equal truth be denominated *relative* in their operation. That the obvious effect of a remedy may either depend upon its *primary*, or upon its *secondary* and incidental operation, will at once be apparent by inspecting the diagram which exhibits the classification of diuretic medicines; the same scheme will also show that remedies may be *local* or *general* in their effects, and may excite an action in distant organs, either by entering the circulating mass, and being thus brought into contact with their textures;—by occasioning an impulse conveyed through the nervous system,—or by exciting a local impression upon the stomach and *primæ viæ*, and thus arousing their energies through the mysterious medium of sympathetic* communication.

That certain bodies are capable of evading the assimilating functions, and of entering unchanged, into the circulating current, either through the branches of the thoracic duct, or of the *vena portarum*, is a fact which admits of chymical demonstration; many of the alkaline salts are thus conveyed to the kidneys, and being excreted from the blood by its vessels, are to be easily detected in the urine by appropriate reagents; I have made many experiments upon this subject, and am prepared to state some results which may perhaps explain the occasional value of such bodies as medicines. Some essential oils, particularly *bitter* principles,† and certain colouring matter,‡ seem also capable of passing the barriers of digestion, and of circulating to the remote parts of the body; mercury, and several of the other metals, would likewise appear, under certain circumstances, to possess a similar privilege, and the former to be able moreover to facilitate the absorption of other bodies with which it may be associated, as I shall hereafter more fully exemplify.§

* The term *sympathy* has often been objected to, as being too figurative; it is certainly a metaphor taken from an affection of the mind; but, as Sir Gilbert Blane very justly remarks, the import of words ought either to be assumed conventionally according to a definition, or to be adhered to in the sense affixed to it by established usage; “by *animal sympathy*,” says he, “is not meant the intelligible principle of Stahl’s hypothesis, but that mutual influence of distant parts, so subtle and rapid as in some instances to be compared to thought or lightning; while in other instances it is an action more tardy and habitual.” *Medical Logic*, Edit. 2nd, p. 123. In the present work, I wish the reader to understand the term *sympathy*, wherever it may occur, in conformity with the above definition.

† *Colchicum*, *Squill*, and many other vegetable diuretics, are of this nature.

‡ The Indian Fig, (*Cactus Opuntia*,) when eaten, renders the urine of a bloody colour.

Rhubarb has likewise an effect upon the colour of this secretion.

§ That certain substances enter unchanged into the circulating fluid, is so clearly established by the facts related by our author, as well as by many others of a similar nature, that we should have supposed none but the most obtuse intellect could have

In some instances, the medicinal body undergoes a partial decomposition by the digestive organs, *in transitu*, by which some of its constituents escape into the circulation, while the others are completely digested, and converted into chyle; this occurs with saline compounds into which vegetable acids enter as constituents. See *Potassæ Acetas*. It is also stated in the history of Diluents, that there is reason to believe that *water* may under particular circumstances suffer decomposition, and transfer its elements for the formation of new compounds, furnishing *oxygen* to some, and *hydrogen* to others. There is likewise reason to suppose, that in particular conditions of the digestive functions, a remedy may be at once rendered inert by its entire decomposition.*

That an impression made upon the stomach by a medicinal agent, should be the means of exciting an action in the distant parts of the machine, will not appear extraordinary when we consider how universal a sympathy and control this central organ exercises over every function of the body; imbued with exquisite and diversified sensibility,—subjected to the first and coarsest impressions of our various ingesta,—stretched occasionally to an enormous extent by the unrestricted indulgence of appetite,—disturbed by the passions,—exhausted by volition, and debilitated by intense thinking; in short, assailed by numerous foes from *without*, and harassed by various revolutions from *within*, can we feel surprised that the aberrations of this viscus should give origin to the greater number of maladies with which we are afflicted, or that those medicinal applications should be effective that are directed for their cure, through the medium of its sympathies?

A dose of Ipecacuan, by exciting the stomach, will abate both the force and velocity of the heart in its vital motion, and affect the whole series of blood-vessels, from their origin to their most minute ramifications, as is evinced by the pallor of the skin under its operation, as well as by its efficacy in arresting hemorrhage; so the brain, when disordered by vertigo, frequently derives instantaneous relief from the administration

resisted their force. Yet have we seen a popular writer on *Materia Medica* in our own country, without denying the facts themselves, attempt to explain them away by gravely informing his readers that all the substances alluded to are *completely decomposed* before they enter the circulation, “but when thrown into the secretions or excretions, being removed beyond the control of the vital energies, chymical affinities are sometimes again brought into play, by which these substances are in part or wholly regenerated!!” Such puerility as this does not deserve a refutation.—*Ed.*

* This is probably the reason of many bodies producing but little effect upon the inferior animals. The vegetable eaters are certainly less affected by vegetable poisons than those animals who exclusively live upon animal substances; it is thus, that a rabbit can take a very large dose of opium without any ill effects, while half the same quantity would poison a dog. It is a curious fact, that a sound horse can take a very considerable portion of opium with impunity, but if he be weakened by previous disease, by strong purgatives, or by excessive bleeding, he is speedily destroyed by a much less dose; (See *Bracy Clarke's Reformed Pharmacopœia for Horses*.) In this latter case, does it not appear that the fatal result depends upon the fact of the digestive organs having been disabled, by debility, from effecting that decomposition by which, under ordinary circumstances, the drug is disarmed of its potency? What important lights might not be obtained by the institution of a series of well devised experiments upon the comparative effects of medicinal bodies upon man and other animals? The Physiologist has thus availed himself of the resources of the comparative anatomist, and I feel persuaded, that results equally beneficial to science would follow a similar inquiry in relation to the operation of medicines.

In the course of the present work, I hope to show the truth of this position by some appropriate illustrations.

of a teaspoonful of æther in a glass of water. The stomach, however, is not in every case the medium of sympathy; a substance may excite a powerful impression upon a distant part, by the instrumentality of the nerves, without any concurrence of the stomach; thus, the *Belladonna*, by coming in contact with the *Tunica Conjunctiva* of the eye, will occasion immediate dilatation of the *Iris*, although no other part of the system is in the slightest degree affected.

But there is yet another mode by which remedies may be made to exert a sanative effect upon particular organs of the body, through the medium of what Mr. Hunter called *contiguous* sympathy, and whose existence appears to depend upon the mere proximity and contiguity of parts without any relation to the distribution of the nerves; thus it is, that relief is afforded to a deep-seated inflammation, by scarifying the nearest external surface; while we know from long experience that the thoracic or abdominal viscera, when similarly affected, receive corresponding relief from the same topical use of bleeding, blistering,* or fomenting.

With respect to the *Modus Operandi* of medicines the following classification may be established.

THE PARTICULAR ORGANS OF THE BODY MAY BE EXCITED INTO ACTION, THROUGH FOUR DISTINCT AND DIFFERENT MODES OF COMMUNICATION.

I. *By the actual contact of the appropriate remedy.*

1. *Conveyed by absorption, WITHOUT DECOMPOSITION.*

Internally.	{	a. through the branches of the Thoracic duct.
	{	b. of the Vena Portarum.†
Externally.	{	c. of divided blood-vessels.
	{	d. of Lymphatics.‡

2. *Conveyed by absorption, WITH DECOMPOSITION, by which one or more of its constituents are developed, and pass into the circulating current.*

- II. *By an impulse conveyed through the instrumentality of the nerves.*
 III. *By the sympathetic control exerted by the stomach on distant parts.*
 IV. *By the operation of contiguous sympathy, or of that which is excited by the mere proximity and continuity of parts.*

* So little does blistering appear to act upon the principle of *contiguous* sympathy, that it is frequently most efficacious when excited at a distance from the diseased organ.—*Ed.*

† That the Vena Portarum constitutes one of the avenues through which certain extraneous bodies enter the circulating current, there cannot exist a doubt; but a series of well devised experiments are greatly wanted for the elucidation of the subject. The professors of Veterinary Medicine might on this occasion render us an important service by some comparative researches.

‡ See *Unguent. Hydrarg.*

And it is important to observe, that those are frequently antagonist operations, and consequently, that remedies, although they should occasion the same apparent effects, unless they act through the same medium, are not SIMILAR agents, but, on the contrary, are generally medicinally incompatible with each other; for an illustration of this truth, the practitioner may refer to the observations which I have offered under the history of diuretics.

The difficulty of justly appreciating these phenomena, in every instance, has furnished a powerful objection against the validity of any classification of medicinal substances which is founded on their supposed modes of operation; and it must be acknowledged that, if we are unable to assign to remedies their primary action, or to distinguish this from their more obvious, though perhaps secondary effects, we shall frequently be compelled to place similar medicines under opposite heads, and to include those of very dissimilar characters under the same artificial division; an error which has contributed more generally to embarrass and misguide our practice than any other therapeutical fallacy, and it was the conviction of this truth which induced me to introduce the present chapter, and to impress the importance of its subject upon the attention of my practical readers.

It is probable that, in philosophical strictness, no two medicines in our *Materia Medica* are perfectly similar, although they recede from each other by such insensible shades of gradation that we may with practical advantage admit their parallelism; at the same time, it must be ever kept in remembrance, that *those Medicines only are practically similar, whose operations have been found by experience to continue similar under every condition of the human body; and which, moreover, owe such similarity to modes of operation which are compatible with other, and consonant with the general indications of cure.*

The importance of admitting this proposition will be frequently illustrated in the sequel; and it may be observed in this place, that every classification in which it is not recognized as a leading principle, must be as imperfect in its execution, as it will be unjust and erroneous in its views.

Before I proceed to any farther discussion upon the present subject, it will be necessary to offer a synoptical view of an arrangement of medicinal bodies founded upon the basis of their operations, in order that I may be better enabled to illustrate the observations which it is my intention to introduce: for this purpose I shall present the reader with three different classifications of this kind; the first being that proposed by Dr. Cullen,* and which is now admitted to rest on principles nearly altogether false, but the investigation of which will afford many useful lessons of practical importance; the second classification is by Dr. Young;† and the third is that proposed by Dr. Murray,‡ which, from its simplicity and strict conformity with the views I intend to offer, will be adopted as being the most eligible for the occasion.

* Treatise on the *Materia Medica*, vol. 1. p. 191.

† Medical Literature, Edit. 2. (*Pharmacology*), p. 454.

‡ System of Mat. Med. vol. 1. p. 132.

CULLEN'S ARRANGEMENT OF THE MATERIA MEDICA.

Medicamenta agunt in

SIMPLICIA.

SOLIDA.

Astringentia.

Tonica.

Emollientia.

Erodentia.

Viva.

Stimulantia.

Sedantia.

Narcotica.

Refrigerantia.

Antispasmodica.

IMMUTANTIA.

FLUIDA.

Fluiditatem.

Attenuantia.

Inspissantia.

Misturam.

Acrimoniam Corrigentia.

In Genere.

Demulcentia.

In Specie.

Ant-acida.

Ant-alkalina.

Antiseptica.

EVACUANTIA.

Errhina.

Sialogoga.

Expectorantia.

Emetica.

Cathartica.

Diuretica.

Diaphoretica.

Menagoga.

CLASSIFICATION OF THE MATERIA MEDICA

BY DR. YOUNG.

I. CHYMICAL AGENTS,

1. *Caustics.*
2. *Antiseptics.*
3. *Antidotes.*
4. *Demulcents.*
5. *Diluents.*

II. VITAL AGENTS.

A. SUPPORTING STRENGTH.

1. *Nutrients.*

B. CAUSING ACTION.

PARTIAL & TRANSIENT.	1. <i>Expergeficients.</i>	12. <i>Hydrogogues.</i>
	2. <i>Excitants.</i>	13. <i>Simply Propellents.</i>
	3. <i>Calefacients.</i>	14. <i>Anthelmintics.</i>
	4. <i>Sudorifics.</i>	15. <i>Diuretics.</i>
	5. <i>Errhines.</i>	16. <i>Carminatives.</i>
	6. <i>Sialogogues.</i>	17. <i>Emmenagogues.</i>
	7. <i>Expectorants.</i>	18. <i>Epispastics.</i>
	8. <i>Stomachics.</i>	19. <i>Suppuratories.</i>
	9. <i>Emetics.</i>	20. <i>Sorbeficients.</i>
	10. <i>Cathartics.</i>	21. <i>Astringents.</i>
	11. <i>Chologogues.</i>	
PERMANENT.	Tonics.	

C. DIMINISHING ACTION OR SENSATION.

Primarily	1. <i>Narcotics.</i>	2. <i>Sedatives.</i>
	3. <i>Nauseants.</i>	4. <i>Diaphoretics.</i>
Secondarily	Exhaustients.	

III. INSENSIBLE AGENTS.

Specifics.

CLASSIFICATION OF REMEDIES BY DR. MURRAY.

A. GENERAL STIMULANTS.

- | | |
|----------------|-------------------|
| a. Diffusible. | { Narcotics. |
| | { Antispasmodics. |
| b. Permanent. | { Tonics. |
| | { Astringents. |

B. LOCAL STIMULANTS.

- | | |
|----------------------|----------------------|
| <i>Emetics.</i> | <i>Expectorants.</i> |
| <i>Cathartics.</i> | <i>Sialogogues.</i> |
| <i>Emmenagogues.</i> | <i>Errhines.</i> |
| <i>Diuretics.</i> | <i>Epispastics.</i> |
| <i>Diaphoretics.</i> | |

C. CHYMICAL REMEDIES.

- | | |
|----------------------|------------------------|
| <i>Refrigerants.</i> | <i>Lithontriptics.</i> |
| <i>Antacids.</i> | <i>Escharotics.</i> |

D. MECHANICAL REMEDIES.

- | | |
|-----------------------|--------------------|
| <i>Anthelmintics.</i> | <i>Diluents.</i> |
| <i>Demulcents.</i> | <i>Emollients.</i> |

With respect to the classification of Dr. Cullen, we may commence our objections by stating, that the very basis upon which it rests is a mere gratuitous assumption, viz. *that certain medicines act on the fluids of the body.* With the exception of a very few substances, it is now generally admitted that medicines produce their effects by acting on the living materials of which our organs are composed, and not by modifying the specific gravity, or chymical composition of the fluids which they may happen to evacuate. The origin of this latter opinion is to be traced to the exploded notions of the humoral pathologists, and to the exclusive doctrine of the earlier chymists; for as the former recognized a depraved condition of the fluids as the source of every disease, so did the latter imagine that every remedy operated by producing a chymical change upon its composition; and the remedial value of a medicinal substance was estimated by its effects upon inert matter. Thus were experiments made with different substances upon the blood, and other fluids of the body, in order to deduce, from results, the nature and extent of their powers as agents upon the living frame; for instance, the

spirit and *salt of hartshorn*, as they were found to render the blood more fluid, when added to it, *out of the body*, were indiscriminately administered in almost every complaint, with a view to dissolve that "lensor of the fluids" which was regarded as the more general source of disease. For similar reasons, a tribe of medicines were introduced into practice under the title of *Antiseptics*, for the prevention of a process which very probably never takes place in the living body; the powers of these supposed agents were as usual, inferred from their effects in resisting and preventing the putrefaction of dead matter.

Nor is the distinction assumed by Dr. Cullen, between the action of remedies on the *simple* and *living* solids less hypothetical. Tonics and astringents may certainly exert a beneficial effect upon the animal fibre, but not by any immediate action on its materials, but through the agency of its living principle.—"*Medicamentum non agit in cadaver.*"

The classification of Dr. Young, although it presents many points of interest and value, is not altogether free from objection; his classes in some instances are perhaps unnecessarily sub-divided, without a sufficient regard to the primary and secondary operations of the substances which they include. The arrangement of Murray has been adopted in the present inquiry, not as being less objectionable, in a general point of view, but as one which, from its simplicity, is better calculated, as a framework, if I may so express myself, for the display of those particular facts, the knowledge of which I consider essential for the successful administration of medicinal agents, and for the full comprehension of those practical doctrines which it is the exclusive object of this work to inculcate.

Dr. Murray observes that, in this arrangement, he places in the first division those substances which exert a GENERAL STIMULANT operation on the system. Of this there are two sub-divisions, THE DIFFUSIBLE and the PERMANENT; the former including the class of *Narcotics*, with which may be associated, as not very remote in their operation, the class of *Anti-spasmodics*; the latter comprising two classes, viz. *Tonics* and *Astringents*. Through these there is a gradual transition from the highly diffusible stimulant, to those most slow and durable in their action.

A second division comprehends LOCAL STIMULANTS, those, the action of which is determined to particular parts of the system. Such are the classes of *Emetics*, *Cathartics*, *Emmenagogues*, *Diuretics*, *Diaphoretics*, *Expectorants*, and *Sialogogues*; with which may be associated the classes of *Errhines* and of *Epispastics*, founded on direct local application.

The remaining classes include substances which do not operate according to laws peculiar to the living system. To one division may be referred those, whose effects depend on the CHYMICAL changes they produce in the fluids or solids; the classes which may be established on this principle are *Refrigerants*, *Antacids*, *Lithontriptics*, and *Escharotics*. To another division belong those, the operation of which is purely MECHANICAL, as *Anthelmintics*, *Demulcents*, *Diluents*, *Emollients*, and certain *Laxatives*.

Under the above classes, says Dr. Murray,* may be comprehended all those substances which are capable of producing salutary changes in

*A system of Materia Medica and Pharmacy, vol. 1. p. 131.

the human system, and which are used as remedies. I have stated my reasons for adopting this as a general basis of classification, although I shall deviate very considerably in the subordinate divisions of the plan, in the hope of establishing some distinctions that may tend to practical utility.

I. GENERAL STIMULANTS.

The four classes comprehended under this first division, are NARCOTICS, ANTISPASMODICS, TONICS, and ASTRINGENTS.

Although the remedies differ very essentially in the degree and permanence of their action, as well as in the character of their apparent effects, yet, as it is conceived that their *primary* operation is stimulant, there are considered as possessing sufficient general similitude to sanction their arrangement under one comprehensive division.

NARCOTICS.

Synon: *Sedatives, Anodynes, Hypnotics, Soporifics.*

Substances which, in a moderate dose, occasion a temporary increase of the actions of the nervous and vascular systems, but which is followed by a greater depression of the vital powers than is commensurate with the degree of previous excitement, and which is generally followed by sleep.

The relative intensity of these primary and secondary effects varies in the different narcotics,* and even in the same narcotic in different doses; in some cases, especially if the quantity administered be considerable, the symptoms of diminished sense and action follow so immediately, that the previous stage of increased action is very obscure, or not in the least perceptible, while in other cases, the operation of the substance is more particularly directed towards the heart and arteries, and syncope succeeds its exhibition. These facts have led many physiologists to deny the stimulant nature of these bodies, and to consider their primary operation as one of a depressing kind, whence they have bestowed upon them the name of SEDATIVES; in referring to the classification of Cullen and Young, we shall find that the arrangement of these substances have been directed in strict conformity with such a view of the subject; but it may be asked, how the increased excitement and exhilaration which so obviously follow the use of these bodies, in small doses, can be reconciled with that theory which considers them as absolutely and primarily sedative? In order to combat an argument so fatal to his hypothesis, Dr. Cullen summons to his aid the potent intercession of his tutelar deity, the *Vis Medicatrix*, a power which he supposes to preside over our living body, and with anxious vigilance, to resist the invasion

* *Narcotics* from *νάρκη* *Torpedo*; an animal which has the power of *stupefying* any thing that it touches.

of every thing that is noxious, or hostile to its health and well being; with such assistance it was not difficult to explain any paradox in physiology, and the anomalies attending the agency of narcotic medicines were accordingly, in the school of Cullen, easily reconciled with the views of a favourite theory. He supposed that whenever a *sedative* was applied in a moderate dose, the *Vis Medicatrix* took the alarm, and excited all the powers of the system, in order to throw off the noxious application, and that thus *indirectly* arose those peculiar symptoms of increased action; but when the dose was more considerable, he contended that the preserving power of the system was silenced, and unable to offer any salutary resistance, and consequently that universal depression immediately followed; but there is no direct evidence in support of the existence of such a power, and still less of its influence upon such occasions; it is far more philosophical to refer the operation of narcotics to a peculiar stimulating power, remarkable for the extreme rapidity with which it exhausts the energy of the nervous system. No one will deny the stimulating powers of alcohol, and yet a very large draught of this liquor will occasion extreme exhaustion without the occurrence of any signs of previous excitement; nor will any one be disposed to question the depressing influence of opium, and yet small doses have enkindled excitement and sustained the powers of life, under circumstances of extreme and alarming exhaustion.*

From the celerity with which narcotics produce their effects, it is reasonable to suppose that they act upon the nervous system through the sympathetic relations of the stomach, although in some instances it is highly probable that these bodies are actually absorbed into the circulation; I am inclined to think that this occurs with opium, as death is accelerated in cases of persons poisoned by it, by the adoption of those measures which are best calculated to promote its absorption: (*see Opium.*) A still more striking proof is furnished by the fact of opium, when externally applied to ulcers, producing all its constitutional effects, such as costiveness, head-ach, nausea, &c. Whether the effects of spirituous potations are to be attributed to the introduction of alcohol into the blood, or to the sympathies existing between the stomach and brain, is still a question of doubt. Dr. Cooke † relates a case, on the authority of Sir A. Carlisle, of a person who was brought dead into the Westminster Hospital, in consequence of having drank a quart of gin for a wager, and that upon examination, a considerable quantity of a limpid fluid was found within the lateral ventricles of the brain, *distinctly impregnated with gin*. I very well remember the case, for it occurred during the period that I held the situation of physician to that hospital, but it is very doubtful whether such an absorption occurs under ordinary circumstances. We well know the facility with which certain odorous bodies enter the circulation, and are developed in distant organs; it is therefore very possible that the apparent odour of the gin, which has been sometimes recognised in the secretions, may depend upon the presence of the flavouring ingredients, independent of the alcohol?

* During the severe campaigns of the late war, the Surgeons of the French army were in the practice of administering Opium and Cayenne Pepper to the soldiers, who were exhausted by fatigue.

† Treatise on Nervous Diseases, vol. 1. p. 221.

At one period, substances supposed to possess narcotic virtues were placed about the bed to obviate watchfulness; the plant *Anethum*, or *Dill*, was very commonly suspended over the head for such a purpose, while in modern times the *Hop* has been introduced into the pillow.

In concluding the history of Narcotics, it may be observed, that there is, perhaps, no class of medicinal bodies, the individuals of which are less disposed to bend and conform to an artificial arrangement; each would seem to have its own particular mode of operation, and to affect sensibility in its own peculiar manner; and hence the practitioner will often find that, after the failure of one narcotic, the administration of another will induce sleep.

ANTISPASMODICS :

Substances which have the power of allaying the inordinate action of muscular structures, and of assuaging pain, without occasioning that state of insensibility which characterises the operation of narcotics.

There are certain medicinal bodies which would appear to exert a specific control over spasmodic action, from whatever cause it may have originated, such are *Assafœtida*, *Galbanum*, *Musk*, *Castor*, *Ammonia*, *Valerian*, &c. To such remedies the term antispasmodic more exclusively belongs, but in a more general view of the subject we must admit that this class of branches, by indefinable gradations, into narcotics, and tonics; for since spasm may be connected with the most opposite states of the body, it is very evident that many of the individuals included in the class of antispasmodics, can only be relative agents: spasm, for instance, may arise from excessive irritability, as from teething, wounds, worms, &c., in which case a narcotic would prove beneficial; or it may depend upon a state of general debility, the proper remedy for which would be the administration of an Aromatic Stimulant, or the assiduous exhibition of some permanent tonic.

TONICS :

Substances, whose continued administration gives strength and vigour to the body.

It is very justly admitted, that a state of permanent tension in the fibres of the body is necessary for the existence of life, and that any undue departure from such a condition is followed by debility. Thus, Sir Gilbert Blane observes, that no muscle, whether voluntary or involuntary, can act unless its fibres are previously in such a state, that if divided they would shrink by their own resiliency, leaving an interval between the cut extremities; the same may be said of the vascular system in all its ramifications, in order to give play to their contraction in grasping and propelling their contained fluids. It appears that there are certain medicinal bodies that have the power of affecting this state of tension, and when their effects contribute to its restoration, they are properly denominated *Tonics*. We are not, however, to consider them as pro-

ducing such a change by any mechanical operation upon the matter of which the fibre is composed, but by a direct action upon its living principle; it seems probable that certain poisons may thus produce sudden death] by their agency on the vital principle, by which the tension of the heart and whole arterial system is immediately relaxed. In this point of view, *Tonics*, like the other remedies which we have described, may be *relative* or *absolute* in the operation. Venesection, purgation, or whatever will, under certain conditions of the body, occasion a salutary change in its vital powers, may produce a corresponding alteration in the tension of its fibres, and consequently fall under the denomination of a tonic remedy; but independent of the state of the body, there would seem to be certain substances that act as specific stimuli upon the living fibre, and are in certain cases indispensable for the maintenance of its healthy tone: such are vegetable bitters, which produce a powerful effect upon the digestive organs, and by nervous sympathy, upon the rest of the system. *Bitter Extractive*,* seems to be as essential to the digestion of herbivorous, as salt is to that of carnivorous animals; it acts as a natural stimulant, for it has been shown by a variety of experiments, that it passes through the body without suffering any diminution in its quantity, or change in its nature. No cattle will thrive upon grasses which do not contain a portion of this vegetable principle; this fact has been most satisfactorily proved by the late researches of Mr. Sinclair, gardener to the Duke of Bedford, which are recorded in that magnificent work, the "*HORTUS GRAMINEUS WOBURNENSIS*." They show, that if sheep are fed on *Yellow Turnips*, which contain little or no bitter principle, they instinctively seek for, and greedily devour any provender which may contain it, and that if they cannot so obtain it they become diseased and die. We are ourselves conscious of the invigorating effects of slight bitters upon our stomach: and their presence in malt liquors not only tends to diminish the noxious effects of such potations, by counteracting the indirect debility which they are liable to occasion, but even to render them, when taken in moderation, promoters of digestion. The custom of infusing bitter herbs in vinous drinks is very ancient and universal; the *Poculum Absinthiatum* was regarded in remote ages as a wholesome beverage, and the Wormwood was supposed to act as an antidote against drunkenness. The Swiss peasant cheers himself amidst the frigid solitude of his glaciers, with a spirit distilled from *Gen-tian*, the extreme bitterness of which is relished with a glee that is quite unintelligible to a more cultivated taste. With regard to the natural use of *Bitter Extractive*, it may be laid down as a truth, that it stimulates the stomach,—corrects putrefying and unwholesome nutriment—promotes tardy digestion,—increases the nutritive powers of those vegetable substances to which it is united,—and furnishes a natural remedy for the deranged functions of the stomach in particular, and through the sympathetic medium of that organ, for the atony of remote parts in general; and I shall hereafter show, that in its medicinal applications it

* Bitterness in vegetables has been supposed to reside in a peculiar proximate principle, which has been accordingly named the *Bitter Principle*. Such an opinion, however, does not appear to rest on sufficient evidence; on the contrary, experiment has shown that it is very generally connected with the extractive matter of the plant, as it is obtained equally by the action of water and alcohol; it is not volatile, nor are its energies impaired by decoction.

certainly imparts additional activity to many remedies, while it renders the stomach and system more susceptible of their salutary energies. As an essential ingredient in the provender of herbivorous animals, it may I think be admitted as a fact, that its importance is in an inverse ratio with the nutritive powers* of the food, and we accordingly find, in conformity with that universal scheme of self-adjustment and compensation, which influences all the operations of nature, that cultivation, which extends the nutritive powers of vegetable bodies, generally diminishes their bitterness in the same proportion; the natural history of the Potato offers a good illustration of this fact, for the roots of this useful plant which have been so greatly improved by culture, are in their wild state both small and bitter.† Gummy matter, which seems to result from the first change of the sap, is undoubtedly rendered more digestible and nutritive by the presence of a bitter; pure gum is not very much disposed to yield to the assimilative functions; "it frequently passes through the bowels," says Dr. Chapman,‡ "very little changed, as I have witnessed a thousand times." We see therefore the value of the bitter principle, in the economy of the *Lichen Islandicus*, which is intended as the food of animals in northern latitudes; we are told that boiled linseed constituted the sole diet of the people of Zealand during a scarcity of long continuance, on which occasion, symptoms of great debility occurred, attended with those of dyspepsia; so again professor Fritze, in his Medical Annals, states that vegetable mucilage, when used as a principal article of diet, relaxes the organs of digestion, and produces a viscid slimy mucus, and a morbid action in the primæ viæ, an effect which analogy shows might be obviated by the addition of bitter extractive. For the same reason animals that feed in marshy lands, on food containing but little nourishment, are best defended from the diseases they are liable to contract in such situations by the ingestion of bitter plants.¶ Upon these occasions nature is very kind, for the particular situation that engenders endemic diseases is generally congenial to the growth of the plants that operate as antidotes to them.

I have offered these views upon the subject of *Bitter Extractive*, from a conviction that they will essentially contribute to the establishing of

* Thus Sir H. Davy, in comparing the composition of the soluble products afforded by different crops from the same grass, found in every trial, the *largest quantity* of truly nutritive matter in the crop cut when the seed was ripe, and the *least bitter extractive* and saline matter; while in the autumnal crops these relations were found inverted. Elem. of Agricult. Chym.

† Molina, in his history of Chili, speaking of the Potato, says, "It is indeed found in all the fields of this country, but the plants that grow wild, called by the Indians *Maglia*, produce only very small roots of a bitter taste." Dr. Baldwin also found the wild parent of the potato plant at Monte Video, and Mr. Lambert informs us that this statement has been confirmed by Captain Bowles, who has not long since returned from the South American station; he says, "it is a common weed in the gardens, bearing small tubers, but *too bitter* for use." Royal Institution Journal, No. XIX.

‡ Discourses on the Elements of Therapeutics and Materia Medica, by N. Chapman, M. D. Philadelphia, 1819.

¶ Thus it has been found by experiments, that the *Menyanthes Trifoliata*, (the Water Trefoil,) which on account of its bitterness has been used as a substitute for Hops, is a cure for the rot in sheep, when given in doses of a drachm of the powdered leaves; and Dr. William Bulleyn, the cotemporary of Turner, the father of English Botany, observes in his work, entitled "*THE BULWARK OF DEFENCE*," that *Tormentil*, in pastures, prevents the rot in sheep.

just and philosophical notions, respecting the necessity and *modus operandi* of many vegetable tonics.

As the action of tonics is gradual, so their operation is not followed by that exhaustion consequent upon the use of diffusible stimulants.

The substances which compose the class of tonics are derived from the vegetable and mineral kingdoms; those of the former are generally bitter, and produce their effects by a primary action on the stomach, and are not absorbed into the circulation, as experiments upon *Bitter extractive* have most fully demonstrated; those derived from the mineral kingdom, comprehending several of the metals, appear in some instances to pass into the circulation, although several of them, like the vegetable tonics, acts primarily on the *primæ viæ*; I apprehend this observation applies to the *nitrate of silver*, which certainly possesses considerable powers as a tonic in certain cases of dyspepsia, for which it may perhaps be indebted to the bitterness which distinguishes it.

AROMATICS:

Substances of a fragrant smell,* which produce upon the organs of taste a peculiar sensation of warmth and pungency, and occasion when swallowed, a corresponding impulse upon the stomach, which is rapidly communicated to the remote parts of the body.

The vegetable bodies which constitute the class of aromatic stimulants are very intimately related with that of tonics; indeed in the most efficient vegetables of the latter kind, the two qualities are generally blended, and the transition from these to the more pure bitters and aromatics is so imperceptible, that it is extremely difficult to arrange them in different classes; Dr. Murray has accordingly in his classification not attempted to separate substances which are so intimately connected. *Aromatic Stimulants*, however, in a practical point of view, must be distinguished from tonics, as the former are valuable for the *rapidity*, the latter, for the *permanency* of their effects. Their characteristic properties appear to depend chiefly, if not entirely, on an essential oil which, when extracted from the vegetable, exhibits all its aromatic power in a very concentrated form.

Medicines of this kind, when administered for the purpose of dispelling wind from the alimentary canal, have been termed *Carminatives*.† They would seem to act by imparting energy to the distended and weakened muscular coat of the stomach, by which the accumulated gas is propelled through the upper orifice; for this viscus, like the bladder, when greatly distended, becomes unable to relieve itself, partly in consequence of the exhausted state of the overstretched fibres of its muscular coat, and partly perhaps from a contraction of the *Cardia*, or upper orifice: for it has been already stated that a loss of power, and spasmodic action, are often the simultaneous results of debility.

* *αρωμα*, which is compounded of *αρι*, very, and *οδμν*, or *οσμν*, smell.

† The origin of this term is derived from the superstitious custom of curing such complaints by incantations in verse (*Carmina*), or perhaps it may be understood metaphorically as expressive of the instantaneous relief which these medicines are capable of affording; operating as it were, like a charm.

ASTRINGENTS:

Substances which, when applied to the human body, corrugate and condense its fibres, and at the same time, exert a tonic influence through the medium of its living principle.

Astringency in any substance may be at once recognized by the organs of taste: its power in corrugating the papillæ of the tongue, and in imparting a sensation of harshness and roughness to the palate, being too peculiar to be mistaken; this is a fortunate circumstance, for there does not exist any one chymical test by which we can invariably detect the property of astringency, since it is found to reside in many different classes of substances: thus, acids, especially the stronger mineral ones, are powerfully astringent; so are many of the metallic salts, as those of iron, zinc, copper, and lead; and some of the earths, when combined with acids, of which alum is a striking example. The vegetable kingdom, however, furnishes the greater number of astringent remedies; and chymistry has shown that this property uniformly depends upon a peculiar proximate principle, characterized by its power of forming an insoluble compound with animal gelatine; to this principle the name of *TANNIN* has been given. As tannin generally exists in union with gallic acid, and as the latter body is known by its property of striking an inky blackness with the salts of iron, solutions of this metal were long, but erroneously, regarded as the proper test of vegetable astringency; the fallacy of this is at once shown by the habitudes of Catechu, one of the strongest of our astringents, but which, nevertheless, will not yield the smallest degree of blackness to the solutions of iron, because it contains only tannin, the true principle of astringency, without a trace of its usual associate, the gallic acid. From the power which these substances possess of astringing, and condensing, the animal solids, their medicinal properties are supposed to arise, and we may perhaps, in this instance, admit such a mechanical explanation; but astringents possess also some power over the living principle of the matter which they astringe, for they are capable of acting as permanent stimulants, of curing intermitting fever, and of obviating states of general debility. Astringents would seem to moderate the morbidly increased secretions of distant parts, and to restrain hemorrhage, by their corrugating influence upon the *primæ viæ*,* which is extended by sympathetic action to the vascular fibre; it is not difficult for any person to conceive the possibility of such a sympathy, who has ever experienced the thrilling and singular feeling which is produced over the whole body, by the *acerb* taste of the sloe juice. As however the primary operation of these bodies, by their actual contact with the animal fibre, must be much more powerful than that which can result from the mere sympathy of parts, we find that the efficacy of astringents is principally displayed in the cure of diarrhœa, or serous evacuations from the intestinal canal; their operation, in checking profuse fluor al-

* When tannin is present in grasses, as Sir H. Davy found in that of *after-match crops*, it is voided in the excrement by animals who feed upon it, together with the bitter extractive, saline matter, and woody fibre. (Elem. of Agricult. Chym. Appendix, p. lxi.) We may therefore infer by analogy that it does not enter into the circulation.

bus, gleet, and the inordinate secretions of other distant organs, is much less striking and unequivocal, and it is a question whether in many of such cases the benefit arising from their use may not depend upon their tonic powers. As the morbid excess of different evacuations may arise from various and opposite states of the living system, so may the individuals of the other classes become astringents; and we are bound to admit upon this, as we have on other occasions, the existence of *absolute* and *relative* remedies.

Narcotics, at the head of which stands opium, will frequently assume the character of astringents, by diminishing the irritability upon which increased discharges depend. In Diarrhœa, an astringent, properly so called, diminishes the flow of those acrid fluids into the intestines, by which their peristaltic motions are preternaturally increased, and it consequently represses the diarrhœa; a narcotic, under similar circumstances, might not repress the flow of the acrid matter to which I have alluded, but it would render the bowels less susceptible to its stimulus, and would therefore produce the same apparent alleviation, although by a very different mode of operation. There is yet a third species of remedy, which may operate in restraining a diarrhœa of this description; not by stopping the flow of acrid matter, nor by diminishing the irritability of the intestinal organs, as in the instances above recited, but, simply, by *acting chymically* upon the offending matter, so as to disarm it of its acrid qualities; such, for instance, is the nature of *absorbent* and *testaceous* medicines. In the cure of hemorrhage, if it be *active*, that is to say, connected with a state of strong tonic contractility of the blood-vessels, a very different remedy will be required as an astringent, than in cases of *passive* hemorrhage, in which the vascular fibres are in a state of relaxation or collapse. Sir Gilbert Blane has offered some valuable remarks upon this subject, with a view to settle the difference of opinion which has arisen respecting the treatment of flooding after child-birth. (*Medical Logic*, Edit. 2d. p. 100.)

Astringents are capable of being exclusively used as local applications, and when they are so employed for the purpose of stopping hemorrhage, they are termed *STYPTICS*.* With respect to these latter agents it must be confessed, that great popular error still exists, much of which has evidently arisen from deductions drawn from the effects of such remedies upon inferior animals; thus have several substances gained the reputation of *Styptics*, from the result which may have followed their application to the wounded and bleeding vessels in the extremities of the horse and ass: whereas the fact is, that the blood-vessels of these animals possess an inherent power of contraction which does not exist in those of man, and to which alone the cessation of the hemorrhage, fallaciously at-

* Various combinations, into which different metallic salts have generally entered as ingredients, have at different periods been extolled for their efficacy as *Styptics*: Helvetius published an account of a preparation composed of the filings of iron and tartar, mixed to a proper consistence with French brandy, and it was long used in France, Germany, and Holland, under the name of *HELVETIUS'S STYPTIC*.

EATON'S STYPTIC. After the styptic of Helvetius had been discarded from the Continent, it was brought into this country, and for a long time continued to be employed with confidence, under the new title of *Eaton's Styptic*. It is now made in several different modes, and consists chiefly of an alcoholic solution of *sulphate of iron*, with some unimportant additions.

tributed to the *Styptic*, is to be wholly attributed. In many cases an application may owe its styptic qualities to its power of coagulating the blood around the orifice of the wound; in this way the contact of heated metal will sometimes arrest the flow of blood from a cut surface.

LOCAL STIMULANTS.

This second division comprehends those medicinal substances, which have been generally classed under the head of *EVACUANTS*; for, as they stimulate particular organs, so do they occasion by their local operation, an increased secretion, or evacuation from them.

EMETICS:

Substances which excite vomiting, independent of any effect arising from the stimulus of quantity, or of that occasioned by any nauseous taste, or flavour.

Before we can determine the *modus operandi* of emetics, it will be necessary to take an accurate view of the phenomena and pathology of vomiting. It is an important fact that any extraordinary stimulus applied to the stomach, instead of increasing its motions, as it would in other instances, actually inverts them: the wisdom of such a peculiar provision is manifest; it is intended to prevent the protrusion of the food into the duodenum before it has undergone those necessary changes in the stomach, by which it is prepared for the more elaborate process of chylickation. The act of vomiting, however, is not affected, as Dr. Haygarth formerly supposed, by the sole influence of the stomach; the brain is an important accessory. Dr. Majendie goes so far as to attribute the operation of vomiting, exclusively, to the agency of this latter organ upon the abdominal muscles, and regards the stomach as a mere passive instrument in the act;* this doctrine was supported in an elaborate experimental memoir, presented by this indefatigable physiologist to the Royal Institute of France in the year 1812.

Although we shall not be disposed to receive this theory in its full extent, yet we cannot hesitate to admit that the influence of the nervous system is indispensably necessary for producing vomiting; and we accordingly find that this act will not take place, however forcibly the stomach may be goaded by emetics, where the energy of the nervous system is suspended, as in cases of profound intoxication, or in violent wounds and contusions of the head; while if the brain be only partially influenced, as by incipient intoxication, or by a less violent blow upon the head, its irritability is increased instead of being paralysed, and vomiting under such circumstances is excited by the slightest causes: the fact of such

* This theory, however, did not originate with Dr. Majendie, for Chiarac, a French physician of the 17th century, drew the same conclusion from an experimental inquiry (*Historie de l'Academie Royale des Sciences*, p. 12. An. 1700.)

opposite results being produced by the same impulse in different degrees of intensity, is no less curious than instructive. Dr. Richard Harrison, in his Gulstonian Lecture before the College of Physicians, treated the subject of vomiting with much ingenuity, and I am disposed to adopt the views which he offered. He observed, that although the experiments of Majendie sufficiently testify the importance of the pressure of the abdominal muscles upon the stomach in the act of vomiting, and which can only be explained by the influence of the brain and nervous system, yet that he has attributed too much to their agency: "it appears to me," continued he, "that vomiting may be explained in the following manner:—the irritation of the stomach makes a call upon the brain for the aid of the diaphragm and the abdominal muscles, in order to expel its contents; the diaphragm then becomes contracted and fixed, the ribs drawn down, and the abdominal muscles drawn inwards, so that the stomach is pressed on all sides by voluntary muscles, which, together WITH ITS OWN CONTRACTION, expel the contents." Now it must be obvious that where the brain, from oppression or injury, is unable to transmit its influence to these muscles,* and disregards the call of the stomach, vomiting can only be excited with difficulty, or it will be prevented altogether.

Under such circumstances venesection may in some cases prove a powerful adjuvant, by unloading the vessels of the brain, and thus restoring to the nervous system its necessary excitability; where its powers have been paralyzed by the operation of a narcotic, a copious draught of some vegetable acid, or the effusion of cold water upon the surface of the body may impart efficiency to an emetic; the operation of *Nightshade* and some other narcotic poisons may be adduced in farther illustration of this subject;—an excessive dose of the *Atropa Belladonna* produces symptoms of alarming stupor, and so difficult is it to evacuate the stomach under such circumstances, that as much as fourteen grains of *Tartarized Antimony* have been administered without effect: now if in such a case a copious draught of some vegetable acid be given, the emetic will be more likely to succeed; here then we perceive, that the brain, being paralyzed by a narcotic poison, is unable to lend its aid to the muscles requisite for the operation of vomiting, until its energies are restored by the antinarcotic powers of a vegetable acid. The practical precaution which this view of the subject affords, is extremely important,—not to allow the apparently inactive state of the stomach to induce us, inconsiderately, to augment the dose of an emetic: for although the stomach, for the reasons just stated, may be unable to void its contents by vomiting, it may nevertheless retain its sensibility, and be therefore liable to inflammation: Dr. Harrison has reported a case of this kind, where the practitioner, in attempting to excite emesis in an epileptic patient, by a very large dose of *sulphate of zinc*, produced an inflammation in the viscus that terminated fatally.

Vomiting may also be produced by the *primary* operation of certain

* Upon the very same principle, a person may die from suffocation, in consequence of an injury in the brain; the respiratory muscles being unable to sustain the function of breathing, for want of a due supply of nervous influence. This happens in cases of Apoplexy, and in poisoning by Narcotics.

Those who wish for farther information upon this subject may consult the chapter on "THE PHYSIOLOGICAL CAUSES AND PHENOMENA OF SUDDEN DEATH," in my work on "MEDICAL JURISPRUDENCE," Vol. 2. p. 16.

agents upon the brain, by which its energy is disturbed, as by narcotics, or by the motions of swinging, whirling, and sailing ; in such cases, the series of actions necessary for the establishing of vomiting, commence in the brain, and is propagated by nervous sympathy to the stomach.

When an emetic is taken into the stomach, an interval of twenty minutes, or longer, usually passes without any apparent effect ; an uneasy sensation, which we term nausea, is then felt, and this continues to increase until vomiting begins ; here then we perceive are two distinct stages, each of which is marked by its own proper symptoms ; the relative intensity and duration of which will be found to vary according to the nature of the exciting causes ; thus some Emetics, as *Sulphate of Zinc*, act without occasioning much nausea, while others, as *Tobacco*, excite it to a degree which is far greater than is proportioned to their emetic power : this is a fact of great importance in directing us in the selection of an emetic, for we shall find that in some diseases it is a great object to avoid that state of system which invariably accompanies nausea, while in others it affords the best mode of answering an important indication of cure.

Nausea would seem to depend upon the exertions of the stomach and muscles, not being proportioned to the effects of the brain, in order to produce vomiting. Where this balance however is maintained, as during the operation of an ordinary emetic, the following are the symptoms which characterize the two stages ;—while the nausea only is present, the countenance is pale and shrunken, the pulse feeble, quick and irregular, and there is a feeling of cold ; but as soon as vomiting commences, the face becomes flushed, the pulse quicker and stronger, although it seldom returns to its natural standard, until some time after the vomiting has ceased. A degree of languor, a disposition to sleep, and a general moisture upon the skin, are the circumstances which occur after the total cessation of the paroxysm.

The feeble state of the circulation, as indicated by the pulse, and the general coldness and languor experienced during a paroxysm of nausea, are to be ascribed to those sympathetic relations by which the brain, stomach, and heart, are reciprocally influenced.

The advantages to be obtained from the administration of an emetic in the cure of disease, may either depend upon its *primary* or *secondary* operations, that is to say, upon the mere evacuation of the stomach, or upon those changes which occur in distant parts from sympathy ; and the judicious practitioner, in the selection of an emetic, will always be guided by the nature of the indication which he intends to fulfil ; if his object be to evacuate on the stomach quickly and completely, he will avoid those emetics that are distinguished by their nauseating tendency, as in cases of disease which depend on a disordered state of stomach, connected with undue distention, and the presence of acrid and indigestible matter ; if, on the other hand, his intention be to influence some remote organ through the sympathetic powers of the stomach, an emetic of an opposite tendency may be better calculated to answer such indications : in some cases, he is to seek a beneficial result from the mechanical action of the diaphragm and abdominal muscles, by whose pressure the gall-bladder and hepatic ducts are emptied of their contents, and hence jaundice, arising from the obstruction of biliary calculi, has been suddenly removed by the *concussion* of an emetic : a similar pressure upon the thoracic viscera

may occasion expectoration, and relieve the bronchial vessels in cases of asthma, catarrh, and croup.

Vomiting, when produced by the operation of a mild emetic, does not appear to exhaust the excitability of the stomach, but on the contrary to increase its tone; for we generally find the process of digestion is carried on more vigorously afterwards; although it is probable that, by frequent repetition, a different result would be obtained, and we should find that its motion would become liable to inversion by slight stimuli; we may therefore question the propriety of that practice which is so strenuously recommended by Hippocrates,* and other ancient physicians, to administer emetics frequently to those in health, in order to prevent the incursions of disease.

The benefits arising from the secondary effects of an emetic are numerous and extensive. It has been observed that during nausea the force of the circulation is considerably abated, hence the use of these remedies in hemorrhage: and, as the energy of absorption is generally in an inverse ratio to that of the circulation,† we frequently obtain from

* Hippocrat. de Diæta. lib. iii. et alibi passim.

This predilection of the ancients for Emetics is the more extraordinary, as they were acquainted with those only which were of the most violent and unmanageable description; the *Veratrum* or White Hellebore, was sometimes fatal.

† Few discoveries in physiology have thrown greater light upon this important subject than that of M. Majendie, published in his *JOURNAL DE PHYSIOLOGIE EXPERIMENTALE*, (1^{er} numero—Janvier, 1821) in a paper entitled, "Memoir sur le Mécanisme, de L'Absorption." The results contained in this essay are the more interesting to me, as they were read at the Academy of Sciences at Paris, some time after the publication of the third edition of my *PHARMACOLOGIA*, and it will be observed, in what a satisfactory manner they confirm the views which I offered at that time, respecting the influence of venesection in accelerating the absorption of Mercury. In the fourth edition (published in October, 1820, p. 115.) these views were farther extended, and as I could not have been influenced by the experiments of M. Majendie, which were not published until some time afterwards, it is very fair to conclude, that when two persons arrive at the same result by different trains of investigation, such a result must be correct. The conclusions established by the experimental inquiries of M. Majendie, with regard to absorption, appear to me to be so important, in reference to the object of the present work, that I shall pause in this place, for the purpose of furnishing the reader with a short account of them. M. Majendie states, that while performing the experiment of injecting warm water into the veins of a living animal, he first conceived the idea of observing what effects would be produced upon the function of absorption by the artificial plethora, thus occasioned: having accordingly injected a quantity of water into the venous system of a middle-sized dog, he introduced a small portion of an active substance, whose effects were well known, into his side, when he was surprised to find that its usual operation was not manifested, until after an interval much longer than usual; the same experiment was afterwards repeated upon another animal, and with similar results. In a third experiment, as much water (about two pounds) was injected, as the animal could sustain without destruction, in which case the poisonous substance produced no effect whatever, the powers of absorption appearing to be entirely suspended; and having waited during half an hour for the occurrence of those symptoms which, under ordinary circumstances, would have manifested themselves in two minutes, M. Majendie concluded that if vascular congestion be the cause of the suspension of absorption, the function ought to be restored by the removal of this artificial condition, an opinion which he proceeded to verify by experiment; the jugular vein of the animal, under trial, was accordingly opened, and the ingenious operator had the satisfaction to observe the effects of the poison gradually developing themselves in proportion as the blood flowed. M. Majendie next proceeded to confirm the truth of his position, by an experiment, the converse of those above related; an animal was bled, to the amount of about half a pound, and the poisonous substance applied to the pleura of the animal, as in the foregoing experiments, when it appeared that those effects which, under ordinary circumstances,

a nauseating dose of an emetic, considerable assistance in the treatment of anasarca, and other dropsical swellings. Those medicines that are liable to produce at once, full vomiting, without any previous stage of nausea, are of course less calculated to fulfil such indications. In the same manner we should select a *nauseating* emetic, when our object is to promote the passage of a gall stone through the *ductus communis*, for the nausea so excited will relax the duct, while the mechanical concussion tends to push the obstructing matter forward. On the other hand, whenever our object is to evacuate the stomach, and to prevent absorption, we must take care to cut short the nauseating stage; a precaution which is highly important in the treatment of a case of poisoning. The state of the stomach produced by vomiting is very frequently extended, by sympathy, to the vessels of the skin; in consequence of which, a diaphoresis not unusually follows the operation. In the different varieties of febrile disease, this circumstance stamps additional value upon the class of emetics; while, at the same time, that they eject any offensive matter which may be present in the stomach, they thus control the accelerated circulation.

From the violent muscular exertions which take place in the act of vomiting, the administration of an emetic may be very injurious in certain states of the body. In consequence of the pressure applied to the descending aorta, and the interrupted circulation through the lungs, from impeded respiration, the blood returns with difficulty from the head during a paroxysm of vomiting, and in plethoric states of the body, or in cases of determination of blood to the cerebral or pulmonary organs, the act of vomiting cannot be considered as free from danger. The concussion of an emetic may also produce mischief in the advanced stage of pregnancy, and in *kernia* and *prolapsus uteri*; while in extreme debility, there is the danger of a syncope being produced, from which the patient may never recover, as I once witnessed in the last stage of Phthisis, where an emetic was imprudently given, with the intention of dislodging the pus with which the lungs were embarrassed.

By violent and protracted retching, a person will sometimes become jaundiced; the stomach, diaphragm, and abdominal muscles, are, under such repeated efforts, apt to be rendered, to an eminent degree, irritable; so that at each effort of the former to discharge its contents, the latter will frequently be thrown into strong spasmodic contractions, and the liver together with the gall bladder will be suddenly caught, and, as it were, squeezed in a powerful press; in consequence of which the bile will regurgitate, and be carried into the *Venæ cavæ*; for Haller has shown with what facility a subtle injection, when thrown into the hepatic duct, will escape by the hepatic veins; and upon which Dr. Saunders observes, "I know this to be a fact, for I have ascertained by experiment, that water injected in the same direction, will return by the veins in a full

were not evident until after a period of twelve minutes, manifested themselves after an interval of only thirty seconds. In order to show that these results actually arose from vascular distention, and not from the artificial state of dilution in which the blood was placed, M. Majendie instituted the following experiment; a considerable quantity of blood was drawn from the vein of a dog, and replaced by a similar quantity of warm water, after which a measured quantity of *Nux Vomica* in solution was introduced into the side, when the poisonous effects were found to take place with the same rapidity as if the blood had not been mixed with water.

stream, though very little force be used." When a jaundice is thus produced it will gradually disappear without the aid of any medicine; the kidneys are the principal means by which all unnecessary bodies are extracted from the circulating mass, a portion of bile will therefore under such circumstances be eliminated in every discharge of urine.

The different emetics employed in practice are derived from the vegetable and mineral kingdoms, some of which appear to produce their effects by an immediate impression upon the nerves of the stomach, while others require to be absorbed into the circulation before they display their energies. *Ipecacuanha* would seem to act primarily on the stomach, but *Tartarized Antimony* has been found, by experiment, to occasion vomiting, when injected into the veins of an animal; while the other mineral emetics, viz. the preparations of *Copper* and *Zinc*, undoubtedly operate on the stomach, and without inducing much nausea.

CATHARTICS:

Medicines which quicken or increase the evacuation from the intestines, or which, when given in a certain dose, occasion purging.

These remedies, from a general difference in their modes of operation, have been classed under two divisions—**LAXATIVES** and **PURGATIVES**. The former operate so mildly that they merely evacuate the contents of the intestines, without occasioning any general excitement in the body, or even stimulating the exhalent vessels of the canal; the latter produce a considerable influx of fluids from these vessels, and extend their stimulant effect to the system in general; and where these effects are very violent, the purgative is farther distinguished by the epithet **DRASTIC**. Laxatives then may be said to empty the bowels simply, and to carry off extraneous matter, which is out of the course of the circulation; but purgatives, as they occasion a constitutional effect, may be made subservient to very important purposes. The effects of a purgative may depend upon three different modes of operation; viz.

1. *By stimulating the muscular fibres of the Intestines, whence their peristaltic motion is augmented, and the contents of the bowels more quickly and completely discharged.*
2. *By stimulating the exhalent vessels, terminating in the inner coat of the intestines, and the mouths of the excretory ducts of the mucous glands; by which an increased flow of serous fluids takes place from the former, and a more copious discharge of mucus from the latter; the effect of which is to render the fecal matter thinner and more abundant.*
3. *By stimulating the neighbouring viscera, as the Liver and Pancreas, so as to produce a more copious flow of their secretions into the intestines.*

It appears that different purgatives have very different powers in relation to the several modes of operation above specified; some medicines,

for example, urge the bowels to evacuate their contents by an imperceptible action upon the muscular fibres, and little or no increase of serous discharge attends the evacuation, such are *Manna*, *Sulphur*, and *Magnesia*; there would seem, moreover, to be certain bodies that have the property of increasing the peristaltic motions by operating as mechanical stimulants upon the fibre; it would not be difficult to derive many illustrations of this fact, from the history of herbivorous quadrupeds, and I have been disposed to consider the harsh and coarse texture which certain grasses assume in moist situations, as a wise provision in Nature to furnish an increased stimulus to the intestines of the animals who feed upon them, at a time when their diminished nutritive qualities must render such a result desirable; but the operation of a mechanical laxative may be demonstrated by a more familiar example; the addition of bran to our bread, constituting what is known by the name of *Brown bread*, induces laxative effects, merely from the mechanical friction of the rough particles, or scales of the bran, upon the inner coats of the intestines, for the wheat without the bran in bread is not particularly laxative.* Other cathartics stimulate the fibres to a much greater degree, and the effects are either confined to a part of the canal, or communicated to the whole range of the intestines, from the duodenum to the extremity of the rectum; *Aloes* will furnish a good example of the former, and *Colocynth* may be adduced as an instance of the latter mode of operation. Other cathartics, again, direct all their stimulus to the exhalent vessels, and are accordingly distinguished by the force with which they produce serous evacuations; and for which they were formerly denominated *Hydragogues*; such *Saline Purgatives*, and certain vegetable bodies to be hereafter described. Dr. Cullen has even supposed that some of these medicines may act solely in this way, and without increasing directly the peristaltic motion; there is, however, as Dr. Murray very justly remarks, no proof of such an hypothesis, and it seems scarcely probable that any substance should act as a stimulant on these vessels, without at the same time stimulating the mobile fibres of the intestines. *Mercurial Purgatives* appear to possess, in an eminent degree, the power of exciting the functions of the liver, and of thereby occasioning an influx of bile into the intestines. From the indications which cathartics are capable of fulfilling, their utility in many diseases must be apparent; the extent of their importance and value were, however, never justly appreciated until the valuable publication of Dr. Hamilton on this subject, in which the author has pointed out with more precision than any preceding writers had done, the therapeutic principles which should regulate their administration. His practice has clearly proved that a state of bowels may exist in many diseases, giving rise to a retention of feculent matter, which will not be obviated by the occasional administration of a purgative, but which requires a continuation of the alvine stimulant, until the healthy action of the bowels is re-established. Since this view of the subject has been adopted, numerous diseases have received alleviation from the use of purgatives that were formerly treated with a different class of remedies, and which were not supposed to have any connexion

* The practical application of this fact may be useful, and digestion, in certain cases, may be thus promoted by the simple expedient of changing the quality of our bread.

with the state of the alvine evacuations ; thus in fever, the peristaltic motion of the intestines is diminished, and their feculent contents are unduly retained, and perhaps, in part absorbed, becoming of course a source of morbid irritation ; this fact has been long understood, and the practice of administering cathartic medicines under such circumstances has been very generally adopted ; but until the publication of Dr. Hamilton, physicians were not aware of the necessity of carrying the plan to an extent beyond that of merely emptying the *primæ viæ*, and they did not continue the free use of these remedies through the whole progress of the disease.

Cathartics are essentially serviceable also in several diseases of the class NEUROSES, which are generally intimately connected with a morbid condition of the alimentary passages ; *Chorea* and *Hysteria*, have been very successfully treated in this manner. The diseases incident to puberty in both sexes are also best relieved by a course of purgative medicines, and their effects in *Chlorosis* have conferred upon many of them the specific title of EMMENAGOGUES.

But the therapeutical utility of cathartics extends beyond the mere feculent evacuations which they may occasion. In consequence of the stimulating action which some of them exert upon the exhalent vessels, they abstract a considerable portion of fluid from the general current of the circulation, and are, on that account, beneficial as *Anti-phlogistics*. For the same reason they may act as powerful promoters of absorption, for there exists an established relation between the powers of exhalation and absorption, so that when the action of one is increased, that of the other is augmented,

Certain Purgatives, as I have just stated, exert their influence upon the neighbouring organs, and are calculated not only to remove alvine *sordes*, but to detach and eliminate foul congestions from the biliary ducts and pores.

With such facts before us, it is impossible to concede to the opinion of Dr. Hamilton,* that the different species of purgative medicines *do not possess distinct powers over the different species of matter to be evacuated* ; on the contrary, there is reason for reviving the ancient theory, too inconsiderately abandoned, and which acknowledged these different distinctions in the operations of cathartic medicines, under the appropriate names of *Hydrargogues*, *Cholagogues*, &c.

The importance of cathartic medicines having been shown, and the distinctions in their modes of operation established, it only remains to say a few words upon the subject of their abuse. All the remedies of this class, but more especially those of considerable power, require caution in their administration, even in those diseases where they are indicated by peculiar symptoms, especially if there be any tendency to inflammation, or to extreme debility, although this latter symptom is often rather apparent than real, and is at once removed by the brisk operation upon the bowels ; during pregnancy, and immediately after delivery, and during the flow of the menses, the prudent practitioner will use a discretionary caution in their exhibition. The too frequent use of these

* Since the publication of this opinion, in the 5th edition of the *Pharmacologia*, Dr. Hamilton has honoured me by a letter on the subject, but I am still bound to confess that my sentiments remain unaltered.

medicines will induce marasmus, and render the bowels so morbidly irritable, that purging is easily excited by the ordinary stimulus of our aliments: while in some habits the contrary obtains, and the resource to which the valetudinarian flies for relief only increases the torpor of the intestines, and confirms his costiveness.

The mode of adapting, combining, and administering Cathartics, will present subjects for our future consideration.

EMMENAGOGUES :

Medicines which are capable of producing the Menstrual discharge.

As Amenorrhœa, or retention of the menses, is generally the effect of a morbid state of the body, it follows that remedies capable of acting as Emmenagogues can only be *relative* agents, unless indeed we are disposed to accede to the opinion so generally maintained in the writings of the older physicians, but now generally discarded, *that certain substances exert a specific* action upon the uterus*. It may certainly be asserted without fear of contradiction, that there are many substances which, when received into the stomach, have their stimulant operation more particularly determined to one part than to another; alkalies, for example, to the kidneys; cantharides to the bladder; mercury to the salivary glands, &c. Reasoning therefore by analogy, it was not unphilosophical to conclude, that similar medicines might exist with respect to the uterus; but experience has negatived the supposition, there being no proof of any of the substances styled *Emmenagogues* producing their effects by any *specific* influence upon the uterine system. If the term *Emmenagogue* be assumed conventionally, according to this view of the subject, it may be retained without any fear of error, otherwise it would be wiser to remove the name from our classification.

The suppression of the catamenia usually depends upon a debilitated state of the body, although it is sometimes the consequence of a plethoric diathesis; in the former cases tonics, in the latter venesection, may display the powers of an emmenagogue; upon which occasion, I have frequently derived the greatest benefit by cupping the patient upon the loins. Where the disease occurs in young women, about the age of puberty, it is very generally connected with extreme debility of the system; the preparations of iron, bark, and other invigorating medicines, are accordingly the most likely to succeed in its cure. Whereas in full florid habits, when the catamenia are suddenly suppressed, *Laxatives*, *Diaphoretics*, or *blood-letting*, afford the surest means of relief.

There are two other classes of medicines which may occasionally prove emmenagogue—**ACRID PURGATIVES** which act upon the rectum,

* The Melampodium, or Black Hellebore, was recommended as an agent of this description in the strongest terms, by Mead: Savin (*Juniperus Sabina*) is another vegetable which has been generally considered as a specific Emmenagogue; with some authors, the *Rubia Tinctorum* Madder; with others, the *sinapis alba*, have been regarded as remedies of this nature: and lately *Polygala Senega* has been extolled by the American practitioners; in modern times, however, few substances have been more confidently recommended as uterine stimulants than the *Secale Cornutum*, or Ergot, but of which I have no practical knowledge.

and hence by *contiguous sympathy* upon the uterus, as *Aloes*, &c., and **STIMULATING DIURETICS**, as *Cantharides*, the *Turpentine*s, &c., which are supposed to excite the womb, sympathetically, by their stimulus upon the bladder. Nor is the advantageous influence of mercury to be overlooked, which, in cases of morbid action in the secreting functions, proves a Herulean remedy.

DIURETICS:

Medicines which increase the urinary discharge.

This effect is produced by very different modes of operation; and as some of them are mutually incompatible with each other, it is essential that we should understand the *modus operandi* of each individual of which the class consists, in order that we may direct its application with precision.

There is undoubtedly no tribe of medicinal agents more precarious in their nature and effects than that of Diuretics; this fact in a great measure depends upon the uncontrollable character of the organs upon which they act, but it must at the same time be admitted, that their failure frequently depends upon their modes of operation being directly incompatible with the state of the system at the time of their administration.

The following classification may perhaps serve to bring together the principal facts which are known upon the subject, and at the same time to display them in an order which is calculated to demonstrate their practical bearings and relations.

DIURETICS,

ARRANGED ACCORDING TO THEIR SUPPOSED MODES OF OPERATION.

CL: I.—MEDICINES WHICH ACT *PRIMARILY* ON THE URINARY ORGANS.

1. *By stimulating the secreting vessels of the kidneys, BY CONTACT.*

a The medicines not undergoing any decomposition *in transitu*.

- | | |
|-------------------------------|-------------------------------|
| 1. <i>Potassa.</i> | 4. <i>Juniperus Communis.</i> |
| 2. <i>Potassæ Nitræ.</i> | 5. <i>Cantharides.</i> |
| 3. <i>Oleum Terebinthinæ.</i> | |

b The Medicines undergoing decomposition in transitu.

- | | |
|----------------------------------|----------------------------------|
| 1. <i>Potassæ Acetas.</i> | 4. <i>Colchicum Autumnale.</i> |
| 2. <i>Potassæ Super-tartras.</i> | 5. <i>Copaifera Officinalis.</i> |
| 3. <i>Scilla Maritima.</i> | 6. <i>Spartii Cacumina.</i> |

CL : II.—MEDICINES WHICH ACT PRIMARILY ON THE ABSORBENTS, AND SECONDARILY ON THE KIDNEYS.

Mercury.

CL : III.—MEDICINES WHICH ACT PRIMARILY ON THE STOMACH AND PRIMÆ VIÆ, AND SECONDARILY ON THE ABSORBENTS.

1. *By diminishing arterial action, and increasing that of Absorption.*

1. *Digitalis.* 2. *Nicotiana.*

2. *By increasing the tone of the body in general, and that of the absorbent system in particular.*

Bitter Tonics, &c., &c.

3. *By producing Catharsis, and thereby increasing the action of the Exhalents directly, and that of the Absorbents indirectly.*

1. *Elaterium.* 2. *Jalap, &c., &c.*

I. OF MEDICINES WHICH ACT PRIMARILY ON THE URINARY ORGANS.

1. *By stimulating the secreting vessels of the kidneys, by actual contact.*

a The substance not undergoing any decomposition in transitu.

It is easy to imagine that any substance which is capable of entering the current of the circulation, and of stimulating the kidneys by a direct application to their discerning vessels, may occasion a more copious urinary discharge; in this manner the different saline* preparations,

* Saline bodies would appear to be the peculiar stimuli of these organs, the principal use of which is to separate such saline matter from the blood, as would otherwise accumulate in the system. That these saline diuretics actually pass off by the kidneys, may be satisfactorily shown by an examination of the urine, in which the bodies in question may be chymically detected. Let any person swallow several doses of Nitre, taking care that the bowels are not disturbed by the medicine, and he will find by dipping some paper into his urine, and afterwards drying it, that it will deflagrate, and indicate the presence of nitre.

Potass, Soda, Nitrate of Potass, &c., are brought to the kidneys in the course of the circulation, and exciting the vessels to an increased action, promote the secretion of a larger proportion of watery fluid from the blood, in consequence of which, the absorbents are indirectly stimulated in order to supply the deficiency, and in this manner dropsical swellings are reduced.

Water, as a simple diluent, will promote the action of the kidneys, and it is very judiciously remarked by Dr. Cullen, that by withholding the use of fluids in dropsy, you will diminish the quantity of fluids secreted, and allow the secretories of the kidneys to fall into a state of inactivity and collapse. This is a sufficient answer to those who defend the practice of enjoining an abstinence of all drinks in dropsy.

b. *The diuretic remedy undergoing decomposition IN TRANSITU.*

The digestive organs appear to possess the power of readily decomposing all saline compounds into which *vegetable* acids enter as ingredients, and of eliminating their alkaline base, which, being in the course of the circulation, carried to the kidneys, excites them into action, and promotes the excretion of urine; and it is probably in this way that the *Acetate, Citrate, Supertartrate*, and other analogous combinations of *Potass* and *Soda* prove diuretic; on the other hand, it is equally evident that salts containing the *mineral* acids are not under the control of the decomposing powers of the *chylo-poietic* organs, and consequently do not undergo any changes *in transitu*, although some of these salts, as I have just stated, especially the more soluble ones, are absorbed entire, and prove diuretic. *Sulphate of Potass*, from its insolubility, is not readily absorbed, and its composition will not allow the developement of its base; we perceive therefore that it has not any tendency to produce an influence upon the urinary secretion.

Certain vegetable bodies likewise appear to occasion diuresis by a similar mode of operation, and it is worthy of notice that these medicines generally contain a bitter principle, which is probably separated by the analyzing powers of the stomach; as exemplified in *Scilla maritima*; *Colchicum autumnale*; *Lactuca Virosa*; *Gratiola officinalis*; *Spartium Scoparium* (Summitates); *Juniperus communis*; *Copaifera Officinalis* (Balsamum,) &c. The stimulant powers of a bitter vegetable principle upon the *primæ viæ*, have already been fully noticed under the consideration of *Tonics*, (page 80,) and it is reasonable to suppose, that an analogous principle, if introduced into the circulation, may exert a corresponding impulse upon the organs with which it comes into contact.

It particularly merits attention, that the diuretic operation of any body that acts by being absorbed, is at once suspended if catharsis follows its administration, whether in consequence of the largeness of its dose, its increased solubility, or from the effect of its combination with some purgative; for it is a law, that the processes of assimilation, and absorption from the duodenum, are arrested, or very imperfectly performed during any alvine excitement; the different effects of the saline compounds of the alkalis with tartaric acid, elucidate the truth of this law in a very striking manner—thus, *Super-tartrate of Potass*, or Cream of Tartar, in well regulated doses, acts, as we all know, upon the

kidneys; the tartaric acid being, as I suppose in this case, abstracted and assimilated by the digestive process, and at the same time the alkaline base (Potass) eliminated, and subsequently carried into the circulation; but if we increase the solubility of the compound, by reducing it to the state of a neutral tartrate (*soluble tartar*), or by combining it with *Boracic acid*, or some body that has a similar effect; or what is equivalent to it, if we so increase the dose* of the *cream of tartar*, that full catharsis follows its administration, then diuresis will not ensue, since no decomposition can take place under such circumstances, nor can it be carried by absorption into the circulation. *Nitre* and those salts which are carried to the kidneys without previous decomposition *in transitu*, are subject to the same law; for, if we combine them with purgatives, their presence can no longer be recognized in the urine, as I have ascertained by experiment. *Oil of Turpentine*, in doses of two fluid-drachms, may so excite the urinary organs as to produce even bloody urine; whereas a fluid-ounce will scarcely occasion any apparent influence upon those functions, because the increased dose acts upon the bowels, and consequently prevents its passage into the circulation.

Sulphate of Magnesia does not readily produce any diuresis, because it operates upon the bowels, but the experiments of Vitet and Bracy Clarke have shown, that if this saline compound be administered to the horse, whose bowels are not easily affected by purgatives, it acts powerfully upon the kidneys;† and I will take occasion in this place to observe that, on account of the inirritability of the bowels of the horse, diuretic medicines are more certain in their operation, than in the human subject; a fact which, in itself, shows the importance of attending to the state of the bowels, during a course of those diuretics which require to be absorbed before they can produce their specific effects.

Equally necessary is it to attend to the state of the vessels of the skin, for if during the administration of a Diuretic, these vessels be excited by external warmth, its action may be diverted from the urinary organs to the exhalents on the surface, and occasion diaphoresis; but if the surface of the body be kept cool, this diversion will not occur: so greatly indeed does cooling the surface determine to the kidneys, that the usual diaphoretic medicines may, by an attention to this circumstance, be converted into powerful diuretics.

C. II. MEDICINES WHICH ACT *Primarily* ON THE ABSORBENTS, AND *Secondarily* ON THE KIDNEYS.

It has been shown, in the former division, that by increasing the action of the kidneys, we diminish the quantity of water in the blood, and consequently occasion an extraordinary action of the absorbents to supply the deficiency, whence dropsical accumulations disappear; it remains to be stated that an operation, which may be considered the converse of

* The *Secondary* Diuresis which sometimes takes place under such circumstances, and succeeds Catharsis, may offer an apparent exception to this law; but this must not be confounded with that which is the result of a *primary* action upon the urinary organs by the absorption, and consequent contact, of a specific stimulant.

† Certain mineral waters, containing cathartic salts in a state of extreme dilution, if insufficient to excite the bowels, sometimes pass off by the kidneys; an effect which can always be prevented by accompanying their exhibition with some laxative.

the one just described, is not unfrequently established; the absorbent vessels, in this case, are first roused to extraordinary action, and the blood therefore becomes surcharged with serous matter, in consequence of which the kidneys are stimulated, and it is eliminated through the urinary passages: so that in the former case the absorbent may be said to be called into action by the kidneys, while in the latter, the kidneys are, obviously, subservient to the increased energy of the absorbent system. The preparations of Mercury are perhaps the only medicinal bodies which we can strictly consider as specific stimulants to the absorbent system; and of their power in directly acting upon these organs there are such ample proofs, that it is unnecessary to adduce any additional evidence upon the subject. In instances of increased absorption from the agency of other medicines, the effect must be considered as rather arising from their *secondary* than primary operations; the most important of which will constitute objects of inquiry in the succeeding divisions of the subject.

C. III. MEDICINES WHICH ACT *Primarily* ON THE STOMACH OR SYSTEM, AND *Secondarily* ON THE URINARY ORGANS.

A Diuretic effect is very frequently occasioned by substances which act on the stomach and *primæ viæ*, producing a peculiar state of these organs, which *sympathetically* affects the whole body, and more particularly the absorbent system, and the vessels concerned in the secretion of urine from the blood. As this primary influence upon the stomach, and the effects to which it gives rise in remote parts, are very different in their character, according to the nature of the remedy employed, and the state of the system at the time of its administration; the present attempt to investigate and generalize these relations, and to adopt them as the basis of a classification, may ultimately lead the practitioner to some distinctions of practical utility.

1. *By diminishing Arterial Action and increasing that of Absorption.*

It would appear that the action of the vessels employed in the circulation of the blood, and the energy of the absorbents are, to a certain extent, antagonist powers; the experiments of Majendie demonstrate that the absorption of a poisonous substance is retarded by a plethoric, and accelerated by a depleted state of the sanguineous system; the fact is practically established by numerous phenomena in pathology. Dr. Blackall has very satisfactorily shown the existence which subsists between increased arterial action and diminished absorption. Hence it follows that remedies capable of controlling the circulation may affect the activity of absorption, increase diuresis, and cure dropsy; in this manner the *Digitalis Purpurea* acts as a sorbefacient, and it may be remarked that it seldom or never produces its diuretic effects, without a concomitant reduction of the frequency of the pulse; its power too appears only when it is administered in dropsy; in a state of health it will reduce the pulse, but not increase the discharge of urine. Tobacco has also somewhat analogous powers in promoting absorption, and its operation is accompanied with a corresponding depression of vascular action.

Venesection, upon the same principle, may occasion, in certain cases of dropsy, a discharge of the accumulated fluid.

2. *By increasing the tone of the body in general, and that of the Absorbent System in particular.*

That diminished absorption, and the consequent accumulation of serous fluids in the cellular texture, and different cavities, frequently depends upon general debility is very obvious, whence fevers, whether of the intermittent or continued kind, which have been long protracted, are followed by *œdematous* swellings. In states of extreme debility the exhalent vessels would seem, from their laxity, to permit the thinner parts of the blood to pass too readily through them; this is proved by the circumstance that palsied limbs, in which such a laxity may be presumed to exist, are frequently affected with *œdema*, and the truth of this explanation is still farther corroborated by the advantages which accrue on these occasions from the mechanical support of pressure from bandages. In such cases, those remedies which are capable of renovating the vigour of the body can alone prove of any signal service. Dr. Blackall presents us with an illustrative case of this nature, on the authority of Mr. Johnson of Exeter, in which the tonic powers of well fermented bread occasioned in the space of a few hours an effect so powerfully diuretic, as to have cured the sailors on board the Asia East Indiaman, who had been attacked with the Dropsy, in consequence of the use of damaged Rice.

Thus then do Diuretics, in some cases, CURE BY EVACUATION, while in others, as in the instance above cited, they EVACUATE BY CURING.

A case has lately occurred in my own practice, which not only affords a striking illustration of the present views, but is well calculated to convey to the inexperienced practitioner a very instructive lesson of caution. A man of the age of thirty-five, of the most dissolute habits, was attacked after a debauch of several days' continuance, with inflammatory symptoms in the chest; a very large quantity of blood was suddenly abstracted, and the bleeding was repeated after the interval of a few hours. The respiration became laborious, and I was desired to visit the patient; I found that little or no urine had been evacuated since the attack, and that there were evident symptoms of effusion, the legs were swollen, and the difficulty of breathing was rapidly increasing. Under these circumstances I directed a large dose of *Ammonia* with some stimulating diuretics, which were to be repeated at short intervals. On the following day the distressing symptoms had subsided, a large quantity of urine had passed, and the patient expressed himself greatly relieved; unfortunately, however, in consequence of a slight increase of his distress in the evening, an injudicious friend in attendance, took more blood from the arm—the dropsical effusions rapidly increased, and life was extinguished in the course of three days by confirmed Hydrothorax.

3. *By producing Catharsis, and thereby increasing the action of the Exhalents directly, and that of the Absorbents indirectly.*

It has been already stated, under the consideration of Cathartics, that

certain medicines of that class excite the exhalents of the alimentary canal, and occasion a very copious discharge of serous matter; by this operation the blood is deprived of a large portion of water, and the absorbents are thus indirectly stimulated to supply the deficiency; *Elaeterium*, and some other *hydragogue* cathartics, may be thus employed with extraordinary success for the cure of certain forms of Dropsy, where the vital powers of the patient can sustain the violence of the remedy;—in the whole circle of medicinal operations there is nothing more wonderful than this, that an impression made on the internal surface of the *primæ viæ*, by a few participles of matter, should thus convey by magic as it were, an impulse to the most remote extremities, rousing their absorbents to action; and, in case of *œdema* there, awakening the sleeping energies of these vessels, which like millions of pumps at work, transmit the morbid fluid to the intestines and urinary passages, effecting a detumescence of the hydropic limbs in the course of a few hours, and thus affording a striking illustration of the sympathetic action of medicines, and an instructive example of the operation of those of the sorbefacient class.*

The observations which I have thus offered will lead the practitioner to select the particular diuretic which is best calculated to fulfil the indications of each individual case; and they will at the same time point out those which cannot be administered in combination, without a violation of the law of medicinal compatibility. With respect to the general efficacy of these medicines it may be stated, that where the disease originates from *organic* affections of the chylopoietic viscera, it will not be cured by the mere evacuation of the water by diuretics: but that where it has taken place from diminished absorption, these remedies may be reasonably expected to effect a cure.

DIAPHORETICS.

The term *Diaphoretic* has been applied to those medicines which increase the natural exhalation of the skin, and when they act so powerfully as to occasion sweating, they have been commonly distinguished by the name of *Sudorifics*, but as no difference exists between these remedies, but in the degree of force with which they act, we may very properly comprehend the whole under the general title of Diaphoretics: the fluid effused is also in both cases similar, but in the one it is discharged more slowly, and is carried off by the conducting† power of the air, in

* See Sir Gilbert Blane's Medical Logic, Edit. 2, page 190.

† The cutaneous discharge is very materially modified by the state of the atmosphere, in its relations to moisture and dryness: when the air contains much moisture it is a bad conductor of the perspirable matter, which, therefore, instead of being carried off in an insensible form, is condensed upon the surface; hence we appear to perspire greatly upon the slightest exercise, whereas the cuticular discharge is at such times absolutely less. We have all experienced the sensation of heat, and disposition to sweating, during the moist weather which so frequently occurs in this country in April and May, the wind being at the time stationary at southwest or south. On the contrary, during the prevalence of an east wind, the most violent exercise will scarcely prove diaphoretic, and yet the quantity of cutaneous exhalation is far greater than during that state of atmosphere when the slightest exercise deluges us with perspirable matter.

the insensible form of vapour, while in the other case it is so copiously effused from the exhalent vessels, as to appear in the liquid form.

As obstructed perspiration may depend upon very different, and even opposite states of the system, so may the most adverse medicines fall under the denomination of diaphoretic remedies.

In some affections, a deficient diaphoresis may be associated with increased vascular action, and in others, with a slow languid circulation.

Diaphoretics may be considered as operating, either by directly stimulating the cutaneous capillaries ;—by increasing the general action of the vascular system ;—by relaxing the morbidly constricted mouths of the perspiratory vessels ;—or, lastly, by producing at once both the latter of these effects.

In conformity with the plan adopted on other occasions, I shall proceed to investigate the powers of this class of medicines, according to their supposed modes of operation.

DIAPHORETICS

Occasion their effects—

I. BY STIMULATING THE CUTANEOUS CAPILLARIES.

A. By external application.

The Stimulus of Heat, Frictions, &c.

B. By medicines which enter the circulation and stimulate the cutaneous vessels by contact.

Mercurials—sulphur.

C. By Medicines which act on the surface sympathetically, through the medium of the Stomach.

Cold Drinks, &c.

II. BY INCREASING THE GENERAL ACTION OF THE VASCULAR SYSTEM.

Violent Exercise—Ammonia—Guaiacum—Alcohol—Warm Bath.

III. BY RELAXING THE MORBIDLY CONSTRICTED MOUTHS OF THE PERSPIRATORY VESSELS.

Antimonials—Cold Affusion—Venesection—Saline Diaphoretics.

The action of the cutaneous vessels may be augmented by heat, without necessarily increasing, at the same time, that of the heart and arteries, hence it is that heat is, of itself, often sufficient to produce sweating, while it generally accelerates the operation of a sudorific medicine. To this general proposition, however, there are some very important exceptions ; and, indeed, in certain conditions of the cutaneous surface, the stimulus of heat will be even found to impede, rather than to promote, diaphoresis ; thus, in the last hot stage of a continued fever, there would seem to exist a peculiar constriction of the perspiratory vessels, accompanied with extreme heat and dryness. In such a state, remedies of the third class must be applied, or conjoined with those of the former. The warm bath may be said to partake of *all* the qualities upon

which our classification is founded; it will stimulate the cutaneous capillaries,—increase vascular action, generally, and, by its emollient powers, relax the morbidly constricted mouths of the perspiratory vessels. During the ardent heat of fever, the external application of cold is the most efficient sudorific, as the valuable reports of Dr. Currie have very satisfactorily established.

Although the *external* application of cold was not often employed in the hot stage of fever, until within the last thirty years, yet the administration of cold *drinks* appears to have been practised by the ancients, as an expedient to produce perspiration. Galen, and his immediate disciples, as well as the physicians of the sixteenth century, seem to have frequently administered cold water for the purpose of exciting sweat in fevers.* Celsus also describes the beneficial effects which arise from copious draughts of cold water in ardent fevers, “*fereque post longam sitim et vigiliam, post multam satietatem, post infractum calorem, plenus somnus venit, per quem ingens sudor effunditur, idque præsentissimum auxilium est.*”† Cold water, when introduced into the stomach in the hot stage of fever, must produce its diaphoretic effect through the sympathetic relation which subsists between that organ and the skin. Nauseating doses of *Antimony*, and of other emetics, occasion a relaxation of the surface from the same mode of operation, and in this latter case, if the force of the circulation be at the same time increased by tepid diluents, the diaphoretic effect is more certain and considerable.

Alcohol, *Guaiacum*, and other powerful stimulants, produce their effects by merely accelerating the circulation; but in employing such remedies for the purpose of exciting sweat, we must be careful to adapt them to the circumstances of the case, and to the degree of action which prevails. In all febrile diseases attended with much increased heat, or connected with local inflammation, diaphoretics of this description must be very cautiously administered, for by accelerating the circulation they might counteract any benefit which they would otherwise confer by relaxing the vessels of the skin. In the whole history of medical opinions there is scarcely a theory which has proved so fatal in its practical applications as that maintained by Van Helmont, and his disciples, viz. that *acute diseases were to be cured by expelling some morbid matter, after its proper concoction*—a theory which suggested the administration of the most stimulating sudorifics, together with high temperature‡ in every grade of febrile exacerbation. The fatal effects of such a practice during the seventeenth, and early parts of the eighteenth centuries, are incalculable, and may be very satisfactorily contrasted with the beneficial results which have accrued, in the same diseases, in the present age, from the use of diaphoretics of the refrigerant kind.

Saline Diaphoretics, as they readily pass with the chyle, may be supposed to enter the circulation, and be thus brought to act, directly, on the cutaneous vessels; at the same time it seems extremely probable

* LOMMIUS de Febris.

† De Medicina. Lib. iii. c. 7.

‡ This practice is still cherished by the vulgar, especially in some of the more remote districts of the kingdom. It is with this view that the Cornish nurse continues to keep down the excess of population, by administering Gin and Treacle, in her smoky chimney corner, to children labouring under measles, in order to throw out the eruption.

that such remedies may also occasion an impression on the stomach, which is sympathetically communicated to the vessels of the skin; they have undoubtedly little or no influence on the general vascular system, and neither augment the force nor the velocity of the circulating current.

It is not, however, in febrile affections alone that this class of remedies proves highly beneficial; the very intimate sympathetic connexion which subsists between the functions of the lungs and skin, renders the use of such medicines particularly advantageous in the cure of the diseases incident to the former of these organs; a fact upon which we shall hereafter offer some remarks under the history of *Expectorants*.

So again, in the treatment of bowel affections, in consequence of the intimate relation which exists between the cutaneous capillaries and those of the internal organs, gentle diaphoretics offer a valuable resource in their cure. How frequently do Diarrhœa, Enteritis, &c., ensue from the sudden suppression of perspiration by cold?

From the influence which these medicines exert upon the extreme vessels of the skin, they are also highly serviceable in various obstinate cutaneous affections, as *Herpes*, *Lepra*, &c.

As evacuating the serous part of the blood must necessarily have an indirect effect in promoting absorption, *Sudorifics* have been occasionally exhibited in dropsy, especially in that form of the disease called *Anasarca*. It has been already observed that cases too frequently occur in which the discharge of urine cannot be increased by art; upon such occasions practitioners have sometimes had recourse to a trial of *Sudorifics*,* but from the great difficulty which generally exists in exciting sweating in such affections, the indication has rarely been fulfilled. Where however a sudorific does succeed, it is less liable to debilitate than the other alternative of a drastic purgative.

There is still another point of view in which the therapeutic importance of Diaphoretics may be considered. It is generally acknowledged that by cutaneous transpiration a portion of excrementitious matter is ejected from the system; hence by the failure or imperfect performance of this function, a deleterious fluid is retained which may give origin to disease; to such a cause may perhaps be attributed the generation of Calculi, and other diseases of the urinary system, as we shall have occasion to notice under the head of *Lithonthyptics*.

The increased efficacy which these medicines derive from combination with each other, will form a subject of interesting inquiry in the succeeding essay.

* *M. Du Hamel* has recorded the cases of two countrymen, considerably advanced in life, who were cured of Dropsy by remaining for some time in a baker's oven, soon after the bread had been drawn. *Varrikillan*, ninth Caliph of the race of the *Abasides*, is said to have been cured by a nearly similar method. His physician caused him to enter a lime-kiln soon after the lime had been removed, when in the course of a few days he was totally cured of his dropsy. The ancients excited sweating in this disease, by burying the patient up to the neck in heated sand or ashes (*Celsus*, Lib. iii. c. 30.) and *Lysons* cured cases by placing his patients in rooms heated to a very high temperature.

In the history of the Royal Academy of Sciences, for 1703, a case is related of a woman, who, tired out by the protracted Dropsy under which her husband laboured, charitably administered to him a very large dose of opium, with the intention of dispatching him, but the medicine immediately produced such a copious sweat that it restored him to health!

EXPECTORANTS :

Medicines which are supposed to be capable of facilitating the excretion of mucus from the breast, *expectore*, that is, from the trachea, and cells and passages of the lungs.

If the term *Expectorant* be intended to express a medicinal substance which has the power of promoting the expulsion of fluid from the lungs, by some *specification* on the parts concerned, we can have no hesitation in at once rejecting the word, and denying the existence of such remedies : if however the term be received, conventionally, as comprehending all those substances which are capable, according to the state of the system in each particular case, of producing expectoration, it will be extremely proper to recognize, and practically useful to retain, such a class of medicinal agents. In order that their *modus operandi* may be correctly understood, the following classification is submitted to the reader.

A CLASSIFICATION OF EXPECTORANTS,

According to their supposed modes of operation.

CL: I.—MEDICINES WHICH INCREASE PULMONARY EXHALATION, AND THEREBY DILUTE THE MUCUS IN THE FOLLICLES OF THE LUNGS.

- a. By removing constriction of the Pulmonary Exhalant vessels.

Blisters.
Venesection.
Nauseants.

- b. By stimulating these vessels by the actual contact of a medicinal substance.

Allium. *Fœtid Gums.*
Scilla?
The different Balsams.

- c. By stimulating the top of the trachea, and thereby increasing the action of the exhalant vessels of the lungs, by a species of *Contiguous Sympathy*.

Stimulating Lozenges, Linctusses, the Inhalation of certain vapours, &c.

CL: II.—MEDICINES WHICH DIMINISH THE INORDINATE FLOW OF FLUID INTO THE LUNGS, AND RENDER THE EXPECTORATION OF THE REMAINDER MORE EASY.

- a. By removing the debility of the Exhalants.
Sulphate of Zinc. *Bitter Tonics.*

- b. By increasing the power of the Absorbents.
Digitalis. *Nicotiana.*

- c. By determining to the skin by gentle diaphoresis.
Tartarized Antimony.

- d. By exciting serous discharges from the bowels.
Saline Purgatives.

CL: III.—MEDICINES WHICH OPERATE, MECHANICALLY IN PROMOTING THE REJECTION OF ACCUMULATED MUCUS.

- a. By stimulating the muscles of Respiration.
Ammonia.
- b. By exciting vomiting, and thereby compressing the thoracic viscera.
Emetics.

I. OF MEDICINES WHICH INCREASE PULMONARY EXHALATION.

- a. *By removing constriction of the Pulmonary Exhalant vessels.*

There can be no doubt but that, in certain states of disease, the exhalants of the lungs, like those of the skin, are affected by a spasmodic constriction, in consequence of which the usual quantity of fluid for the lubrication of these parts, is not effused, whence a train of morbid phenomena arise; this appears to happen in *Pneumonia Asthma*, and certain other diseases of the pulmonary organs. In order to remove such a constriction, remedies of the Antispasmodic class may be exhibited with advantage: nauseating doses of Tartarized Antimony, or of Ipecacuanha, are likewise calculated to fulfil the same indication, by an operation analogous to that by which Diaphoresis is produced. If the term might be allowed we should call such remedies *Pulmonary Diaphoretics*. It is in this way that Venesection, Blisters, and other anti-phlogistic remedies, may in certain states of the lungs restore a healthy excretion from these vessels.

- b. *By stimulating the Pulmonary Exhalants, by the actual contact of a medicinal substance.*

There certainly appear to be substances which enter the circulation, and are more peculiarly determined to the pulmonary vessels, since their odour is to be distinctly recognized in the air that is expired. *Garlic* may be adduced as an example of this kind; so penetrating is its odorous principle, that if it be only applied to the soles of the feet it may be perceived in the breath. Such substances may stimulate the exhalant vessels through which they pass, and by this stimulus the secretion may be increased, and the mucus contained in the follicles diluted, so as to be poured out in a less viscid form, and consequently in a state to be more easily brought up by expectoration.

- c. *By stimulating the top of the trachea, and thereby increasing the activity of the Exhalant vessels of the lungs, by a species of contiguous sympathy.*

The salutary operation of those various remedies, which are allowed to pass slowly over the fauces, sufficiently establish the fact which is here

announced. In this manner I apprehend that much benefit may arise from the use of a *Linctus*, and I am satisfied from experience that certain cases of hoarseness are to be frequently removed by such an application of stimulating syrups.

The inhalation of certain vapours will also enable us to make a more direct application to these parts; as, however, it is my intention to dedicate a chapter to the consideration of this form of remedy, it is unnecessary to dwell upon it in this place.

II. OF MEDICINES WHICH DIMINISH THE INORDINATE FLOW OF FLUID INTO THE LUNGS.

a. By removing the debility of the Exhalants.

It not unfrequently occurs in persons either debilitated by age or disease, that the exhalant vessels of the lungs lose their tone, and pour out a larger quantity of fluid than is necessary for the lubrication of these organs; this is particularly observable in the disease called *humoral asthma*, and in the catarrh of old persons: if this excess be restrained by strengthening the tone of the system generally, or by astringing these vessels in particular, the expectoration of the remainder will be rendered much more easy: according to my experience, *sulphate of zinc* displays considerable powers in moderating this effusion of fluid, and it appears to produce this effect by increasing the tone of the exhalant vessels of the lungs; several medicines also, which are included in the former division of this classification, may, by stimulating these organs, not only promote the exhalation when it is too scanty, but repress it when it is too abundant.

b. By increasing the power of the Absorbents.

In some cases, the mucous inundation may not depend upon any fault in the exhalants, but upon a torpid state of the pulmonary absorbents: our remedy for this evil is to be found amongst that class of medicines which have the power of promoting absorption, as small doses of some mercurial preparation, *Digitalis*, and perhaps *Nicotiana*, &c.

c. By determining to the skin by a gentle diaphoresis.

It is evident that an increase of the cutaneous exhalation is generally attended with a relative diminution in the other serous excretions of body: this is so obvious with respect to our urinary discharge, that every person must have noticed the variation of its quantity at different seasons of the year: in like manner the exhalation from the lungs, although less capable of becoming an object of observation, is not less affected by the state of the cutaneous discharge; hence medicines capable of promoting it, are calculated to diminish the quantity of serous exhalation from the lungs; and it is upon this principle, that well regulated doses of the compound powder of *Ipecacuan*, frequently furnish the oppressed asthmatic with a valuable resource.

d. By exciting serous discharges from the bowels.

Upon the principle announced in the preceding section, the operation of a saline cathartic may relieve the pulmonary organs when loaded with a preternatural accumulation of fluid, and consequently assist expectoration. On the contrary, if the exhalation be deficient, this class of remedies may increase pulmonary irritation, and check expectoration, a fact which coincides with the concurrent testimony of many able practitioners.

III. OF MEDICINES WHICH OPERATE *mechanically*.

a. By imparting vigour to the respiratory muscles, engaged in the act of expectorating.

It must be admitted that, to a certain extent, expectoration is a voluntary operation, connected with the action of a variety of muscles, which in a state of extreme debility are not easily excited into action: every practitioner must have noticed this fact during the treatment of the coughs of exhausted patients, and have witnessed the distress necessarily arising from it; in this condition, the exhibition of a stimulant may so far renew the exhausted excitability of these organs, as to enable them to undergo the necessary exertions.

b. By compressing the thoracic viscera, through the operation of an emetic.

The beneficial results which frequently attend the concussion of an emetic, in cases of mucous accumulations in the lungs, are too well known and understood to require much elucidation: in the act of vomiting, the thoracic viscera are evidently compressed, the neighbouring muscles are also called into strong action, and both expiration and inspiration are thus rendered more forcible, and the expulsion of mucus from the cavity of the lungs necessarily accomplished.

The safety and expediency of such a resource must, however, in each particular case be left to the discretion of the medical practitioner,

Besides the remedies above enumerated, there are some others which afford relief in certain coughs, and have therefore in popular medicine, been considered as *Expectorants*; but their operation, if they exert any, is to be explained upon principles altogether different from that of facilitating expectoration, and will more properly fall under the head of *Demulcents*.

Atmospheric changes, in relation to moisture and dryness, deserve some notice before we conclude the history of expectorant agents: the subject teems with curious and important facts, and the advantages which the asthmatic patient derives from such changes merit farther investigation. That the lungs are constantly giving off aqueous vapour is made evident by condensing the expired air on a cold surface of glass or metal; and it is easy to imagine that when the atmosphere is saturated with moisture, its power of conducting off this vapour will be proportionally diminished, and that an accumulation of fluid may thus take place in the

lungs ; on the other hand, we may suppose the air to be so dry as to have an increased capacity for moisture, and to carry off the expired vapour with preternatural avidity : in either of these cases, the excretions from the lungs will be materially influenced ; whether to the benefit or disadvantage of the patient will depend, in each particular instance, upon the nature of the disease under which he suffers. I have known a person who could breathe with more freedom in the thick fogs of the metropolis than in the pure air of a mountainous region, and it would not be difficult to adduce many examples in illustration of a diametrically opposite constitution of the pulmonary organs.

From the same cause we may frequently observe remarkable changes occur in the character of a cough, at the breaking up of a frost ; in some cases the expectoration will be checked, and in others promoted, by a sudden change from a dry to a moist atmosphere. Can a more instructive illustration be offered of that important fact, which I have been labouring in every page to impress upon the mind of the young practitioner, that *remedies are only relative agents* ?

In the course of considerable experience in the treatment of pulmonary complaints, and in the influence of climate and seasons upon them, I have repeatedly observed the rapid transition from moisture to dryness to occasion very remarkable effects upon the disease ; and I much question whether an attention to such a condition of the atmosphere does not deserve as much consideration in the election of a suitable place of residence for such invalids, as the more obvious circumstance of temperature. I have been long in the habit of recommending to persons confined in artificially warmed apartments, to evaporate a certain portion of water, whenever the external air has become excessively dry by the prevalence of the northeast winds, which so frequently infest this island during the months of Spring ; and the most marked advantage has attended the practice. But in such cases the practitioner must ever be guided by the symptoms of each particular case ; it would be worse than useless to lay down any general precept for his guidance. We cannot then be surprised that such a difference of opinion should exist amongst practitioners of equal eminence, respecting the influence of a marine atmosphere ; some advocating its advantages to the pulmonary invalid, and others maintaining with equal confidence the injurious tendency of such localities ; each party appeals to *experience* in justification of his opinion, and with equal candour and justice ; but the cases from the results of which the medical inference has been drawn, however parallel they may have appeared, differed in those essential points to which we have alluded, and upon which the question of climate would seem to turn. There is another circumstance connected with the subject of atmospheric moisture, which it is also essential to remember,—that the air gains a considerable increase in its power of conducting caloric, by becoming saturated with aqueous vapour ; thus, when a thaw takes place, and the thermometer rises a few degrees above 32°, the air, instead of impressing us with the sensation of increased temperature, actually appears much colder.

SIALOGOGUES :

Substances which increase the salivary* discharge. This class comprehends two orders of medicines, viz.

1st. Those which increase the salivary excretion by *external* application to the secreting vessels, by mastication, as the following acrimonious and pungent substances, *Anthemis Pyrethrum*; *Colchearia Armoracia*; *Daphne Mezereum*; *Nicotiana Tabacum*, &c.

2d. Those whose *internal* exhibition affects these organs through the medium of the circulation, of which *Mercury* is the only true example; for all the preparations of this metal, when administered in certain quantities, produce salivation.

The acrid Sialogogues, or Masticatories, by stimulating the excretory ducts, and increasing the secretion of saliva, sometimes relieve the pain of toothach, and are commonly resorted to for that purpose; they are besides supposed capable of relieving other congestions, or inflammatory dispositions, in more remote parts of the head, by the derivation they occasion from the neighbouring vessels, especially the branches of the external carotid.

Mercury, in its metallic state,† is perfectly inert, and does not exert any influence whatever upon the living body; this fact is sufficient, if any serious refutation were necessary, to overturn the theory which attributes its sialogogue property to the gravity of its particles, by which "it is disposed to retain the *direct line* in which it is propelled from the heart, and is therefore more certainly determined to the vessels of the head." It has been also supposed to act by diminishing the *lensor* of the blood, and disposing it to pass more easily into the salivary glands, so as to increase their secretion; equally gratuitous and improbable are the chymical hypotheses which have been offered to explain this curious and singular property; Dr. Cullen endeavoured to solve the problem, by supposing that "*Mercury has a particular disposition to unite with ammoniacal salts, and that such salts are disposed to pass off by the salivary glands more copiously than by any other excretion.*" Dr. Murray, however, very justly remarks that mercury has not any peculiar tendency of this kind; and that if it had, these salts are not more abundant in the saliva, than in some other secretions. Dr. Murray then proceeds to submit a theory which he considers better calculated to explain the phenomenon; he observes, that the urine appears more peculiarly designed to convey matter which has been received into the circulating mass, but which is still excrementitious, from the system. To pass, however, with this fluid, it is necessary that the matter conveyed should be soluble in it; and when it is so, we can discover it in the secretion by chymical tests. If there is any property connected with it, therefore, which shall prevent this solubility, it probably will prevent the substance from being secreted.

*σialος, saliva; et αγω, excito.

† I of course except its application in the form of vapour, in which state it proves extremely active. See Hydrargyrum.

Now, the *phosphoric acid*, abundant in urine, must in this mode counteract the secretion of mercury in any form of preparation, by forming with it a compound, insoluble, and to which the slight excess of acid cannot communicate solubility; the mercury, therefore, existing in the circulating mass, when brought in the course of the circulation to the secreting vessels of the kidneys, will not pass through their whole course; but if conveyed so far as to be combined with *phosphoric acid*, will, from this combination, be incapable of being conveyed onwards, and will therefore be retained in the composition of that part of the blood which does not enter into the secretion, but returns into the circulation. It must be discharged by some other emunctory; a portion of it appears, from some facts, to pass off by the insensible perspiration; but the *tenacity* of this secretion, if the term may be employed, must be unfavourable to this mode of discharge. The salivary secretion is one by which it may be more easily transmitted; and this transmission may even be facilitated by the affinity exerted to the *Oxide of Mercury* by the *Muriatic Acid*, and *Soda* and *Ammonia*, which are the chief saline ingredients in saliva; for it deserves to be remarked that triple compounds of these substances are, to a certain extent, soluble in water; and if the *Mercury* is thus secreted, it will of course stimulate the secreting vessels through which it passes, and increase the discharge.

Sir Gilbert Blane* has lately advanced another hypothesis to account for the effects of mercury as a sialogogue; he considers the salivary glands as one of the outlets for the *ramenta* of the bones, for by analyzing the saliva we discover the principles of which they consist; indeed the osseous matter not unfrequently concretes on the teeth, and sometimes on the salivary ducts; in the form of what is called *Tartar*: "does not this fact," says Sir Gilbert Blane, "in some measure account for these glands being the parts upon which determination is made by the operation of mercury, which consists in exciting an active absorption of solid parts, as I have elsewhere observed?"†

But do not the kidneys, and other excretory glands also furnish outlets, through which the *detritus* of the body is eliminated? How does it happen, therefore, that the kidneys are not as equally affected as the salivary glands by the action of mercury? In the present state of our knowledge it will be more prudent to rest on the phenomenon as an ultimate fact, than in attempting to ascend higher in the scale of causes, to involve ourselves in impenetrable darkness.

During the prevalence of the theory which attributed to *nitric acid* all the antisiphilitic powers of mercury, it was even maintained that this acid also excited ptyalism; experience however has disproved the effects thus attributed to it, and no one attempts to support its pretensions, as a sialogogue, except indeed as it may perchance, by its acrid qualities, influence the excretory ducts of the glands, externally, in the act of being swallowed.

It has very lately been stated by Dr. Macleod,‡ that the *Hydro-cyanic acid* occasionally produces soreness of the gums, and a disposition to

* Medical Logic, Edit. 2. p. 75.

† Transactions of a society for the Improvement of Medical and Chirurgical knowledge, Vol. iii. p. 119. London, 1822.

‡ Medical and Physical Journal for October, 1811.

pytalism; this, if true, is a very remarkable fact, and well deserves attentive consideration.

Some theorists may, perhaps, be inclined to consider certain nauseating Medicines as possessing sialogogue properties. It cannot be denied that an increased discharge of saliva will take place during the operation of such remedies, but it is very transient, and can never be rendered available to any therapeutic object. I shall however have occasion to refer to this fact hereafter, and to the inference deduced from it by Dr. Eberle, in explanation of the effect of nauseating medicines in promoting the operation of mercury.

ERRHINES, OR STERNUTATORIES :

Substances which, by direct application to the pituitary membrane, occasion a discharge from the nostrils either of a mucous or serous fluid. This class contains several different species, whose operation varies in intensity, as well as in duration.

Errhines have been regarded as useful in consequence of the evacuation they occasion, but in this respect their value has been greatly overrated; it has been stated, that they diminish the quantity of fluid circulating in the neighbouring vessels, and even extend their influence to all the branches of the external carotid; and Dr. Cullen says that he has, apparently from this operation, known headach, pain of the ear, and some cases of ophthalmia, cured or relieved by the use of Errhines. There can be no doubt that local stimulants of this kind will frequently remove pain from the head and neighbouring parts, but not merely by occasioning vascular depletion, as Dr. Cullen supposed, but by a stimulant operation thus conveyed through the medium of nervous communication, or contiguous sympathy.

Dr. Cullen has moreover supposed, that these substances may be useful in preventing apoplexy or palsy. Morgan * however relates a case in which sneezing induced a fatal attack of this disease: and Van Swieten † has satisfactorily shown, that continued paroxysms of sneezing tend to load the vessels of the head with blood; for the violent contraction of the chest impedes, for a time, the passage of the blood through the lungs, and therefore obstructs the return of the venous blood from the brain, the vessels of which are in consequence greatly distended; the face therefore reddens and becomes turgid, the eyes are suffused with water, and appear full and distended. Its occasional dangerous violence is said to have given origin to the benediction so universally bestowed on those who sneeze. ‡

It has been a subject of popular inquiry, how far the habitual use of snuff may prove beneficial or injurious; and whether the habit, when

* De Sed. et caus. Morb. Epist. xiv. art. 27.

† Comment. ad Aph. 271.

‡ This is one of the most ancient superstitions which have descended to us. It was customary in Greece, when any one sneezed, to exclaim Ζῆθι, 'May you live;' or Ζεῦ σᾶσον, 'God bless you.' Aristotle, in his problems, has attempted to account for the origin of the custom, but unsatisfactorily; Pliny, (Nat. Hist. lib. 28. c. 2.) asks—"Cūr Sternutantes salutentur?"

once fully established, can be discontinued with impunity? It may be remarked that snuff, by habitual use, soon ceases to produce the effect of an Errhine, for which reason its discontinuance cannot, generally, be regarded as likely to be attended with any danger; in those cases, however, in which the discharge is perpetuated, a contrary judgment should be pronounced, for all artificial discharges become constitutional by long continuance, and can therefore be seldom checked with impunity. Dr. Cullen states, from experience, that "whenever the nasal discharge has been considerable, the laying aside the custom of taking snuff has been productive of evil."

EPISPASTICS. *Vesicatories. Blisters.*

External applications to the skin, which produce a serous or puriform discharge, by previously exciting a high state of inflammation.

When these agents act so mildly as merely to excite inflammation, without occasioning the effusion of serum, they are denominated RUBEFACIENTS.

Various substances have at different times, been proposed for the accomplishment of this object,—such as *Nitric Acid, Boiling Water, Strong Acetic Acid, Tartarized Antimony, &c.* It is, however, generally admitted, that no substance ever employed, equals, in efficacy, or certainty, the *Cantharis Vesicatoria*, the common blistering, or Spanish fly; and those effects may serve to illustrate the *modus operandi* of this class of remedies.

By the application of a *Blister*, the extreme blood-vessels are excited into increased action, by which inflammation is occasioned, and the exhalants made to pour out a thin serous fluid which separates the cuticle from the true skin, and forms a vesicle or blister.

From this simple view of the subject it will appear evident, that blisters may produce their salutary effects by several different modes of operation; by a just estimate of which the practitioner will be enabled to reconcile the discordant opinions which have been delivered upon the subject, and to employ these agents with greater satisfaction and advantage.

Blisters may act—

1. AS DERIVATIVES, i. e. *by producing a derivation of the circulation from the inflamed and engorged vessels of the neighbouring organs to the blistered surface.* This mode of operation was long overlooked by physicians, who ascribed all the beneficial effects of a blister to the evacuation which it produced, while the humoral pathologist, moreover, considered the matter so discharged to be of a morbid nature. That such agents owe their salutary tendency to causes independent of their powers as evacuants, is at once rendered evident by the relief which they afford, when used only as Rubefacients.
2. AS EVACUANTS—*by occasioning an effusion of Fluids.* In this case the vesicated part may be considered in the light of a new excretory

organ, the formation of which requires the establishment of a new current or determination of blood; so long as the discharge continues, so long will there be an especial demand of blood in the blistered part, and a consequent derivation of the circulation from the inflamed and engorged vessels on the neighbouring organs.* The nature of the fluid effused is at first serous, but after some time it becomes purulent, and this stage of its operation must be considered as, by far, the most beneficial; hence the great advantages derived from a "*perpetual blister*."

3. AS GENERAL STIMULANTS, by raising the vigour of the circulation.† That Blisters have such a tendency there exists too many proofs to allow us to doubt. Hence in fevers they frequently prove valuable auxiliaries, but since the application of any stimulus, in such diseases must be regulated by the degree of excitement, it is evident that they can only be made with success in particular stages; this simple fact will at once explain the cause of that want of unanimity in physicians with respect to the value of blisters in febrile diseases. Rush considered that there was one particular period, in the course of a continued fever, intermediate between its stage of high excitement and the appearance of a collapse, in which blisters will generally produce unequivocal good effects, and to this he gave the name of the *Blistering point*.
4. AS ANTISPASMODICS.—*Relieving pain through the medium of Contiguous sympathy.* This effect would frequently appear to be independent of the operations above enumerated; a similar principle seems to exist with regard to the pain excited by blisters, which may also be applied to the explanation of the advantages derived from them in several diseases. It has long been remarked that, by exciting one pain we may often relieve another, and hence blisters afford relief in toothach, and other painful affections. Epilepsy and Hysteria, arising from irritation, have been removed by such applications, apparently from their exciting powers.

It remains for us to make a few observations upon the abuse of these remedies, for, notwithstanding the popular adage that "*Blisters are always safe things*," that "*if they do no good, they can do no harm*," they will be found, like all other potent applications, capable of producing much mischief when directed by unskilful hands. In stages of high vascular excitement in the pulmonary organs, blisters have increased the irritation they were designed to allay, and in some cases have promoted a tendency to effusion; in the treatment of acute Hydrocephalus the common practice of blistering the head appears very questionable, and has too often, I am well persuaded, accelerated the fatal termination, by increasing the disposition to serous effusion.

* Eberle's Treatise on the Materia Medica.

† It is said that whenever Dunning, the celebrated barrister, was called upon to make the finest display of his eloquence, whether forensic or parliamentary, he constantly applied a blister to his chest, which he found to have the effect of imparting an unusual tone and vigour to his body, and elevation to his mind.

ISSUES (*Fonticuli*) and SETONS (*Setacea*.*)

The effects of these processes bear a strong analogy to those which are produced by Vesicatories; they are, however, more permanent, and are, on that account, better adapted to the relief of those chronic affections, which would seem to require a remedy of long continued influence. In pulmonary affections, for instance, a seton in the side is frequently attended with very considerable benefit. The popular belief in humoral pathology, which continues to influence the mass of mankind, has perhaps assigned to these remedies a greater share of credit than that to which they are really entitled, but it must still be acknowledged that when an ulcer having existed a great length of time, is healed, or *dried up*, or any constitutional discharge is suddenly checked, the health may become affected. In such cases the establishing a discharge by means of an issue is undoubtedly a safe, and often a beneficial operation.

III. OF CHYMICAL REMEDIES.

There is no principle in physiology better established than that which considers vitality as a power engaged in continual conflict with the physical, chymical, and mechanical laws, to which every species of inanimate matter is invariably subject. Every phenomenon of the living body might be advanced in illustration and support of this general position. The animal machine is constantly surrounded and assailed by agents, whose elective attractions for the principles of which it consists, are so numerous and energetic, that its decomposition would inevitably and speedily result, were not the adhesion of its molecules maintained by the conservative influence of a superior power. The compositions and decompositions which manifest themselves in the elaborate operations of chylication, sanguification, and secretion, are carried on by agencies totally distinct from those which govern the combinations of inert matter, and must be investigated upon principles essentially different. How then, it may be asked, can a medicinal substance be brought to act *chymically* upon the *living* body? Notwithstanding the general proposition, that the animal processes to which we have alluded, are governed by laws peculiar to life, yet it must be admitted that such processes are occasionally influenced,† modified, and controlled by powers strictly chymical

* From *setum*, a horse hair, a substance which was formerly used for the accomplishment of this object.

† It sometimes happens that the stomach and digestive organs are so weakened by disease as to lose their control, or what Dr. Fordyce called their 'governing power,' in which case they would appear to be unable to prevent the matters which they contain from acting chymically upon each other, and occasioning decompositions and new combinations: in such cases substances are sometimes developed in the internal organs by the action of disease, which are capable of producing a chymical effect upon the fluids; for instance,—an acid is not unfrequently generated in the bowels of children which decomposes the bile and produces a green precipitate, and green stools are the consequence; in other cases the acid combines with the *Soda* of the bile, and the precipitate thus occasioned is thick, viscid, very bitter, and inflammable, and we have stools looking like pitch. In Yellow Fever, and in several other diseases, the

in their operation; although in some cases it will be seen that such effects afford only apparent exceptions to the general law: for several of the remedies whose operations have been regarded as purely chymical, exert their influence on parts which cannot be strictly considered under the control of the living principle; of which *Antacids*, and certain *Antidotes* and *Antiseptics*, to be hereafter explained, may be considered as examples: in like manner will cataplasms of acetic acid hasten the exfoliation of carious bone; a practice which has lately been employed with much success in the Infirmary at Gloucester. Upon the same principle alkaline applications may be made to dissolve coagulated blood; suppose, for the sake of illustration, that the bladder should become filled with coagulum through hemorrhage from the prostate gland, and that the most serious consequences were to be apprehended from the distention; in such an emergency, a dilute and tepid solution of potass, if injected through the catheter, might prove eminently serviceable; although such a practice would require the utmost skill for its safe direction, since the removal of the plug, thus afforded by Nature to the bleeding vessel, might be followed by an immediate return of active hemorrhage. On the contrary, other agents destroy the vitality of the organ before they can produce any change in the matter of which it is composed, as the action of *Escharotics* will clearly demonstrate.

REFRIGERANTS:

Substances which directly diminish the force of the circulation, and reduce the heat of the body, without occasioning any diminution of sensibility or nervous energy.

These remedies may be considered either as external and local, or as internal and general. In the first case, there will not be much difficulty in substantiating their claims to be considered *Chymical Agents*, but in the latter case, the theory of their operation is unsatisfactory and obscure; and even the facts which are adduced to establish the existence of such a class of remedies, are of a very problematical character.

TOPICAL REFRIGERANTS. In the case of external inflammation, refrigeration may be produced by the application of cold substances, such as water, ice, or certain saline solutions, or by the abstraction of heat by means of evaporation, which is very effectually accomplished by the use of lotions composed of spirit or ether. By these methods we are capable of directly diminishing the activity of the vessels of the part; thus, in burns and scalds, the pain is instantly relieved, and the inflammation effectually reduced.

bile which is brought up by vomiting is frequently of a vivid green colour, and some writers have attributed the phenomenon to a morbid condition, or action of the liver or gall bladder; the fact however is, that the bile itself undergoes a chymical change in the Duodenum and Stomach. That bile does undergo such a change from decomposition, is proved by a variety of facts observed to take place *out of the body*; it is well known, for instance, that the *fæces* of infants, although yellow when voided, frequently become green after some time: and Dr. Heberden observes, in his *Commentaries*, that the urine of a certain jaundiced patient, which was of a very deep yellow, became, after a few hours, green; in such cases it is probable that an acid is generated by the reaction of the elements of which the bile consists.

INTERNAL REFRIGERANTS. There are certain saline substances which, by undergoing a rapid solution, and acquiring an increased capacity for caloric, produce a diminution of temperature, and if this takes place in the stomach, the sensation of cold which it will produce is equivalent to a partial abstraction of stimulus; which, being extended by sympathy to the heart, occasions a transient reduction in the force of the circulation, and by this, or by a similar sympathetic affection, causes a sensation of cold over the whole body; in this manner Dr. Murray explains the refrigerant operation of nitre, which after all is of a very doubtful nature. We shall perhaps not feel much difficulty in accepting this theory, and in allowing that general refrigerant effects may be temporarily produced, by occasioning an impression of cold upon the stomach. The theory which is proposed to explain the refrigerant operation of vegetable acids and certain other substances, and which we have now to consider, is derived from those chymical views respecting animal heat, in which the consumption of oxygen in the act of respiration is considered the principal source. Dr. Murray,* who has given a luminous exposition of this theory, says "it is established by numerous experiments and observations, that the quantity of oxygen consumed in the lungs is materially influenced by the nature of the ingesta received into the stomach. When the food and drink are composed of substances which contain a small proportion of oxygen it is known that the consumption of oxygen in the lungs is increased, and this even in a short time after the aliment has been received; thus Mr. Spalding, the celebrated diver, observed, that whenever he used a diet of animal food, or drank spirituous liquors, he consumed in a much shorter time the oxygen of the atmospheric air in his diving bell; and therefore he had learned from experience to confine himself to a vegetable diet, and to water for drink, when following his profession.† During digestion too, it was established by the experiments of Lavoisier and Seguin, that a larger proportion of oxygen than usual is consumed."

But it is known, that the animal temperature is derived from the consumption of oxygen gas by respiration; and, that an increase in that consumption will occasion a greater evolution of caloric in the system, and consequently an increase of temperature in the body, while a diminution in the consumption of oxygen will have an opposite effect. If, then, when the temperature of the body is morbidly increased, we introduce into the stomach substances containing a large proportion of oxygen, especially in a loose state of combination, we may succeed in reducing the general temperature. This we accomplish in part by a vegetable diet, but still more effectually by the free use of the *Acids*. The vegetable acids in particular, which are found by experience to be the best refrigerants, are readily acted upon by the digestive powers, and assimilated with the food; and as the large quantity of oxygen which they contain is already in a concrete state, little sensible heat can be produced by the combination of that element with the other principles

* System of Materia Medica, vol. 1. p. 453.

† The same fact has been long known by the Divers in the Indian Pearl-fisheries; see my Work on Medical Jurisprudence, Introduction, Vol 1. p. v.

of the food. The nutritious matter which is received into the blood, containing thus a larger proportion of oxygen than usual, will be disposed to abstract less of it from the air in the lungs, and consequently less caloric will be evolved; the temperature of the body will be reduced; and this, again operating as a reduction of stimulus, will lessen the number and force of the contractions of the heart."

Such is the philosophical web which chymical ingenuity has wove for us,—the device is beautiful, but the fabric will be found too frail to endure the touch. The experiments of Dr. Crawford, in proof of the chymical origin of animal heat, are highly ingenious and plausible, but it is now generally admitted that the temperature of animals depends upon the living principle* which animates them, and that although the absorption of oxygen, in the act of respiration, may directly contribute something to its production, yet that its chief action is that of serving as a stimulus to the living power in generating it; for, as Sir Gilbert Blane† remarks, oxygen plays an interesting and active part as an exciting power throughout all nature, both animate and inanimate. If the heat of the body depended on respiration alone, any one might, by a voluntary effort of quick, deep, and prolonged respiration, increase the temperature of his body at will; the effect also of the emotions of the mind, in generating both heat and cold, adds Sir Gilbert, is proof sufficient of temperature depending on a vital, and not on a chymical cause.

ANTACIDS:

Remedies which obviate acidity in the stomach, by combining with the acid, and neutralizing it.

This is the most decided instance of chymical action which occurs in the history of medicinal operations. We have an acid whose presence excites morbid symptoms in the *primæ viæ*, and these are immediately removed by the administration of any one of those substances which are capable of forming a natural compound with the acid in question, *out of the body*, and the same proportions are required in both cases for saturation. If a carbonated alkali be employed, the same disengagement of carbonic acid takes place in the stomach as would occur in the laboratory, and a new compound is produced, whose operation varies according to the chymical nature of the substance employed; thus, the salt which magnesia forms with the acid in the stomach proves slightly purgative, while that which lime produces under similar circumstances is distinguished by an opposite property.

* See a paper upon this subject by Mr. Brodie, Phil. Trans. 1811.

† Medical Logic, Edit. 2, p. 50.

ANTILITHICS AND LITHONTHRYPTICS.

ANTILITHICS* are remedies which have the power of preventing the formation of those mechanical deposits from the urine, which gave origin to calculous concretions; and may belong either to the class of Vital, or Chymical Agents.

LITHONTHRYPTICS† are those medicines which, by a chymical operation, are capable of dissolving calculous concretions.

It has been already shown, while treating the subject of Diuretics, that certain substances, when internally administered, are capable of passing the barriers of digestion, and of entering the circulation; and that, moreover, these bodies may be again separated by the secretory vessels of the kidneys, and be ejected from the body in the urine. It cannot therefore be contended, that the urinary calculus is placed beyond the sphere of direct medicinal influence, nor can any argument, founded upon the alleged incompatibility of chymical and vital action, be fairly maintained in this case; for the urinary calculus, as well as the urine itself,‡ may very justly be considered as extraneous to the living body. The existence of such a class of remedies as that of Lythonthryptics being thus established, we have to consider the mode and possible extent of their operation in the different varieties of the disease, which they are thus calculated to palliate or cure. In entering upon this inquiry, it is not my intention to prosecute the subject farther than may be necessary to explain the *modus operandi* of the remedies in question, and in conformity with the object and plan of this work, to establish some general principles that are to direct us in their election, combination, and administration; for farther details the practitioner must consult the systematic treatises of Prout§ and Marcet,|| and the very able papers of Mr. Brande,¶ and Dr. Wilson Philip.**

The urine may be considered as one of the most heterogeneous of the animal fluids;†† and since a knowledge of its composition, and that of the morbid changes of which it is susceptible, must constitute the basis of all our knowledge respecting the formation and cure of calculous affections, the following results of an elaborate analysis by Berzelius, are submitted with a view to elucidate our pathological researches.

* From *αντι* against, and *λιθος* a stone.

† From *λιθος*, and *θρυπνω* to break.

‡ The kidneys have a more obtuse sensibility, and not such energetic activity as other glands possess: vital action is less concerned in the secretion they carry on, and their functions more easily fall under chymical and hydraulic explanations.—(Richerand.)

§ An Inquiry into the Nature and Treatment of Gravel, Calculus, and other diseases connected with a deranged operation of the Urinary Organs; by W. Prout, M. D. F. R. S.

|| On the Chymical History and Medical Treatment of Calculous Disorders, by A. Marcet, M. D. F. R. S.

¶ Journal of the Royal Institution, Vol. VI.

** Medical Transactions of the College of Physicians, Vol. VI.

†† The ancients considered the urine as a kind of extract of animal substances, a true lixivium, by which every thing impure in the animal economy was washed away, and thence they gave it the name of Lotium.

<i>Animal Principles.</i>	{	Water	-	-	-	-	-	-	-	933.00
	{	Urea	-	-	-	-	-	-	-	30.10
	{	Lithic Acid	-	-	-	-	-	-	-	1.00
	{	Pure Lactic Acid, Lactate of Ammonia, and Animal matters not separable from these	-	-	-	-	-	-	-	17.14
	{	Mucus of the Bladder	-	-	-	-	-	-	-	.32
	{									
<i>Alkaline and Earthy Salts.</i>	{	Sulphate of Potass	-	-	-	-	-	-	-	3.71
	{	———— of Soda	-	-	-	-	-	-	-	3.16
	{	Phosphate of Soda	-	-	-	-	-	-	-	2.94
	{	———— of Ammonia	-	-	-	-	-	-	-	1.65
	{	Muriate of Soda	-	-	-	-	-	-	-	4.45
	{	———— of Ammonia	-	-	-	-	-	-	-	1.50
	{	Earthy Phosphates with a trace of Fluete of Lime	-	-	-	-	-	-	-	1.00
	{	Silex	-	-	-	-	-	-	-	.03
										<hr/>
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Besides the above ingredients, which appear to be essential to healthy urine, Dr. Prout observes that in different diseases it may contain Albumen, Fibrin, and the red particles of the blood; Nitric acid; various acids, which are found to be modifications of the Lithic: Oxalic acid; Benzoic acid; Carbonic acid;* Xanthic Oxide; Cystic Oxide: Sugar; Bile; and Pus.

It will be necessary in this place to make a few observations upon the nature and habitudes of those principles, which are more immediately active in the production of calculi—

1. *Urea* is a principle peculiar to urine, and must be regarded as a result of the action of the kidneys upon some of the constituents of the blood, perhaps, as Dr. Prout suggests, upon its albuminous matter. For a long time it was regarded as the peculiar principle upon which the colour and other sensible qualities of the urine depended; Berzelius however has corrected this fallacy, and considers that the Lactic acid, and its accompanying animal matters, are the bodies which impart to this fluid the characteristic smell and colour which distinguishes it.†

2. *Lithic or Uric ‡ Acid.* As this principle is not found in the blood, but is constantly present in healthy urine, it follows that it must

* Mr. Brande first stated the existence of this acid in urine; but Berzelius expressed his doubts respecting the fact. The experiments of Dr. Marcet, however, are certainly favourable to the conclusion of the former chymist, and Dr. Prout informs us that he has himself seen small calculi discharged from the bladder composed principally of the carbonate of lime.

† The reader will find some interesting observations upon this subject in Dr. Prout's Treatise, p. 22.

‡ The name of Uric Acid was suggested by Dr. Pearson; it is, however, as Dr. Marcet very justly remarks, objectionable on account of the close resemblance which the term bears to that of Urea, a substance totally distinct from Lithic Acid.

be generated by the action of the kidneys. M. Majendie* has lately endeavoured to prove that its secretion depends upon the *Azote* received in alimentary substances, and for the following reasons, viz. 1. *Azote* is a component part of *Lithic Acid*†—2. Those persons who use a large proportion of animal food, and fermented liquors, are liable to calculous disorders—3. When animals are confined to food which contains no *Azote*, no *Lithic acid* is formed—but of this anon.—Berzelius and other animal chymists have supposed that this acid exists in urine in a free state; but Dr. Prout, whose arguments appear very satisfactory and decisive, is of opinion that it is always in combination with ammonia (*Lithate of Ammonia*), from which however it is very easily separated by the addition of any acid, even the carbonic, in the form of a red powder. It moreover appears to be susceptible of several important modifications, with which it behooves the pathologist to be acquainted; the profession is greatly indebted to the ingenuity and industry of Dr. Prout for some very essential additions to our knowledge, respecting the habitudes of *Lithic acid* with different bodies.

Erythric Acid. When nitric acid diluted with about an equal bulk of water, is poured upon pure lithic acid, and a moderate heat is applied, an effervescence takes place, and the lithic acid is dissolved; if we then concentrate this solution by a gentle evaporation, we obtain transparent colourless crystals, which have been found to constitute a peculiar acid, to which M. Brugnatelli has given the name of *Erythric acid*.

Purpuric Acid. Dr. Prout has discovered that if into a strong solution of the above crystals in water, whilst boiling hot, we carefully drop some pure ammonia, the solution acquires a beautiful purple‡ colour, and crystals of *purpurate of ammonia* speedily begin to form and subside. If these crystals are treated by means of potass and sulphuric acid, pure *Purpuric acid* is obtained in the form of a yellowish, or cream-coloured powder.

* *Recherches physiologiques et médicales sur les causes, les symptômes, et le traitement de la gravelle*, 8vo. Paris. 1818.

† ULTIMATE PRINCIPLES OF LITHIC ACID.

According to M. Berard, and adopted by M. Majendie.				According to Dr. Prout.			
Azote	.	.	39.16	.	.	.	31.12
Carbon	.	.	33.61	.	.	.	40.00
Oxygen	.	.	18.89	.	.	.	26.26
Hydrogen	.	.	8.34	.	.	.	2.22
<hr/>				<hr/>			
100.00				100.00			

‡ This fact derives its pathological interest from the probability that, in certain states of disease, the *Lithic acid* assumes this peculiar modification, giving to the sediments of urine those beautiful hues which were formerly considered by Proust, as the effect of an acid, which he named the *Rosacic*; now as the *Purpuric acid*, or rather the *Purpurate of Ammonia*, says Dr. Prout, is nothing more than *Lithic acid* modified by the action of *Nitric acid*, and as I have already shown that the *Pink* and *Lateritious* sediments occasionally contain *nitric acid* in some peculiar state of combination, the nature and origin of the colouring matter cease to be problematical.

3. *The Phosphates.* As the Phosphoric acid and its compounds perform an important part in the generation of calculi, their origin* and history demand particular attention from the chymist. The Phosphoric acid frequently exists in the urine in a free state, when it would appear to act, like any other acid, as a precipitant of the Lithic acid; this however is not the circumstance that renders its presence formidable: it is to the abundance of its compounds that we are to look for mischief. In healthy urine the phosphoric acid appears to exist in union with soda and ammonia, and partly with lime and magnesia; the latter salts being retained in solution by an excess of acid; but the proportion of these bodies is liable to considerable variation.†

Having thus briefly noticed those particular points in the chymistry of the subject with which the therapeutic principles are more immediately connected, we shall be better prepared to examine and appreciate the several plans of treatment which have been proposed for the prevention, cure, or palliation of calculous disorders; and here the subject naturally divides itself into two parts; the one comprehending the *modus operandi* of Antilithics, or those remedies which prevent or correct the calculous diathesis; the other, explaining the solvent action of Lithonthryptics over concretions already formed.

The line of demarkation by which healthy and morbid urine are separated, is so slight that it is difficult to define its limits; nor would the circumstance appear to be materially important, for the boundary is daily exceeded, not only with impunity, but even without our consciousness of the event; and Dr. Prout has accordingly denominated such occasional deviations, the "*Sediments of Health.*"

The same enlightened author considers that mechanical deposits from the urine, although composed of the same general ingredients, may, in a pathological point of view, be conveniently divided into three classes,

* Whence is derived the large quantity of Phosphoric acid which is daily evacuated from the system?—The researches of modern chymistry have furnished a very satisfactory solution of this problem, by demonstrating its presence in those animal and vegetable substances which are used by us as food. Mr. Barry, in prosecuting his interesting and important experiments on the preparation of Pharmaceutical Extracts, *in vacuo*, discovered the curious fact, that Phosphoric acid is to be found in all the extracts in a soluble state; and on extending the investigation, says he, it was ascertained that this acid, besides that portion of it which exists as phosphate of lime, is contained in a vast variety of vegetables, and more especially in those which are cultivated. *Medico-Chirug. Trans.* Vol. 10. p. 240.

† The urine of infants and nurses contains very little phosphate of lime and phosphoric acid: it is not until after ossification is finished, that these elements are found in abundance in the urinary fluid. That of old men, on the contrary, contains a great quantity of them; the bony system, already overcharged with phosphate of lime, refuses to admit more of it. This saline substance would ossify every part, as it does sometimes in the arteries, ligaments, cartilages, and membranes, if the urine were not to remove the greater part of this superabundant portion. In Rachitis it is by the urine that the phosphate of lime passes off, the absence of which causes the softness of bones. Richerand. If we might be allowed to theorise, I should say, that this disease depends upon a deficient action in the powers of assimilation, in consequence of which the phosphoric acid is incapable of entering into its assigned combinations, and is therefore eliminated as excrementitious. Dr. Glisson considered the disease to depend upon some fault in the spinal marrow, whence he termed it Rachitis, from $\rho\alpha\chi\iota\varsigma$ Spina Dorsi.

viz. *Pulverulent* or *Amorphous Sediments*; 2. *Crystalline Sediments*, usually denominated gravel; and 3. *Solid Concretions*, or calculi formed by the aggregation of these latter sediments. The first of these may be passed over, as unconnected with the present subject; the latter however constitutes an essential object of research; for a complete acquaintance with the chymical history of calculi can alone furnish the true indications of cure.

Scheele,* with whom the inquiry originated, conceived that every calculus consisted of a peculiar concrete acid, soluble in alkaline lixivium, and which Morveau denominated the *Lithic Acid*; but the subsequent researches of Fourcroy, Vauquelin, Wollaston, Pearson, Henry, Brande, Marcet, and Prout, have demonstrated the existence of several bodies in the composition of urinary calculi, viz. *Lithic Acid*; *Phosphate of Lime*; *Ammoniac-Magnesian Phosphate*; *Oxalate of Lime*; *Cystic Oxide*;† and *Xanthic Oxide*;‡ to which may be added an *animal cementing ingredient*. The varieties of calculi produced by the combination or intermixture of these ingredients, are represented in the following Tabular Arrangement.

* Transactions of Stockholm.

† *CYSTIC OXIDE*, discovered by Dr. Wollaston in 1815; it does not affect vegetable colours, and has all the chymical habitudes of an oxide.

‡ Dr. Marcet discovered two calculi, which were not referable to any of the known species; but they are not introduced into the following table, as they may never again occur; at all events, from their extreme rarity, they cannot be considered as objects of practical interest. To one of these he has given the name of *Xanthic Oxide*, because it forms a lemon-coloured compound when acted upon by Nitric acid. To the other nondescript calculus he has bestowed the appellation of *Fibrinous*, from its resemblance to Fibrine.

A TABULAR VIEW OF THE DIFFERENT SPECIES OF URINARY CALCULI.

SPECIES OF CALCULI.	EXTERNAL CHARACTERS.	CHEMICAL COMPOSITION.	REMARKS.
1. LITHIC or URIC.	<i>Form</i> , a flattened oval; <i>Specific gravity</i> , generally exceeds 1.500; <i>Colour</i> , brownish or fawn-like; <i>surface</i> smooth, texture laminated.	It consists principally of <i>Lithic acid</i> : when treated with nitric acid, a beautiful pink substance results. This calculus is slightly soluble in water, abundantly in the pure alkalies.	It is the prevailing species; but the surface sometimes occurs finely tuberculated. It frequently constitutes the <i>Nuclei</i> of the other species
2. MULBERRY.	<i>Colour</i> , dark-brown; <i>texture</i> , harder than that of the other species; <i>Sp. grav.</i> from 1.428 to 1.976. <i>Surface</i> , studded with tubercles.	It is <i>Oxalate of Lime</i> , and is decomposed in the flame of a spirit lamp, swelling out into a white efflorescence, which is <i>Quicklime</i> .	This species includes some varieties which are remarkably smooth and pale coloured, resembling a <i>hemp seed</i> .
3. BONE EARTH.	<i>Colour</i> , pale brown or gray; <i>surface</i> smooth and polished; <i>structure</i> , regularly laminated; the laminae easily separating into concrete crusts.	Principally <i>Phosphate of Lime</i> . It is soluble in muriatic acid.	
4. TRIPLE.	<i>Colour</i> , generally brilliant white: <i>surface</i> uneven, studded with shining crystals; less compact than the preceding species; between its laminae, small cells occur, filled with sparkling particles.	It is an <i>Ammonio-magnesian phosphate</i> , generally mixed with phosphate of lime; pure alkalies decompose it, extricating its ammonia.	This species attains a larger size than any of the others.
5. FUSIBLE.	<i>Colour</i> , grayish-white.	A compound of the two foregoing species.	It is very fusible, melting into a vitreous globule.
6. CYSTIC.	Very like the Triple Calculus, but it is unstratified and more compact, and homogeneous.	It consists of <i>Cystic Oxide</i> ; under the blow-pipe it yields a peculiarly fetid odour. It is soluble in acids, and in alkalies even if they are fully saturated with carbonic acid.	It is a rare species.
7. ALTERNATING.	Its section exhibits different concentric laminae.	Compound of several species, alternating with each other.	
8. COMPOUND.	No characteristic form.	The ingredients are separable only by chymical analysis.	

Let us now inquire into the circumstances under which the several substances enumerated in the foregoing table, are found to be deposited; and first of the *Lithic Acid Diathesis*. It has been already stated, that the lithic acid exists in the urine in combination with ammonia, so as to be held in solution under ordinary circumstances: if however any free acid be generated, the lithic acid is immediately precipitated, giving rise to the appearance so well known under the name of *red gravel*; from this view of the subject the lithic acid deposit must be considered as arising, not from the excess of that substance in the urine, but from a decomposition of the compounds into which it enters by the agency of a free acid. M. Majendie is therefore incorrect in attributing its appearance to the quantity of azote in the ingesta; an opinion which has been very ably controverted by Dr. Philip, in a paper published in the sixth volume of the *Medical Transactions*. It appears, moreover, that whatever tends to disturb the process of digestion, by favouring the production of acid, may be considered as the exciting cause of the lithic deposits; especially where the cutaneous functions are imperfectly performed; for Dr. Philip is of opinion, that the precipitating acid, in a healthy state of the system is thrown off by the skin; and he supposes that even when generated in excess, it may be diverted to the surface of the body by merely increasing the insensible perspiration. The medical treatment of the lithic diathesis is thus rendered simple and satisfactory; and if the opinion of Dr. Prout be true, that at least two thirds of the whole number of calculi originate from lithic acid, the extreme importance of the subject is too apparent to require comment. Remedies, medicinal and dietetic, that are capable of correcting dyspeptic symptoms, such as slight bitters,* will doubtless prove valuable resources; while all those agents which have a tendency to correct and regulate the insensible perspiration, will necessarily fall under the head of antilithic remedies. Mr. Copland Hutchison, in a paper which has been published in the *Transactions of the Medico-Chirurgical Society*, has shown a comparative rarity of calculous disorders in British seamen. Can the quantity of muriate of soda taken with their food, from its stimulating influence upon the cutaneous functions, be considered as affording a plausible explanation of this fact? The *Phosphatic Diathesis* seems to be accompanied with considerable derangement of the chylo-poietic viscera, and Dr. Prout very justly remarks, what I have frequently observed, that the stools are extremely unnatural; as the phosphates are retained in solution by an excess of acid, it would appear as if an alkaline principle was occasionally developed, and it is not unreasonable to suppose that this may be sometimes derived from bilious regurgitations;† in some cases, the alkali is derived from the spontaneous decomposition of urine itself, especially where the

* I am by no means disposed to reject altogether, as a popular fallacy, the general opinion in favour of the antilithic virtues of malt liquor; the observations which have been already offered (page 30) will explain how such agents may occasionally operate in assisting digestion. In the observations made upon the Bills of Mortality in the year 1662, by an ingenious citizen, concerning the increase of some diseases, and the decrease of others, it is observed "The Stone and Stranguary decreaseth, from the drinking of Ale."

† In consultation with Dr. Baillie, some few months before his death, he said to me "although I have never published the opinion, I am satisfied that after a patient has long laboured under diseased liver, the blood becomes surcharged with alkaline matter."

bladder has lost its *governing power*,* as from some injury† of the spine; or from some local affection of the bladder or prostate gland; wherever the urine undergoes an incipient process of decomposition, ammonia will be generated, and an *ammoniaco-magnesian phosphate*‡ be immediately precipitated: hence in cases where the bladder is unable to discharge its contents, this deposit is very apt to take place, as in diseases in the prostate; and this explains the reason why the triple phosphates are so frequently formed in elderly people, who cannot wholly evacuate their bladder.

It will appear evident from these cursory observations, that some varieties of Calculi will be influenced by acids, and others by alkalies, and that the exhibition of such remedies will be liable to palliate, or to aggravate the symptoms, according to the character and composition of the offending calculus, and according to the prevailing diathesis of the patient; as a general rule to direct us in the chymico-medical treatment of these cases, Dr. Marcet states, that “*Whenever the lithic acid predominates, the alkalies§ are the appropriate remedies, but that when the calcareous or magnesian salts prevail, the acids are to be resorted to.*” But if it be asked how we are to discover the nature of the calculous affection, so as to direct the suitable remedy? the reply is obvious—by an examination of the sediment deposited by the recent urine, or by an analysis of the small fragments which are frequently voided with it; the Phosphates subside from the urine as a *white*, lithic acid, generally, as a *red* deposit; and since the phosphates are held in solution in the urine by an excess of acid, it is evident that whenever such acidity is diminished by the hand of nature or art, a white sabulous deposit will ensue; hence, says Mr. Brande, it occurs in the urine of persons who drink soda water, or take magnesia; the remedy of such a deposit, when it takes place habitually, is a course of acidulous medicines; on the contrary, since *lithic acid* is precipitated by the acids, alkalies are naturally suggested for the prevention of that deposit. In the *compound* calculi, acids and alkalies may be equally injurious or beneficial, for since these bodies are composed of a variety of ingredients, the action of any one solvent must be partial, and may convert the smooth calculus into a rough and highly irritating body, or vice versa. In the *alternating* calculi it may be judicious to exhibit these remedies alternately, as the symptoms of the case and the deposit of the urine may indicate. After all, however, the solvent powers of Lithonthryptic remedies must be very limited, and in advanced cases we

* See an explanation of this term in the note, at page 115.

† It is, says Dr. Prout, a very old observation, that injuries of the back produce *alkaline urine*: “it also appears,” continues this author, “to hold in other animals as well as in man: thus I have frequently observed jaded and worn out horses pass great quantities of lime in their urine; I have known the same also to take place in dogs, and particularly of the sporting kinds; and in both these circumstances have thought it probable, that the circumstance was connected with some strain or injury of the back produced by over-exertion, or other causes.”

‡ I have in my possession a splendid specimen of this triple salt, in large and well defined crystals, covering a portion of a decayed beam; it was sent to me by my friend Mr. Marshall, from whom I learnt that it had been taken from a privy belonging to a public-house in Southwark. I lent the specimen to the late Mr. Wilson, in order that he might exhibit it in his lectures before the College of Surgeons, and he has published a description of it in his work on the Urinary and Genital Organs.

§ A question has arisen respecting the comparative efficacy of the two fixed alkalies upon these occasions. See *Sodæ Sub-carbonas*.

can never expect to procure more than palliation. With respect to the agency of these different remedies, as *Antilithics*, I would observe, that while experience bears us out in confiding in the production of certain chymical effects from their use, we must not forget that much is to be effected by their judicious administration as *vital* agents: and it will be hereafter my duty to point out the many advantages that may be obtained, by combining in one formula, medicines which individually belong to each class.

Independent of any chymical effect, alkaline substances are found by daily experience to allay the morbid irritability of the urinary organs in a manner not yet explained; alkalies may also prove *generally* serviceable in these disorders, by acting immediately upon the digestive organs, for the disposition of forming calculi is always, more or less, accompanied with the indications of deranged digestion; and it is probable that the first link of the series of actions, which cause this disposition, has its origin in the stomach.

The alkaline carbonates are found to answer as effectually as the pure alkalies, and they have the advantage of being less liable to disagree with the stomach. Mr. Hatchett has proposed the carbonate of magnesia, in doses of \mathfrak{z} j to 3j, as a valuable substitute for alkaline remedies in cases of lithic calculi; but as its insolubility must render its absorption equivocal, the beneficial operation of the substance must principally depend upon its neutralizing any excess of acid in the *primæ viæ*, and in this way there can be no doubt of its lithonthryptic agency; "but," says Dr. Marcet, "such is the tendency which the public has to overrate the utility of a new practice, or to take a mistaken view of its proper application, that there is every reason to believe that the use of magnesia has of late years become a frequent source of evil in calculous complaints." Lime-water has been also recommended for the purpose of fulfilling the same indications, and as not being liable, to produce that irritability of stomach which frequently attends the long continued use of the fixed alkalies; besides which, some chymists have maintained that it exerts a peculiar solvent power over the cementing animal matter of the concretion, and thereby destroys its cohesion.*

Where an acid is indicated, the *Muriatic* will in my judgment be found as convenient and effectual as any that can be administered. Mr. Brande proposes *Cream of Tartar* for this purpose; upon this point I differ with him, for this salt, to say the least of it, is questionable in its mode of operation; for although its first impression upon the stomach is that of an acid, the subsequent processes of digestion decompose it, and eliminate its base, which being absorbed acts upon the urinary organs as an alkali. I have seen a white sabulous deposit, consisting of the Phosphates, in the urine of persons after the constant use of *Imperial* as a beverage, which I am at a loss to explain upon any other principle. Sir Gilbert Blane has also very satisfactorily shown, that a fixed alkali produces the same effect upon the urinary organs whether it be exhibited alone, or in combination with citric acid; in this latter case the salt undoubtedly undergoes a decomposition *in transitu*, as I have more fully explained under the consideration of Diuretics, (page 95.) During an alterative course of Lithonthryptic remedies it may be beneficial to in-

* For an account of the celebrated remedy of Mrs. Stephens, see *Liquor Calcis*.

terpose occasionally a purgative medicine, but we must not combine it with the lithonthryptic, at least, if we wish this latter medicine to reach the urinary passages; for it is a law which I have already attempted to establish (*see page 96,*) that *Catharsis suspends the process of alimentary absorption.*

There remains to be considered another mode of applying a solvent, and which would seem on the first view of the subject to be full of promise,—that of injecting the proposed menstruum into the bladder. Unfortunately, however, the irritable state of this organ will generally preclude the possibility of preserving the menstruum, for a sufficient length of time, in contact with the calculus to accomplish any material solution; nor am I aware that any case, in favour of such a practice, stands recorded. An ingenious and novel application of the powers of Electro-chymistry has been lately* proposed by M M. Prevost and Dumas, as capable of affording means for the solution of the calculus within the bladder; the suggestion is highly plausible, and ought not to be hastily rejected without trial. Could the functions of the part be protected against the influence of so powerful an agent, it is evident that, by a galvanic battery of sufficient intensity, a calculus composed of alkaline or earthy salts might be transferred from the bladder by the simple introduction of a double sound, communicating on one hand with the calculus, and, on the other, with two vessels filled with water, in which are plunged the opposite poles of a galvanic apparatus.† This arrangement would transfer the acid constituents into the vessel connected with the *positive* end, and the bases into that of the *negative* end. So far, however, as the experiments have hitherto been carried, this degree of galvanic operation would seem to excite too much irritation in the bladder to be admissible; but it still offers a resource of an apparently more practicable nature. This consists in giving to the calculus a tendency to crumble from the slightest force; such a friability, in short, as shall render it easily broken into pieces sufficiently small to be evacuated through the urethra, especially by the aid of dilating that passage, an operation upon which much has lately been said and written. A fusible calculus from the human subject was submitted to the action of a pile, consisting of 120 pairs of plates, for twelve hours in succession. The platinum wires, constituting the poles, were placed in contact with the calculus, about six or eight lines distant from each other, and the whole plunged in a vessel filled with pure water. During the galvanic action, the bases and phosphoric acid first arrived at their respective poles, then re-entered into combination, when the salt thus reformed was precipitated in the state of powder. The calculus weighed 92 grains before the experiment, and was reduced at its termination to 80. The process being continued, at the end of sixteen hours it presented a mass of such friable texture as to be reduced into small crystalline particles by the slightest pressure; the largest of which did not exceed the size of a lentil, so that it might have easily passed through the urethra.

In order to ascertain how far this decomposition could be effected in the living body, the ingenious experimentalists selected a dog of rather

* Journal de Physiologie; Juillet, 1823.

† For a farther account of this extraordinary law of Electro-Chymistry, the reader may consult my work on the ELEMENTS OF MEDICAL CHYMISTRY.

large size, into whose bladder they introduced a fusible calculus attached to a sound, and between two conductors of platinum; the bladder was next distended by injecting tepid water, and the apparatus subjected to galvanic influence. After a little struggling, the animal became calm, and was subjected to the operation during an hour. On removing the sound, the calculus showed unequivocal marks of decomposition. The same process was repeated, night and morning, during six days, when the friability of the calculus rendered it impossible to continue the experiment. It had lost weight in the same proportion as in the preceding trial. The bladder, which was afterwards examined, exhibited no appearance of injury or disease.* The authors assert that this organ does not suffer any inconvenience from this more moderate degree of galvanic action, and suggest, as a proof of the mildness of its influence, that we should immerse the tongue in a vessel filled with water, in which a calculus is undergoing decomposition, and it will be found that the tongue, which is far more sensible than the bladder, will scarcely perceive the galvanic action, even when decomposition is going on briskly. The authors add, that this process cannot offer any advantage for the removal of those calculi which consist wholly of *Uric acid*, or which contain a large proportion of it.†

ANTIDOTES.

Synon: *Alexipharmics. Alexiterials.*

Counter-poisons :

Medicines which are capable of preventing the ill effects of a poison; or, of counteracting its fatal virulence.

There is perhaps no subject upon which the credulity of mankind has been so extravagantly exercised as on that of Poisons; nor is there, certainly, any class of remedies whose history has suffered so many vicissitudes from the caprice of hypothesis, as that of ANTIDOTES.‡

It is not my intention, on the present occasion,§ to enumerate the many extraordinary virtues|| which credulity has, at different times, assigned to such medicines; nor shall I consume the time of the reader by attempting to expose the absurdity of those fearful powers with which

* These experiments have been repeated at the Jardin des Plantes, with similar results; it farther appears that a certain quantity of *Nitrate of Potass* added to the water injected into the bladder will expedite the decomposition.

† This, it must be confessed, is singularly unfortunate, if the opinion already expressed be true (page 120) viz. that at least two thirds of the whole number of calculi originate from this acid.

‡ The word *Antidote* is derived from *ἀντί*, against, and *δίδωμι*, I give; as being a medicine given against poison, either by way of cure or preservative. The word is also sometimes used in a more general sense, for any compounded medicine; thus *Peter Damian* speaks of a person who in his whole life never took an antidote. It is likewise used by some authors in a less proper sense, for any remedy against any disease, chiefly if it be inveterate, and arise from some ulcer or abscess; and lastly, the term has been used to signify a perpetual form of medicines, otherwise called *Opiates*, or more properly *Confections*.

§ The reader will find this subject treated more fully in the second volume of my work on MEDICAL JURISPRUDENCE.

|| See the history of *Theriaca* at page 28, note.

ignorance, terror, and imposture, have invested certain poisons, —a subtlety so extreme as to defeat the most skilful caution, and a virulence so manageable as to be capable of the most accurate graduation; so that while the former attribute was believed to ensure their deadly operation, although exerted through the most secret and least suspicious medium, as that of gloves,* tapers, or letters, the latter was said to enable the accomplished assassin to measure the allotted moments of his victim with the nicest precision, and to occasion his death at any period that might best answer the objects of the assassination.†

The abandonment of such notions may be considered as one among the many advantages which have arisen to medicine from the cultivation of physiology.

Without farther introduction, I shall proceed to the main object of this work, and inquire how far a *chymical* agent may be capable of neutralizing, or of decomposing, a poisonous substance in the human body; and endeavour to ascertain the degree of confidence to which it may in each particular case be entitled; equally important is it to learn, whether certain *vital* agents may not be serviceable in cases of poisoning, either by promoting the elimination of the poison, or by producing a state of the system best calculated to resist its deleterious operation.

It may be safely asserted that we possess very few true antidotes; for although several of the mineral poisons may be neutralized or decomposed by various re-agents, yet their destructive action is generally so rapid, that the mischief is effected before any chymical changes can avail; and, in other cases, the substances resulting from the chymical action, are as poisonous as the original ingredients, as in the case of the decomposition of *Corrosive Sublimate*, by the alkalies and earths, when the precipitated oxide is as virulent as the original salt; while, under certain circumstances, I suspect that the vital powers of the stomach are in direct opposition to those changes and decompositions which so readily, and so uniformly, take place in our laboratories. To *vital agents* then, the practitioner must principally look for succour; but before we can establish any general rules for the treatment of poisoning, it is essential to distinguish between the different modes in which poisonous substances produce their effects, or at least to determine the parts of the

* JOHN, king of Castille, as Tissot relates, was poisoned by a pair of boots, prepared by a Turk; HENRY IV. by gloves; Louis XIV. fearing a project to poison PHILIP V., prohibited his opening letters, or putting on gloves (*Tissot Traite des Nerfs*, T. 1, P. 11, page 13;) Plouquet has the following remark upon this subject. "Huc et ignota illa venena pertinent, quibus epistolæ chirothecæ, et ejusmodi infici, et vim adeo toxicam induere dicuntur, ut lectio ejusmodi epistolæ, indutus chirothecæ subitam mortem causentur." (*Comment Med. super Homicid.* page 184.) POPE CLEMENT VII. is said by Zacchias to have been poisoned by the fumes of a taper, (*Quæst. Med. Leg.*) and a priest is reported to have offered to destroy QUEEN ELIZABETH by poisoning her saddle. (*Sir Edward Coke, in the trial of Sir John Hollis.*) Bishop Burnet, in the history of his own times (vol. 2. p. 230,) says, that some believed CHARLES the Second to have been poisoned through the medium of snuff.

† This conceit does not appear to have been confined to the ignorant alone, for we learn from Spratt's History of the Royal Society, that very shortly after the institution of that learned body, a series of questions was drawn up by their direction, for the purpose of being submitted to the Chinese and Indians, which clearly shows their belief in the possibility of such an operation, viz. "Whether the Indians can so prepare that stupifying herb, *Datura*, that they make it lie several days, months, years, according as they will have it, in a man's body, without doing him any hurt, and at the end kill him, without missing half an hour's time?"

living system through which they act; for it will be found, that each poison has its own *modus operandi*, from which alone can be derived the particular indications of cure.

The hypotheses devised by the ancient physicians, to account for the destructive powers of these substances, were principally derived from mechanical notions respecting the supposed form of their particles, which they imagined capable of lacerating and disuniting the animal fibres by the sharpness of their spiculæ;* it is, however, now satisfactorily established that the action of a poison in the human stomach is very rarely, if ever, *mechanical*; sometimes *chymical*; but for the most part *vital* in its operation.

Each of the three kingdoms of Nature furnishes a number of poisons, the investigation of whose chymical properties and physiological actions, and that of the symptoms to which their administration gives rise, the lesions of structure which they occasion, and of the medical treatment which they require, constitutes an elaborate branch of science, designated by the term *Toxicology*, and of which I have more fully treated in my work on Medical Jurisprudence.

Poisons differ materially from each other, not only with respect to the modes in which they produce their effects in relation to the several vital organs, but with respect to their application; some of those, for instance, which, if introduced into a wound, are speedily fatal, may be taken into the stomach with complete impunity, as in the instance of the venom of the viper and other snakes, which appears to exert no influence on the stomach; others, on the contrary, display their deleterious action on the stomach alone, such as caustic acids, and alkalies, corrosive sublimate, and some chymical poisons; while others, again, are equally destructive whether applied to the inner surface of the stomach, or to the lower intestines, in the form of clyster, or even to the mucous membrane of the mouth or nose; to the eye; to the vagina and orifice of the uterus, or to an abraded portion of the skin. There is, moreover, a class of substances which may be termed *Aerial* poisons, for they may exist in the state of gas, or be held dissolved in the atmosphere, and be received by respiration, or by the mucous membranes of the nose and throat; the saliva may also thus become the medium for transferring various subtle poisons from the atmosphere to the animal body; this is well illustrated by the fact of the transfer of metallic influence, as related in the case of a gentleman in perfect health who became salivated in consequence of sitting for one hour by the side of a person who was in a state of mercurial ptyalism, in order to give him a lesson in botany.

It also deserves notice, that a poison acts with different degrees of force and celerity in different parts of the same tissue; its absorption, for instance, would appear to be energetic in proportion to the number of veins,† although several apparent exceptions to this law might be ad-

* Dr. Mead adopted this opinion, but he became so convinced of its inadequacy that, in the later editions of his work on Poisons, he withdrew the hypothesis. It is hardly necessary to observe that upon its abandonment, a host of popular antidotes at once fell into disuse; for as long as the injury was supposed to arise from mechanical irritation, oils, fats, and other similar remedies were held capable of obtunding the acrimony. So has the abandonment of other conceits and hypotheses cleared away many absurd articles from the list of Antidotes; see page 26.

† The introduction of poisons into the body through the medium of the circulation of the blood is frequently alluded to by the physiologists of the seventeenth century,

duced, and it is evident that the plethoric state of the part with respect to its blood-vessels has a considerable share in modifying the effects; this observation, however, has no relation to those poisons which operate on the system through the sympathetic communication of the nerves; Mr. Brodie, for instance, found that the poison of bitter almonds acted more speedily when applied to the tongue than when injected into the intestine, though the latter presents a much better absorbing surface.

Foderé, in the fourth volume of his *Medicine Legale*, arranges poisons according to their action on the living system, and which, with a slight alteration in the order of the classes, has been adopted by Orfila, and most other writers on Toxicology. Poisons are thus reduced into six classes: viz. 1. CORROSIVE or ESCHAROTIC, as the *Preparations of Mercury, Arsenic, Antimony, Copper, Tin, Zinc, Silver, Gold, and Bismuth; the concentrated Acids, and caustic alkalies, and Earths; Cantharides; glass and enamel powder; diamond dust.** 2. ASTRINGENT POISONS, of which the *preparations of Lead* constitute the only species. 3. ACRID or RUBEFA- CIENT POISONS, which, with a few exceptions, are furnished by the vegetable kingdom, as certain *drastic purgatives, Hellebore, Euphorbium, &c.* 4. NARCOTIC POISONS, *Opium, Henbane, the Cherry-laurel, Stramonium, &c.* 5. NARCOTICO-ACRID, embracing such articles as produce the united effects of the two former, and which constitute some of the most deadly poisons, as the *Ticunas, Nux-vomica, Belladonna, Tobacco, Hemlock, Digitalis, &c.* 6. SEPTIC POISONS, *contagious miasmata, pu-*

I have lately met with a curious passage in a work entitled "Popular Errors in Physick, first written in Latine by the learned physitian, James Penrose, Doctor in Physick. London, 1651." "The venome is carried by the veines and arteries, as appeares in that all the blood of them that have been bitten by a viper doth turne into a pale greenesse. And seeing that the veines in the papps are so very slender, and doe not come unto the heart, but with a great many long windings, I affirme, and it is more probable, that if the viper be applyed to the feet, which are farthest remote from the heart, it will sooner infect the heart than if to the papps, but soonest of all if it be applied to the armes. And now the story of CLEOPATRA comes to my minde. PETRUS VICTORIUS blames the painters, that paint Cleopatra applying the aspe to her papps, seeing it is manifest out of PLUTARCH in the life of ANTONIUS, and out of PLINIE likewise, that she applyed it to her arme. ZONARUS relates that there appeared no signe of death upon her, save two blue spots on her arme. CÆSAR also in her statue which he carryed in triumph, applyed the aspe to her arme; for in the armes there are great veines and arteries, which do quickly, and in a straight way convey the venome to the heart, whereas in the papps the vessels are slender. And therefore in SAINT PAUL the miracle was so much the greater, in that he felt no harme from the viper, which layd hold on his hand, for if it had assailed him on the breast, he had had respite enough to take some antidote."

* There can be no doubt but that death has been produced by the mechanical operation of various insoluble bodies, although we cannot believe the numerous tales recorded on the subject of diamond dust (supposed to constitute the basis of the celebrated "Powder of Succession") or of powdered glass, &c. Numerous cases are recorded where life has been destroyed by the lodgement of substances in the intestines; and we have lately heard of the fatal effects produced by alvine accumulations from the habitual use of Magnesia. With respect to the danger from the ingestion of glass and enamel in powder, there still exists much difference of opinion; Caldani, Mandruzzato, and M. Le Sauvage, report experiments made upon men and animals, in which no bad consequences followed; on the other hand, Schurigius (*Chylogia*) and Cardanus (*De Venenis*) cite instances where persons have died of ulcerations of the stomach from such causes; and M. Portal, Foderé (*Medicine Legale*) Plouquet (*Comment. super Homicid.*) Stoll, (*Ratio Medendi*, part vi, p. 60) Gmelin (*Hist. General de Ven. mineral.*) Frank (*Man. de Toxicol.*) furnish testimony in support of the opinion which assigns to such bodies a highly deleterious action.

trid exhalations from animal matter, Sulphuretted Hydrogen, the venom of the viper, &c.

The value of this classification has been very justly stated to consist in its combining to a certain degree, the advantages of a pathological arrangement with those of one founded on the basis of Natural History ; for, while it is strictly pathological, it at the same time distributes the different poisons, with some few and unimportant exceptions, in an order corresponding with that of their natural history. The First two classes, for instance, present us with substances of a mineral origin ; the Third and Fourth, with those which are chiefly of a vegetable nature ; and the Sixth, with objects principally belonging to the animal kingdom. The importance of acknowledging a division, which has a reference to the organic and inorganic kingdoms of Nature, is considerable in a chymical point of view ; for in enumerating the various experiments to be instituted for the detection of poisons, we are thus enabled to bring together a connected series of processes, nearly allied to, intimately connected with, and in some respects mutually dependent upon, each other. At the same time it must be acknowledged, that this classification has many defects and some fallacies. In the first place, it has little or no reference to the enlarged views of the modern physiologist, respecting the "*modus operandi*" of Poisons ; nor indeed is its construction susceptible of such modifications and improvements, as can ever render its degree of perfection progressive with the advancement of science. In the next place, the classes are in many particulars ill defined, and indistinctly, if not erroneously, divided. How questionable, for instance, are the boundaries which separate *Corrosive* from *Acrid* poisons ? the respective species, even, of each class are, in many cases, less allied to each other, than are the great divisions to which they are subordinate. As an exemplification of this fact we have only to compare the physiological actions of *Arsenic* and *Corrosive Sublimate*, both of which are arranged under the class of Corrosive Poisons. The former of these substances undoubtedly occasions death by being absorbed, and thus acting as a vital agent ; the latter, by its local action, as a caustic on the textures with which it immediately comes into contact. In the same manner, if we examine the individual actions of the different species composing the class of "*Acrid Poisons*," we shall discover the same want of uniformity ; thus, the *Spurge Flax*, and the *Lutropa Curcas*, act by occasioning a local inflammation, while the *Hellebore*, being rapidly absorbed, exerts a fatal action on the nervous system, and produces only a very slight inflammation. The class of Narcotic Poisons is certainly more absolute in its definition, and more uniform in its physiological affinities, and therefore less objectionable than the divisions to which we have just alluded ; but the propriety of the class "*Narcotico-Acrid*" is by no means equally unexceptionable ; indeed Orfila himself questions it, "because the narcotic or sedative effects only follow the previous excitement." Some of the poisons of this division also are rapidly absorbed, and act, through the medium of the circulation, on the nervous system, without producing any local inflammation ; while others, on the contrary, merely act upon the extremities of the nerves, with which they come in contact, and, without being absorbed, occasion death by a species of sympathetic action.

These few objections, and many more might be urged, are sufficient to

demonstrate the imperfection of the classification under consideration, and which must render it wholly unavailable to the physician in the treatment of cases of poisoning, who must derive his plan of cure from the physiological action of the substance against which he has to contend; thus, for instance, *Arsenic* and *Corrosive Sublimate* are both corrosive poisons, but so materially do they differ from each other in their physiological actions that, when swallowed, they will require for the preservation of the individual, a very different system of treatment.

For such reasons I have ventured to propose a new arrangement of Poisons, which may furnish the practitioner with a general theorem for the administration of Antidotes.

The *First Class* of our arrangement comprehends such poisons as operate, through the medium of the nerves, upon the organs immediately subservient to life; in their application it is obvious that they cannot require to be introduced into the stomach; they may convey their destructive influence by an application to any part duly supplied with nerves, and whose extremities are exposed to their action. It had been long admitted that a poison might occasion death, by acting on the nerves of the stomach and intestines without being absorbed; but to the experimental labours of Mr. Brodie* we are principally indebted for our present correct views of the subject. The class admits of two important divisions, into one comprehending those poisons which destroy the functions of the brain, and into another, including those which direct their influence upon the heart. We shall offer a few observations upon the facts which have suggested such a division, and upon the practical advantages which may attend its adoption.

It was observed by Bichât, and the observation has been fully confirmed by Brodie, that the influence of the brain is not *directly* necessary to the action of the heart, and is *immediately* necessary to life only because the muscles of respiration owe their action to its influence.† For when the functions of the brain are destroyed, even when the head is removed, the heart continues to contract for some time afterwards, and then ceases only in consequence of the suspension of respiration, which is under the direct influence of the brain. Assuming this as a fact, it will appear evident that certain poisons may, by affecting the brain, so paralyse the muscles of respiration as to occasion death by suffocation, and by such a mode of operation I imagine that those substances, arranged in the former division of my first class, prove mortal. Mr. Brodie accordingly found that, by the administration of a large dose of alcohol to a rabbit, the pupils of its eyes became dilated, the extremities convulsed, and the respiration laborious, and that this latter function was gradu-

* See "Experiments and Observations on the Different Modes in which Death is produced by certain Vegetable Poisons." By B. C. Brodie, Esq. F. R. S. in the 181st Volume of the Philosophical Transactions for the year 1811.

† M. Lallemand has published the history of a foetus, in which the brain and spinal marrow were equally deficient, notwithstanding which, it even exceeded the usual size, the heart was also perfect, and it was evident that the circulation had been properly performed. No sooner however was the monster born than it perished, because the diaphragm and other muscles of respiration were unable to perform their functions without the aid of nervous excitement; no air was therefore inhaled into the lungs, and in a few minutes the heart ceased to contract from the deficient supply of oxygenized blood. See MEDICAL JURISPRUDENCE, Vol. ii. "On the Physiological Causes, and Phenomena of Sudden Death."

A SYNOPTICAL TABLE OF POISONS,

NEWLY ARRANGED

ACCORDING TO THE DIFFERENT PRIMARY OPERATIONS, BY WHICH THEY PRODUCE THEIR EFFECTS,
With a view to furnish a General Theorem for the administration of Antidotes.

CLASS I. POISONS WHICH ACT PRIMARILY, THROUGH THE MEDIUM OF THE NERVES, WITHOUT BEING ABSORBED; OR EXCITING LOCAL INFLAMMATION.

Order 1. *By which the functions of the Nervous System are suspended, or destroyed.*

(*Death by Suffocation from paralysis of the Respiratory muscles.*)

Alcohol.	Essential Oil of	Opium? [†]
Aconite.	Almonds. [†]	Salts of Lead?
Oil of Tobacco.	Camphor. [†]	Croton Tiglium. [†]

Order 2. *By which the heart is rendered insensible to the stimulus of the Blood.*

(*Death by Syncope.*)

Infusion of Tobacco.

Upas Antiar.

CLASS II. POISONS WHICH, BY ENTERING THE CIRCULATION, ACT THROUGH THAT MEDIUM, WITH DIFFERENT DEGREES OF ENERGY, ON THE HEART, BRAIN, AND ALIMENTARY CANAL.

(*Death in many forms.*)

Arsenic.	Meadow Saffron.	Prussic Acid.
Emetic Tartar.	Squill.	Deadly Nightshade. [†]
Muriate of Baryta.	Opium? [†]	Hemlock.
Hellebore.	Lettuce.	Camphor. [†]
Savine.	Henbane.	Cocculus Indicus.

CLASS III. POISONS WHICH, THROUGH THE MEDIUM OF THE CIRCULATION, EXPEND THEIR ENERGIES UPON THE SPINAL MARROW, WITHOUT DIRECTLY INVOLVING THE FUNCTIONS OF THE BRAIN.

(*Death by Tetanic Convulsions.*)

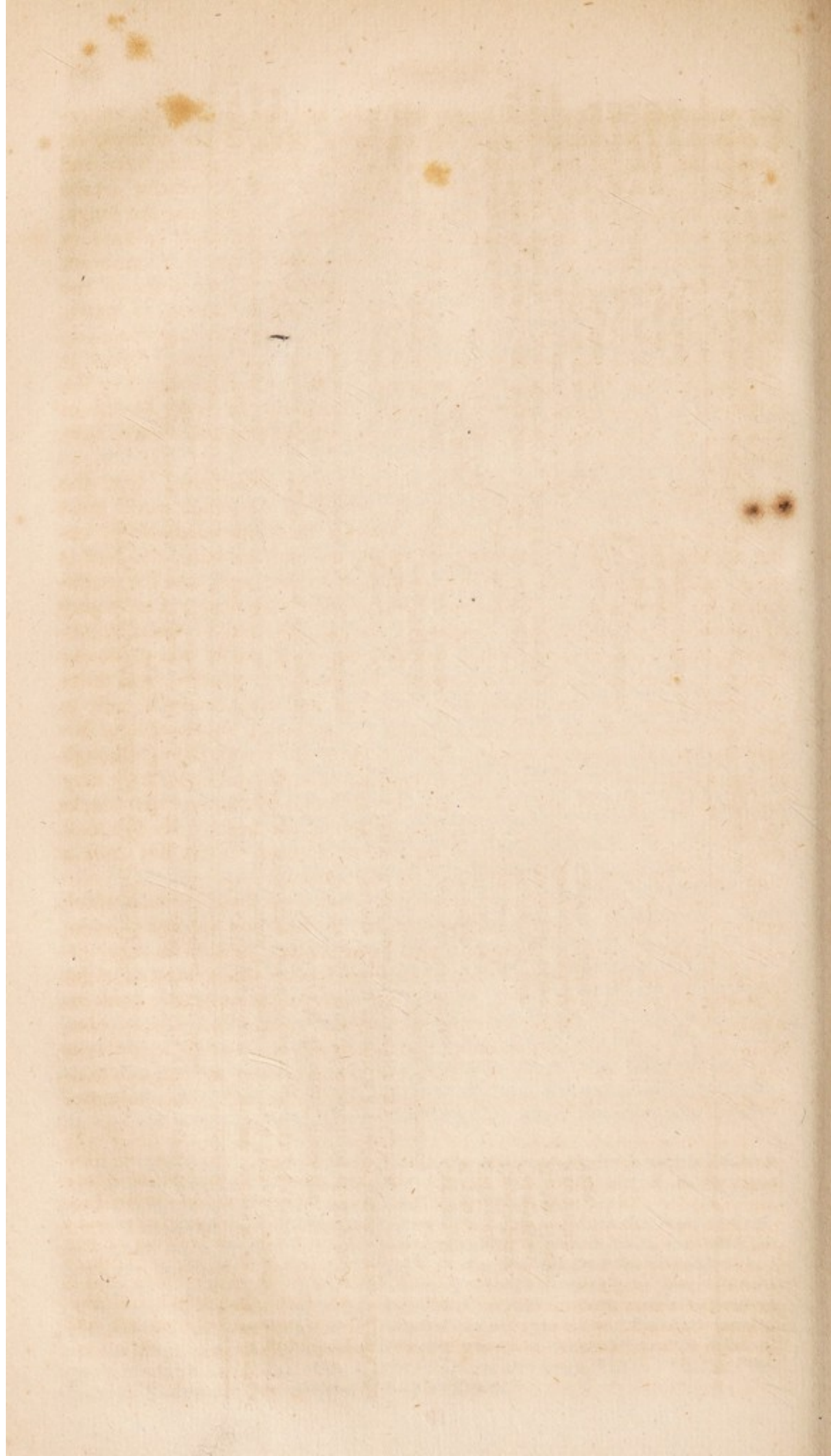
Nux Vomica—and the whole tribe of *Strychnus*.

CLASS IV. POISONS WHICH PRODUCE A DIRECT LOCAL ACTION ON THE MUCOUS MEMBRANE OF THE ALIMENTARY CANAL.

(*Death by Gangrene.*)

Corrosive Sublimat. [†]	Cantharides.
Verdigris.	Bryony.
Muriate and	Elaeterium.
Oxide of Tin.	Euphorbium.
Sulphate of Zinc.	Colocyuth.
Nitrate of Silver.	Hedge Hyssop.
Concentrated Acids.	Ranunculi.
Caustic Alkalies.	Nitre.

[†] This mark denotes that the substance, against which it is placed, may also act by being absorbed.
[‡] Signifies that the article has also a local action.



ally performed at longer and longer intervals, and that it at length entirely ceased. Two minutes after the apparent death of the animal, he opened the thorax, and found the heart acting with moderate force and frequency, *circulating dark coloured blood*; he then introduced a tube into the trachea, and produced artificial respiration by inflating the lungs, and he found that by these means the action of the heart might be kept up to the natural standard, as in an animal from whom the head is removed. The same phenomena resulted from the injection of two drops of the *Essential Oil of Bitter Almonds*, diffused in half an ounce of water, into the rectum of a cat; and from the application of the empyreumatic oil of *Tobacco* to the tongue, and rectum of cats and dogs. Now it is obvious that the functions of the brain are immediately disordered by the influence of these poisons on the tongue, stomach, and lower bowels of animals, so instantaneously, that it is impossible absorption should have already taken place.

Although the general proposition seems to be established, that the brain is not *immediately* necessary to the action of the heart, yet it must not lead us to the conclusion that the heart is therefore incapable of being affected by violent impressions on the nervous system; the fact is quite otherwise, for although the brain may be removed, and the circulation be nevertheless maintained by artificial respiration, yet an injury of another kind inflicted on the brain, may be followed by those immediately fatal consequences which decapitation itself would not produce; thus is a blow on the head commonly followed by syncope, and there are certain poisons that would seem to act in the same manner, such is the *infusion of tobacco*,* which suspends the action of the heart long before the animal ceases to respire, and kills by producing syncope, although in this latter case it has been questioned whether the spinal marrow may not be primarily affected, which has been shown by recent experiments to have an intimate relation with the action of the heart. Be this as it may, it is sufficiently obvious, that the second division of the first class is sanctioned by theory, and confirmed by experiment.

We come now to speak of the Second Class,—of those poisons which enter the circulation, and act through that medium on the heart, brain, and alimentary canal. These organs, however, are affected in very different degrees by different poisons, or even by the same poison, under different circumstances. *Mr. Brodie* has shown that vegetable poisons, although when introduced into the alimentary canal affect life, in consequence of the nervous sympathy which subsists between these surfaces and the common sensorium, yet, that the same poisons applied externally to a wound, produce their effects exclusively through the medium of

* It is a very curious fact, that the *Oil of Tobacco* should differ so essentially in its physiological action from the infusion of that vegetable poison; the former we have stated, affects the brain only, the latter we now learn, when taken into the alimentary canal, suspends the action of the heart. This apparent anomaly at first led *Mr. Brodie*, as he has since informed me, to suspect the accuracy of his experiments; and I suggested to him, whether a probable explanation might not be derived from the late chymical researches into the composition of tobacco, which have shown the existence of two active principles, viz. *Nicotin* and an *Essential Oil*? Where an infusion is employed, we seem to obtain the influence of the former, and the effects are displayed upon the heart; but where the oil is applied, the *Nicotin* has been removed, and the brain is the organ principally affected—see *Tabaci Folia*.

the circulation, being conveyed to the brain only by mixing with the blood in its vessels, and not by being conveyed through the lymphatics, for a ligature upon the great blood-vessels prevents their producing deleterious effects; whereas a ligature upon the thoracic duct, or general canal through which all the absorbents pour their contents into the blood, does *not* in the least retard or prevent the operation of the poison. There are also several of the mineral poisons which, whether introduced into the stomach, or applied externally to a wound, poisons the animal in consequence of being carried into the circulation. It had long been supposed that Arsenic occasioned death by inflaming the stomach; but Mr. Brodie has very satisfactorily shown that its influence arises from its absorption, and that it must be regarded rather as a *vital*, than as a *chymical* agent. In the first place, he has found the inflammation of the stomach, in several cases, so slight, that on a superficial examination it might have been easily overlooked, and, in most of his experiments with Arsenic, death took place in too short a time to be considered as the result of inflammation; and in the next place, in whatever manner the poison is applied, whether *externally* to a wound, or *internally* to the membrane of the stomach, the inflammation is confined to the stomach and intestines; and, indeed, it is commonly more violent, and even more immediate, when applied to a wound, than when internally administered; and it also precedes any inflammation of the wound. This important fact was proved by an experiment made by Mr. Hunter and Sir Everard Home, and subsequently by the repeated investigations of Mr. Brodie.

It has been just stated that after a poison has found its way into the circulation, it expends its virulence upon some particular organs. In some cases this is much more striking than in others. The preparations of *Baryta*, and of *Tartarized Antimony*, attack the heart, and occasion death by syncope. *Arsenic* is less definite in its action, it influences both the brain and the heart, but with different degrees of force in different cases, so that it is often difficult to ascertain which of these organs is the first to fail in its functions. *Hydro-cyanic Acid* is absorbed, and destroys life by its action upon the nervous system, whose energies it would seem to extinguish without any ostensible injury to the respiration and circulation; for in all those animals which were killed by it in the experiments of *Orfila*, *Brodie*, and others, the heart was found acting regularly, and circulating dark-coloured blood; and in some cases, this phenomenon was visible for many minutes after the animal was in other respects apparently dead.

Some substances would seem to direct their powers to various parts of the alimentary canal; and the appearances so produced might be mistaken for the effects of the local action of the poison, had they not been clearly proved by experiment to have arisen from an application addressed through the medium of the circulation; thus is inflammation of the *primæ viæ* induced by the contact of Arsenic with an external surface of the body!

The *Third Class* of my arrangement includes those poisons which enter the circulation, and, through that medium, expend their influence upon the spinal marrow, without *directly* involving the functions of the brain. *M. Majendie*, in the year 1809, submitted to the first class of the

French Institute a series of experiments which had conducted him to the extraordinary result above stated. He found that an entire class of vegetables (the bitter *Strychnus*) possesses this singular property.

The *Fourth Class* comprehends all those substances which destroy life by a local action upon the alimentary canal, not by any impression upon their nerves, but by simply inducing a fatal lesion in the membranes.

Through one or more of the above modes of operation all poisons may be said to produce their fatal effects. In some cases a poisonous substance will be found to act in several different ways; thus, the *Nightshade* is evidently absorbed, carried into the circulation, and is enabled, through that medium, to act upon the brain; at the same time it exerts a local action upon the stomach, although less violent than that occasioned by the acrid poisons; it moreover would appear, upon some occasions, to act directly through the medium of the nerves, like those substances which have been received in our first class, or else, how shall we explain the fact of the pupil of the eye becoming permanently dilated by the contact of the *Belladonna* with the tunica conjunctiva? It would appear therefore that this plant unites within itself all the three great modes of action, upon which I have just attempted to establish a physiological arrangement of poisons. So again, *Corrosive Sublimate*, although placed in the fourth division, as being a substance which destroys by inflicting local mischief, is nevertheless capable of being absorbed. The embarrassments, however, which might be supposed to arise from this double mode of operation, are of but trifling importance. It is to the primary operation of a poison to which we are to direct our attention, the subsequent effects are less important in as much as they are more capable of being controlled.

Having thus offered a summary of our present views respecting the physiological action of poisons, we are prepared to lay down a general plan of treatment, which, it will be seen, can only be successful when conducted on principles strictly conformable with the just notions which the preceding experiments have so satisfactorily established.

Where a poisonous substance has, either through accident or design, found its way into the alimentary canal, three important indications are, if possible, to be fulfilled; and under these heads I shall offer such observations as may serve to instruct the practitioner in the philosophy of the general treatment, reserving the details to be observed in that of each poison, for more particular notice in the second part of the work, where the history of these substances will be individually considered. The indications to which I allude are the following, viz.

1. *The immediate ejection of the poison from the body, by the operation of vomiting and purging.*

Whatever may be the nature of the poison, we should endeavour with all possible expedition, to eject it from the body; and upon the promptness with which this is effected, the safety of the patient will generally depend; for the dangerous effects of such substances advance in a very increasing ratio, with the time they remain in contact with a living surface. A question may arise, whether in some cases it would not be judicious to attempt in the first instance the neutralization or decomposition

of the poison; where a mineral acid, or a caustic alkali has been swallowed, it would undoubtedly be right to neutralize, and dilute it, as soon as possible, and then to excite vomiting, which may be advantageously effected by thrusting the finger down the throat, or by tickling the internal fauces with a feather: where an emetic is at hand, whatever may be its nature, it should be promptly given, but if circumstances will allow us the opportunity of selection, *Antimony*, *Ipecacuanha*, &c., should be rejected, and *Sulphate of Zinc*, or *Sulphate of Copper*, for several reasons, be preferred; in the first place they do not require much dilution* for their action, a circumstance of no small importance in the treatment of poisons that act by being absorbed; in the next place, they are extremely expeditious, a dose of fifteen or twenty grains producing almost instantaneous vomiting, without exciting that previous stage of nausea which so frequently characterizes other emetics, and which occasions a state of the vascular system highly favourable to the function of absorption, (as I have so fully explained at page 89.)

The practice of emptying the stomach by means of a syringe, as proposed by Boerhaave, has lately been revived with all the confidence of a new invention. There are cases of narcotic poisoning in which there can be no doubt it would furnish the practitioner with a valuable resource but I much fear that it will be found to be less successful than its more sanguine advocates have anticipated; for where the stomach has so far lost its power as to be insensible to the stimulus of a potent emetic, the chances of recovery are small; the practice, however, in such cases ought never to be neglected, for it cannot possibly do harm, and may perhaps be beneficial.

After all has been ejected, which the operations of art can effect, we are to proceed, without delay, to the fulfilment of the second indication; viz.

2. *The Decomposition of any remaining Portion, and the adoption of measures best calculated to obviate its absorption.*

Where the substance is in a solid form, and acts by absorption, we should be very cautious how we favour its resolution; while, if it exists in a liquid state, our object must be to render its active portion insoluble; this problem involves a series of questions which are wholly chymical. In order to prevent, or retard, the absorption of the active matter, we must, to a great degree, depend upon the agency of vital adjuvants; this latter indication however does not apply to *Corrosive Sublimate* and other substances which act upon the stomach locally, and are not absorbed; copious dilution also, in such cases, will frequently disarm the poison of its virulence,† but it should be followed as quickly as possible by vomiting. In cases where the poison requires to be absorbed, before it can display its energies, it would be generally unsafe to adminis-

* Dry Vomit of Marriott. This once celebrated vomit, called Dry, from its being exhibited without drink, consisted of equal proportions of Tartarized Antimony and Sulphate of Copper.

† Sydenham relates a case of poisoning by Corrosive Sublimate; which was successfully treated by copious draughts of water, and repeated vomiting (*Opera Medica* Epist. 1, p. 200;) and Orfila, in his laborious work on Poisons, presents us with a mass of satisfactory evidence upon the same subject.

ter any solvent. Nothing therefore can be less true as an aphorism, nor more dangerous as a precept, than the unqualified assertion of Boerhaave, "*Aqua omnia venena enervat, quæ cum aqua misceri possunt.*" (Prælect. in Instit: T. vi. p. 289.) Alkaline solutions and *Magnesia*, in cases of the ingestion of arsenic, accelerate its fatal effects, by promoting its solution,* whereas *Lime*, or its *Carbonate*, has an opposite tendency,† in consequence of the insolubility of *Arsenite of Lime*; so again, Orfila has shown that the pernicious qualities of the *Muriate of Baryta* are counteracted by the administration of any soluble *Sulphate*, which renders the former substance insoluble. In cases where *Verdegris* has been swallowed, the administration of vinegar greatly increases its virulence, as M. Drouard has ascertained, by converting the substance into a soluble *acetate of copper*. This view of the subject will explain why the pure earth *Baryta* is so slow, and comparatively inert, in its effects upon the system, while its *muriate* is distinguished by the extreme rapidity and virulence with which it operates. The propriety of administering *vinegar*, *lemonade*, and different acid potations, in order to counteract the baneful effects of *Opium*, which has been so often questioned, will thus also receive ample explanation; it must appear that, if any quantity of the substance of opium remain in the primæ viæ, acid, or mucilaginous drinks will, by favouring its solution and absorption, accelerate its fatal effects;‡ but should it have been previously ejected from the stomach, that then the anti-narcotic influence of a vegetable acid§ may remove the consecutive stupor and delirium, and thus realize the expectations which Virgil has so poetically raised.

"Media fert tristes succos tardumque saporem
Felicis Mali: quo non præsentius ullum
(Pocula si quando sævæ infecere novercæ
Miscueruntque herbas, et non innoxia verba)
Auxilium venit, ac membris agit atra venena."

"Nor be the Citron, Media's boast unsung,
Though harsh the juice, and ling'ring on the tongue.
When the drugg'd bowl mid witching curses brew'd
Wastes the pale youth by step-dame hate pursu'd,
Its powerful aid unbinds the mutter'd spell
And frees the victim from the draught of hell."

* Circumstances, however, may occur, which will render it even judicious, with certain precautions, to administer a solvent, in order to remove the particles of the substance, which sometimes adhere with such obstinacy to the coats of the stomach as to defy the exertions of an emetic to detach them, especially if the poison be arsenic; but let the practitioner remember that this practice can never be allowed until all that can be ejected by vomiting or purging has been previously removed; then perhaps the ingestion of *Magnesia*, or an Alkaline Salt, as proposed by Mr. Marshall, might be admissible, but it should be quickly followed up by fresh emetics and purgatives.

† London Medical Repository, August, 1817.

‡ The truth of this statement has been very satisfactorily established by the experiments of ORFILA (*Toxicologie générale considérée sous les Rapports de la Physiologie, de la Pathologie, et de la Médecine légale*) as well as by several that have been performed in this country.

TORTOSA (Istituzioni di Med. For.) has remarked that *Opium* may act mortally without losing much of its weight in the stomach—I should question the truth of this assertion.

§ Vegetable acids are in Nature rarely the vehicles of poisons, the most deleterious plants being inert in those parts that are impregnated with acid; the pulp of the fruit of the *Strychnus*, amongst many others, offers an illustration of this fact. Virey.

Chardin, in his travels through Persia, informs us that when a Persian finds himself in a distressed situation, he has recourse to a piece of opium as large as the thumb, and that immediately afterwards he drinks a glass full of vinegar; by which he is thrown into a fit of laughter, terminating in convulsions and death.

With regard to the use of *Antidotes*, it has been already stated how little they are to be depended upon; in certain cases, however, we are bound to acknowledge their power, but they should be very rarely trusted, unless subsequent to, or in conjunction with, the operation of an emetic; in many cases the effects of this latter remedy may be promoted by the ingestion of liquids holding the particular antidote in solution, a practice which offers the double advantage of accelerating the elimination of the poison, and at the same time of decomposing any which may remain. Orfila has fully established the fact of *Albumen* being a counterpoison to *Corrosive Sublimate*; vomiting may therefore be very judiciously promoted in cases of such poisoning by water holding the white of egg in solution; with equal effect, where *Verdegris* has been swallowed, sugared water may be used as a diluent to encourage emesis; and *Muriate of Soda* in solution will be found the most efficient antidote to *Nitrate of Silver*; and *Sulphate of Magnesia* to *Acetate of Lead*. Where an emetic salt, like *Tartarized Antimony*, has been taken, copious dilution with common water will in general so provoke vomiting, as to render it its own antidote; but it may be useful to remember, that the *Infusion of Galls*, and according to Berthollet, the *Decoctions of Bark*, at the temperature of from 30° to 40° *Fah.* have the power of decomposing it; while Orfila considers milk the most efficient counterpoison to the *Sulphate of Zinc*.

Having ejected from the stomach all the poisonous matter we can by vomiting, and attempted to decompose what remains, we are to pursue such measures as may be calculated to prevent the absorption of the poison into the circulation; it has been already observed that on this account nauseating emetics should be avoided; the reader is now requested to refer to our *exposé* of the celebrated doctrine of *Majendie*, (page 89, note) and he will see that *Venesection* proves one of the most powerful means of exciting the function of absorption: hence in poisoning by arsenic, such an expedient should never be recommended,* while a particle of that substance remains in the body; where *Corrosive Sublimate* has been swallowed, the same precaution is unnecessary. The last indication which remains to be fulfilled is—

3. *To anticipate the occurrence of the Consecutive Phenomena, and to combat them by appropriate treatment.*

This is to be conducted on the general principles of *Therapeutics*; the treatment must necessarily vary in each particular case. Where the

* Notwithstanding this fact, we find *Venesection* recommended in works on *Toxicology*, as a safe precaution to be used against the inflammatory action produced by arsenic.

The application of a ligature above an abraded surface to which a poison has been applied, prevents its effects upon the constitution, not so much by obliterating the capacity of the vessels, as by inducing a local plethora, and so suspending the process of absorption.

exhaustion of nervous energy is to be feared, as after poisoning by *Prussic Acid*, ammonia, and other diffusible stimulants, together with external warmth, will furnish the best resource; for the same reason Venesection should be performed with great caution and judgment after a narcotic poison. Where, on the other hand, inflammatory action is to be anticipated, it is unnecessary to detail the plan of treatment which may be adopted with the greatest chance of success. In cases where the nervous system is stupified, the symptoms may be combatted by vegetable acids, infusion of coffee, &c., but where it is in a state of preternatural excitement, recourse must be had to opiates.

ESCHAROTICS :*

Substances whose application to the animal solids, erodes, or decomposes them.

The operation of these bodies may, in general, be considered chymical; for having destroyed the life of the part to which they are applied, they cause, as if by a species of resulting affinity, the elements of the animal matter to enter into a new state of combination; this is well exemplified in the action of caustic potass, where the nascent elements thus disengaged by the decomposition of the animal substance, reunite in proportions to generate an oily matter, which may be observed to form a film over the ulcerated surface, while the excess of nitrogen and hydrogen constitute ammonia, which is disengaged during the action of the caustic; and may be rendered sensible by inverting over the surface, a small jar moistened with muriatic acid, when the fumes of *Muriate of Ammonia* become visible.†

Their surgical value consists in their power to remove excrescences, to establish an ulcer, or to convert an ulcerated surface into a simple sore.

IV. OF MECHANICAL REMEDIES.

This subdivision includes those classes of remedies, whose operation depends entirely upon *mechanical* principles; and we must agree with Dr. Murray in considering them as the least important of all the articles which we have enumerated, and which cannot therefore constitute objects of elaborate inquiry.

* *Escharotic* from *crustam* ἐσχαρῶω induco, to scab over, to burn into a crust.

† Or in a still more striking manner, by holding over the surface of the sore a piece of white paper moistened by the mixed solutions of Nitrate of Silver and Arsenious Acid, when the disengaged Ammonia will by the operation of double affinity enable the Arsenious Acid to decompose the salt of Silver, and to display the presence of the Arseniate of that metal by its characteristic yellow indication. I am not acquainted with any test for Ammonia so summary and satisfactory as this. See Arsenicum in an after part of this work.

ANTHELMINTICS:

Remedies which expel worms* from the intestinal canal.

It has been already stated, (page 91) that certain bodies have the power of increasing the peristaltic motions of the intestinal canal, by operating as mechanical stimulants upon its fibres; in this manner the filings of tin and iron, or the irritating down which covers the pods of the *Dolichos Pruriens*, are supposed to act in dislodging and evacuating the worms from the intestines. But there is a variety of remedies employed as vermifuges, which must owe their effects to a very different mode of operation; *Bitters* for instance appear to prove an absolute poison† to these animals, while they, at the same time, give an increased tone to the organs of digestion: from whose debility the generation of worms would seem to arise. Other remedies, again, obviously depend upon their simple cathartic property, for the powers which they possess in the evacuation of worms. See *Terebinthinæ Oleum*—*Cam-bogia*.

In the cure of *Ascarides* the local application of the remedy becomes necessary, in the form of glyster, and which acts both *mechanically* in washing out the gut, and *medicinally* in proving obnoxious to the animals, according to the experience of some of our best practitioners, a strong decoction of the *Semina Santonici* proves most efficacious upon these occasions.

DEMULCENTS:

Medicines which are capable of shielding sensible surfaces from the action of acrid matter, by involving it in a mild and viscid medium.

It cannot be denied that where these remedies admit of direct application, considerable benefit may arise; in the progress of a catarrh, we have all experienced the relief that may be occasioned by lubricating the fauces with demulcents, which, by soothing the top of the trachea, quiets, by a kind of contiguous sympathy, the whole pulmonary structure; in certain states of intestinal irritation, the same remedies have furnished considerable benefit, and in ophthalmia, relief has been obtained by the application of a demulcent to the inflamed conjunctiva, by which it is defended from the irritation of the tears; see also *Formula* 61; but in parts beyond the reach of the first passages, and to which no fluid can arrive but through the medium of the secretions, it is very difficult to explain the principle upon which their beneficial operation can depend; and it seems indeed highly probable that they act in

* There are four species of worms generated in the human intestines, viz. The *Tænia*, or tape-worm—*Tricocephalus*, or *Trichuris*—*Ascaris Vermicularis*, or *Ascarides*—and *Lumbricoides*.

† It is a very curious fact that vegetable bitter should be so essential to the well-being of the higher order of animals, as explained at page 81, and yet prove so generally destructive to insects. Flies are almost immediately destroyed by an infusion of *Quassia*, and Nature has protected the ear from the invasion of insects by providing an intensely bitter secretion.

such cases as simple diluents, for the process of digestion must necessarily deprive them of their characteristic viscosity. The administration of demulcent drinks in gonorrhœa is probably of no farther service in assuaging the *ardor urinae*, than an equivalent quantity of pure water; although Dr. Murray observes, "it is sufficiently certain, that many substances, which undergo the process of digestion, are afterwards separated in their entire state from the blood, by particular secreting organs; and there is, continues he, no gland which has this power more particularly than the kidneys; substances received into the stomach and digested, afterwards passing off in the urine with all their peculiar properties." This is undoubtedly very true, but mucilaginous substances rarely or never pass off in this manner; if they evade the assimilative functions, they pass through the alimentary canal, and are thus eliminated. I can state, as the result of experiment, that the urine undergoes no change except in the relative proportion of its water, by the copious and repeated administration of mild mucilages. Dr. Saunders has very justly remarked that the long list of *Ptisons*, *Decoctions*, &c., usually prescribed upon these occasions, generally owe their virtues to the watery diluent itself.

The pharmaceutical applications of this class of medicines constitute, perhaps, not the least part of their value, by which we are enabled to introduce acrid substances into the stomach with safety and effect; but such services will more properly fall under our notice in a future part of the work.

DILUENTS.

Watery liquors, which increase the fluidity of the blood, and render several of the secreted and excreted fluids less viscid.

There are certainly few remedies whose operation is more simple, obvious, or important; and yet there are scarcely any whose value has been more mistaken, or whose application has been so frequently perverted through the suggestions of false theory; water is the universal beverage of animals, and the necessity of its supply is indicated by thirst, a sensation which, in excess, is borne with less tranquillity even than that of hunger; in certain morbid states of the body its presence is to be regarded as indicating the necessity of copious potation; and yet how often has the prejudiced physician, under such circumstances, aggravated the pressure of disease, by adding the sufferings of Tantalus. In febrile affections, the irritation of thirst tends to keep up the disease, and hence diluents, besides the other beneficial effects which they may produce, must be regarded as important remedies. There are also diseases of the alimentary canal which may be removed by the same agents; when water is conveyed into the intestines it will have a tendency, by mixing with, and diluting the biliary secretion, to diminish its acrimony, and thus to obviate a source of morbid irritation; the dilution of the chyme and chyle may also have a salutary tendency, and favour the absorption of the finer and more nutritive parts of the lacteals; and by increasing the fluidity of the mass, expedite the numerous combinations which it is destined to undergo. The blood itself is also thus modified

in its fluidity; although it has been very truly observed that in healthy bodies, or such as are without any obstruction of the excretions, an unusual distention of the vessels cannot be produced, or at least long subsist; for it is evident that such an increased quantity of water in the blood will immediately pass off by one or other of the excretions; this effect, however, in itself, renders the operation of diluents of signal service in the treatment of the disease; in consequence, for instance, of their disposition to pass off by urine, they furnish valuable resources in diseases of the urinary organs, allaying the pain of strangury, and the irritation from an inflamed bladder. From these observations, the practitioner will be led to appreciate the value of diluents; and many of the beneficial effects which are daily experienced from the copious potation of mineral waters, are, without doubt, to be wholly attributed to simple dilution. See *Aqua*.

It is here necessary to say a few words upon the misapplication of this order of remedies. Dr. Davy found by experiment that when an animal is bled to death, the last portions of blood that flow are of a much lower specific gravity than that which flows first, in consequence of the former containing more water, which it may be inferred was derived by the increased activity of the absorbents, exerted chiefly on mucous and serous membranes. Since then venesection promotes and accelerates absorption,* it is clear that, in inflammatory diseases, where we have recourse to blood-letting, in order to diminish the volume of circulating fluids, we ought not to suffer the patient to indulge in an unrestrained use of liquids, which he eagerly demands to satisfy a thirst which, in all probability, is the natural consequence of increased absorption. In such cases, it is often better to take liquids in small divided doses, which will have the effect of moderating the thirst, without overloading the arterial system, and bringing on that tension and plenitude which are liable to be produced by swallowing too large a proportion of liquids.

In the use of water upon such occasions, it may moreover be observed, that its temperature ought to be attended to; as a general rule it may be laid down, that in the *cold* stage it should be *hot*, in the *hot*, cold, and in the *sweating*, tepid.

With regard to the value of diluents, as capable of promoting the operation of other remedies, many observations of great practical importance might be adduced; but this subject will be more properly elucidated when we come to consider the influence of solubility in modifying the activity of medicinal substances, and which constitutes a very curious and interesting object of chemico-medical inquiry.

While speaking of Diluents it may be cursorily noticed, that water appears, under certain circumstances of the body, to suffer decomposition, and to have its elements appropriated to new combinations. Count Rumford has endeavoured to prove, that the surprisingly small quantity of solid food which is sufficient for nourishment, when converted into rich and palatable soup, is owing to the culinary process having prepared the water for chymical decomposition,† and that this is ultimately effect-

* The reader is also referred to an account of Majendie's experiments as related at page 89 of this volume.

† Fish, especially those of the cetaceous tribe, constantly decompose water, and live upon its hydrogen.

ed during the act of Digestion.* It cannot be denied that the exorbitant potation of water has a tendency to produce fat, but this may depend upon the vascular distention which is thus occasioned. Gin drinkers, before they become materially injured by the habit, grow extremely corpulent, as may often be witnessed in unfortunate cyprians of the lower orders. Can the hydrogen of the spirit contribute to this effect?

EMOLLIENTS:

Substances whose application diminishes the force of cohesion in the particles of the solid matter of the human body, and thereby renders them more lax and flexible.

According to this definition, which we derive from Dr. Cullen, the primary operation of emollients would appear to be purely mechanical, for they are insinuated into the matter of the solid fibre, and either diminish its density, or lessen the friction between its particles; this explanation will undoubtedly apply to those emollients which consist of unctuous bodies, and which are introduced into the animal fibre by friction; but it is evident that the beneficial effects of *Cataplasms* and *Fomentations* cannot be so explained; for in these instances, none of the materials can be absorbed through the entire cuticle; and yet the relaxation and consequent ease which such warm applications produce on inflamed surfaces, is very considerable, but it must be wholly attributed to the relaxing effects of warmth and moisture upon the extreme vessels of the surface, propagated by *contiguous sympathy* to the deeper seated organs.

The operation of those substances which afford relief to excoriated surfaces by their bland qualities, as mucilaginous lotions in erysipelatous affections, is too obvious to require explanation.

Having thus investigated the manner in which medicinal substances produce their effects upon the living system, we shall be better prepared to appreciate the advantages which are to be derived from their combination with each other, and to escape the too common error of uniting in one formula, remedies which are rendered adverse by the incompatibility of their physiological actions.

* Rumford's Essays. Vol. I, p. 194—202.

ON
THE THEORY AND ART
OF
PRESCRIBING.

“ To know
“ That which before us lies in daily life,
“ Is the prime wisdom.”

MILTON.

THE THEORY AND ART

OF

TEACHING

ON

THE THEORY AND ART

OF

PRESCRIBING.

OF MEDICINAL COMBINATION.

“*Variarum mixtura novas sæpe vires generet, in simplicibus nequaquam réperiundas longe saluberrimas.*”—*Gaubius.*”

It is a truth universally admitted, that the arm of physic has derived much additional power and increased energy, from the resources which are furnished by the mixture and combination of medicinal bodies. I by no means intend to insinuate that the physician cannot frequently fulfil his most important indications by the administration of one simple remedy; I only contend that, in many cases, by its scientific combination with other medicines, it will not only act with greater certainty and less inconvenience, but that its sphere of influence may be thus more widely extended, and its powers so modified or changed, as to give rise to a remedy of new powers. Such a theory is amply justified by the state of combination in which certain medicinal principles are found in our more efficient vegetable remedies, while the medicinal practice founded upon it is thus, as it were, sanctioned by Nature's own prescriptions; enter but her laboratory, and you will soon be satisfied, that many of her potent remedies do not owe their valuable powers to any one specific ingredient, but to the combined or modified energies of various, and sometimes opposite principles. This view of the subject opens an interesting and unexplored field* of medical and chymical research, and I shall endeavour to avail myself of the novelties its investigation may present,

* I selected it as the exclusive subject of my Lectures before the Royal College of Physicians, during the year 1820.

and of the hints it may suggest for the improvement of *extemporaneous combination*. By contemplating the laws by which Nature effects her wise purposes, we may learn to emulate her processes, and even in some cases to correct and assist her operations :* such at least has been the happy result of our labours in the other departments of natural knowledge. It is said for instance that by observing the means used by nature for preventing the diffusion of light in the eyeball, Euler derived an important hint for the improvement of his telescope ; and more lately, the structure of the crystalline humour of the eye has been successfully imitated in the invention of achromatic lenses. On the other hand, it is hardly necessary to observe to what extent these instruments of art are capable of improving and multiplying the powers of that natural organ, to the contemplation of whose structure and functions, we are, as I have just stated, so greatly indebted for their origin and perfection. So shall I endeavour to show, in the progress of this work, that the combinations of nature, as exemplified in her more valuable remedies, are capable, if properly studied, of suggesting many important hints for improving the arrangements of art ; while art in return may frequently supply the defects, or extend the advantages of natural compounds.

AN ANALYSIS

OF

THE OBJECTS TO BE ATTAINED BY MIXING AND COMBINING MEDICINAL SUBSTANCES.

THE objects to be attained, and the resources which are furnished by MEDICINAL COMBINATION, together with the different modes of its operation, and the laws by which it is governed, may with much practical advantage be arranged in the following order.

I.

TO PROMOTE THE ACTION OF THE BASIS, OR PRINCIPAL MEDICINE.

A.—*By combining together several different forms, or preparations, of the same substance.*

The utility of such a combination is obvious, whenever we desire the full and general effects of *all* the principles of a medicinal body in solu-

* It was wisely said by Lord Bacon, " that Man should observe all the workmanship, and the particular workings, of Nature, and meditate which of those may be transferred to the Arts." *Advancement of Learning*, Book v. 148. For a further illustration of these views, the partiality of an author may perhaps be excused if he refer the reader to his paper " On the Recent Sandstone," published in the first volume of the Transactions of the Royal Geological Society of Cornwall.

tion; thus, where the *bark* is required in the cure of an intermittent fever, and the stomach will not allow the exhibition of the powder, it will be eligible to conjoin in one formula, the tincture, decoction, and extract, as exemplified by *Formule* 42, 126, 127. The necessity of such a combination may be expressed by the following canon. *Whenever the chymical nature of the medicinal substance will not admit of the full solution of all its active principles in any One Solvent, and its exhibition in substance is at the same time impracticable.* For farther illustrations see *Form.* 2, 25, 33, 38, 70, 109.

Practitioners, probably without having reasoned upon the theory, have very generally adopted the practice, of combining the different solutions of the same substance; for in the prescriptions of practical physicians we commonly find, that the decoction or infusion of a vegetable remedy is quickened by a certain portion of a corresponding tincture.

B.—*By combining the Basis with substances which are of the SAME NATURE, that is, which are INDIVIDUALLY capable of producing the same effect, but with less energy than when in combination with each other.*

Dr. FORDYCE first established the existence of the singular and important law, that *a combination of similar* remedies will produce a more certain, speedy, and considerable effect than an equivalent dose of any single one*; a fact which does not appear to have been known to any ancient physician. The earliest mention of it that I can find is by VALISNIERI, the favourite pupil of Malpighi, who filled the medical chair at Padua in 1711, nearly ninety years before Fordyce published his valuable memoir on the combination of medicines, but he does not attempt any generalization† of the subject; he merely states, as the result of careful experiments, that twelve drachms of *Cassia Pulp* are about equivalent in purgative strength to four ounces of *Manna*; and yet, says he, if we give eight drachms of *Cassia Pulp*, in combination with four drachms of *Manna*, we obtain double the effect! How, adds the professor, can this possibly happen? Surely the very contrary *ought* to obtain, since four drachms of *Cassia* are much more than equivalent to an equal weight of *Manna*; the strength of the former being to that of the latter as 8 to 3.

* The practitioner must receive the term *similar*, coventionally, as expressed at page 73. Many of those substances which we are at present bound to consider *similar*, will no doubt, require to be transplanted into other classes as the progress of physiological knowledge shall elucidate their modes of action. In this attempt to teach the Art of Medicinal Combination, I have endeavoured to reduce the propositions it comprehends to the greatest degree of generality of which they are, at present, susceptible.

† Numerous isolated statements of the same tendency may be adduced, but these cannot invalidate the claim of Dr. Fordyce, as the first person who generalized the fact, and applied it with success to practice. DIEMERBROECK, in his notes upon the *Theriaca Andromachi*, observes that the composition is a more efficacious medicine from the concurrent powers of so many ingredients, alike in virtue: and Quincy in his *Lectures on Pharmacy*, which were published by Dr. Shaw, in 1723, says, "these fetid gums which are generally prescribed in Hysteria, as *Ammoniacum*, *Galbanum*, &c., may be conjoined with advantage, because from a concurrence of properties, they all conspire to the same end."

The truth of this law of medicinal combination must be continually felt by the practitioner in the ordinary routine of his practice, viz.

NARCOTICS will better fulfil the intention of allaying irritation and pain, when composed of several of such medicines in combination, than when they consist of any single one, even should the dose, in this latter case, be increased. See *Formulae* 3, 4, 5.

ANTISPASMODICS acquire increased efficacy by the application of the same principle. *Form.* 20, 21, 22, 23, 24, 25.

BITTER TONICS are also thus exalted, see *Form.* 39, 40, 41. The beneficial effects, however, which arise from combinations of this kind will admit of a satisfactory explanation upon another principle; we may, for instance, consider them as medicines, differing from each other in their composition, and producing by their union an assemblage of bitter astringent, and aromatic principles.

AROMATIC and DIFFUSIBLE STIMULANTS. There are perhaps no remedies which receive greater mutual benefit by intermixture with each other, than the individuals which compose this class; for they not only thus acquire increased force and efficacy, but at the same time they lose much of their acrimony; if, for instance, any one spice, as the dried capsule of the *Capsicum*, be taken into the stomach, it will excite a sense of heat and pain; in like manner will a quantity of *Black Pepper*; but if an equivalent quantity of these two stimulants be given in combination with each other, no such sense of pain is produced, but, on the contrary, a pleasant warmth is experienced, and a genial glow felt over the whole body; and if a greater number of spices be joined together, the chance of pain and inflammation being produced is still farther diminished. The truth of this law is also strikingly illustrated, as Dr. Fordyce has observed, by that universal maxim in cookery, *never to employ one spice, if more can be procured*; the object in this case, being to make the stomach bear a large quantity of food without nausea.* This same principle also finds an illustration of its importance, as it regards the class of stimulants, in the following preparations of our *Pharmacopœia*, viz. "*Pulvis Cinnamonomi compositus*; *Infusum Armoracæ compositum*; *Infusum Aurantii compositum*; *Spiritus Lavendulæ compositus*; *Tinctura Cinchonæ composita*; *Tinctura Valeriana Ammoniata*; and the *Confectio Opii*, the elegant and scientific substitute for the celebrated *Mithridate* or *Theriaca*. The practitioner is also referred to *Form.* 45, 47, and to *Allii Radix*.

The local action of these stimulants would appear to be placed under the dominion of the same law, and perhaps the origin of the custom, so long observed, of mixing together the varieties of snuff, may thus receive a plausible and philosophical explanation; certain it is that by such combination the harsh pungency of each ingredient will be diminished, whilst the general potency of the application, in exciting the nerves, will be increased, and rendered more grateful; the same principle will direct the

* Such was the nature of the "*Mustacea*" of the Romans, which were a species of cake, used at weddings, and consisted of meal, aniseed, cummin, and several other aromatics; their object was to remove or prevent the indigestion which might be occasioned by eating too copiously at the marriage entertainment. It must be acknowledged that this compound was better adapted for such a purpose than the modern bride-cake, to which it gave origin. Cato (de R. R. c. 121) has given us a receipt for the Roman bride-cake.

formation of safe and efficient plasters and lotions; the *Emplastrum Cumini* of the London, and the *Emplastrum Aromaticum* of the Dublin Pharmacopœia, offer examples of its judicious application.

ASTRINGENTS. For illustration see *Form.* 51, 58.

EMETICS are certainly more efficient when composed of *Ipecacuan*, united with *Tartarized Antimony*, or *Sulphate of Zinc*, than when they simply consist of any one of such substances in an equivalent dose. See *Form.* 63, 65.

CATHARTICS not only acquire a very great increase of power by combination with each other, but they are at the same time rendered less irritating in their operation; the *Extractum Colocynthis compositum* affords an excellent example of a compound purgative mass being much more active and manageable, and less liable to irritate, than any one of its components separately taken. Additional examples of this fact are furnished by *Formulae* 70, 76, 78, 79, 81, 88. In many cases, however, the fact of purgatives thus accelerating and correcting each other's operation may be explained by considering them as substances endowed with different powers, as already demonstrated, (p. 91,) and which will be more fully considered in the third division of this Essay.

DIURETICS. Under this class of medicinal agents it may be observed that, *whenever a medicine is liable to produce effects different from those we desire, its combination with similar remedies is particularly eligible*, by which the action of the basis may be directed and fixed; thus the individuals which compose the class of Diuretics are uncertain in their operation, and disposed, when exhibited singly, to produce diaphoretic and other contrary effects; it is, therefore, in such cases, highly judicious to unite several of them in one Formula, by which we increase their powers, and are more likely to ensure their operation. *Formulae* 101, 103, 108, 109, 110, 111, 115, are constructed upon this principle.

DIAPHORETICS. Our maxim, "*VIS UNITA FORTIOR*," certainly applies with equal truth to this class of medicinal agents. *Form.* 122, 124.

EXPECTORANTS. More is frequently to be gained by the co-operation of these remedies than can be obtained by the exhibition of them separately, as in *Form.* 134, 135.

DEMULCENTS do not appear to obtain any other benefit from combination than, occasionally, a convenience and efficacy of application arising from a suitable degree of consistence and solubility. See article "*Trochisci*."

The operation of the law which has thus formed the first object of this inquiry, will be found, like every other, to have a natural and well defined limit: it is easy to perceive that by multiplying the number of ingredients too far, we shall either so increase the quantity and bulk of the medicine as to render it nauseous and cumbersome, or so reduce the dose of each constituent as to fritter away the force and energy of the combination.

The propriety of combining *several* stimulants, of the diffusible class, in *one* formula, has been questioned on different grounds. Dr. Chapman, in his work on Therapeutics, adduces some arguments on this point, which, although they fail in establishing his general position, certainly suggest an important exception to the practice in question; "by directing," says he, "stimulating remedies, *separately*, we shall economise our resources in many lingering diseases." The justness of this

statement must be admitted to its fullest extent, and practitioners will, on certain occasions, do well to act in conformity with the views that suggested it; for instance, in the feeble forms of protracted fevers, where the indications are to be met with the continued action of stimulants, it will certainly be salutary to alternate the use of *camphor*, *ammonia*, and other remedies of a similar nature, in preference to presenting them all at once in combination, so that the system may not lose its susceptibility by the continued impression of the same stimulant; the same motive should induce us, on particular occasions, to employ in succession different narcotics, for each of them affects sensibility in its own peculiar manner.* The nervous system as *Richerand* has very justly observed, may be compared to a soil, rich in different juices, and which requires the cultivator to plant the germes of a diversified vegetation to develop the whole of its fecundity; to insure a perpetual return, therefore, it will be right to sow a succession of different seeds. *Hoffman* also has offered us some advice upon this subject; he directs us in the treatment of chronic diseases to suspend the administration of remedies, at intervals, and afterwards to resume them, lest the system should become *habituated*, and ultimately *insensible* to their influence.

But there remains for investigation a still more important precaution respecting this law of medical combination;—that, in combining substances in the manner, and for the object just related, the practitioner should be well satisfied that their medicinal virtues are in reality *practically* SIMILAR, or he will fall into an error of the most fatal tendency; it has been already shown, and I hope I shall not be considered tedious by again directing the reader's attention to the fact, that medicines are not necessarily similar because they have been arranged in the same artificial division of remedies; in order to establish a perfect similarity *their operations must be found by experience to continue similar under every condition of the human body; and that, moreover, they must owe such similarity to modes of operation which are compatible with each other, and consonant with the general mode of cure*; we have only to refer to the history of Diuretics (page 95) for a full illustration of this important truth; thus *Squill*, *Calomel*, and *Digitalis*, are each powerful Diuretics, but nevertheless they cannot be considered *similar* remedies, since *Digitalis* will entirely fail in its effects in the very cases that *Calomel* and *Squill* succeed; and *Squill* will prove inert when *Digitalis* is capable of producing the most powerful influence; this arises from their modes of operation being dissimilar, and consequently requiring for their success such different states of the living system. *Squill*, it will be seen, acts *primarily* on the urinary organs, by stimulating the secreting vessels of the kidneys; *Mercury*, on the contrary, acts *primarily* on the absorbents, and *secondarily* on the kidneys; whereas *Digitalis* produces its effects by diminishing arterial action, and increasing that of absorption.

Dr. Blackall, in his "Observations upon the Cure of Dropsies," has offered some remarks so valuable in themselves, and so illustrative of

* Dr. Majendie goes so far even as to assert, that by varying the different preparations of the same Narcotic, we shall be better able to keep up its action on the animal economy, without an increase of its dose. He adds, "Some English writers have denied the truth of this observation; but they have not given any reason for their scepticism.—Why should it not be true?"

this important subject, that I shall take leave to quote the passage. "Many physicians," he observes, "are fond of combining *Squill*, *Calomel*, and *Digitalis*, as a diuretic in dropsy; a practice unsafe, and not very decidedly possessing the merit even of being consistent. *Digitalis* greatly depresses the action of the heart and arteries, and controls the circulation, and it seems most unreasonable to believe that its curative powers can be independent of such an effect; on the other hand, *Mercury*, if it does not pass off quickly, is always exciting fever, and raising and hardening the pulse; speaking from experience, where the urine is coagulable, and *Digitalis* agrees, both the others are, often at least, positively injurious. On the contrary, where the urine is foul, and not coagulable, and *Squills* with *Calomel* render service, I have on that very account, made less trial of *Digitalis*, and cannot therefore speak of it from much experience." See *Form.* 103, and the note thereon.

The individual medicines which compose the class of **DIAPHORETICS** vary no less in their primary operations, as the synoptical arrangement at page 101 very fully exemplifies; thus, in the cure of intermittent fevers, diaphoretics are useful both in the paroxysm, and during the intermission; in the first case they shorten its duration; in the second they support the tone of the extreme vessels, and prevent its recurrence; but in these opposite states of disease a very different kind of diaphoretic is required—to fulfil the first indication, a cooling and relaxing one is necessary; to answer the second, the stimulating diaphoretic is exacted; the one may be said to *solicit*, the other to *extort* perspiration. So again **EMMENAGOGUES** can only be considered relative agents, since the suppression of the catamenia may depend upon, or be connected with, very different states of the system; in some cases with a diminished, and in others with an increased state of excitement; for on many occasions the suppression of the menses is the effect, and not the cause of disease; *Boerhaave* has very justly observed, that it is a most dangerous error to ascribe all the diseases of young females to a retention of the catamenia, which often do not appear, because the patients are disordered from other causes. If, therefore, we were to attempt a combination of the several medicines which have gained reputation as *Emmenagogues*, it is very obvious, that we should bring together an assemblage of adverse and incompatible remedies; nor would the physician be less inconsistent were he to combine **EXPECTORANTS**, without a due regard to their modes of operation; it is only necessary to observe their classification, as presented at page 105, to become satisfied how greatly the success of such remedies must depend upon their scientific adaptation to each particular case.

The class of **ANTISPASMODICS** may likewise embrace remedies of the most opposite tendency, for spasms may occur under the most opposite circumstances—in an extreme condition of weakness, as in nervous affections, and in an highly excited state, as in colic, &c.; it is hardly necessary, therefore, to point out the mischief that must arise from the fortuitous and indiscriminate admixture of the individual substances which are thus unavoidably arranged in the same artificial classification. *Bark* and *Steel* are also too often considered as equivalent *Tonics*; in Dropsy, says Dr. Blackall, it is far otherwise, the former being infinitely to be preferred after the dropsy of young persons, of acute disease, and of sound stamina; the latter being suited to a vitiated rather than to a feeble habit, and indicated more by a pale sallow

complexion, and a want of red colour in the blood, as shown by the paleness of the lips, than by any other signs. Need we then adduce farther illustrations of the obvious but important fact, that the terms employed to denote the different classes of remedies are frequently but relative ones, expressive of effects which are produced only in reference to a particular state of the living body? and as this necessarily varies in different states of health and disease, it follows that medicines are convertible agents, and that when we attempt to institute general rules respecting their administration, without taking into consideration the constitution and circumstances of the patient upon whom they are to operate, we shall generally be disappointed in the result. We may say of medicines what Van Swieten said of diet, "to assert that such, or such a thing be wholesome, without a knowledge of the condition of the person for whom it is intended, is like a sailor pronouncing the wind to be fair without knowing to what port the vessel is bound." Boerhaave was so fully impressed with this truth that he exclaimed, "*nullum ego cognosco remedium, nisi quod tempestivo usu fiat tale.*"

Although medicines which produce the same ultimate effects by modes of operation obviously different, cannot be considered SIMILAR, in the sense affixed to the term in the present section, yet if these different modes of operation be not physiologically incompatible with each other, the union of such remedies may not only be admissible, but even useful; and it will, accordingly, constitute an object of inquiry in a succeeding section. (III. A.)

C.—*By combining the Basis with Substances of a DIFFERENT NATURE, and which do not exert any Chymical influence upon it, but are found, by experience, to be capable of rendering the Stomach, or System, or any particular organ, more susceptible of its action.*

Thus it is that the system is rendered more susceptible of the influence of Mercury, by combining it with Antimony and Opium.* Where the stomach is insensible to impressions, the exhibition of Opium previous to, or in combination with, any active medicine, often assists its operation: this is remarkably striking in some states of mania, when emetics will fail, unless the stomach be previously influenced and prepared by a narcotic; indeed, in ordinary cases of inirritability of stomach, the addition of a small quantity of opium will often render an emetic active.†

* It would even appear probable that in some cases mercurial influence has, after its subsidence, been renewed by doses of Opium; a remarkable instance of this kind is related in Hufeland's Journal (vol. ix.) in which an old woman is said to have fallen into a considerable salivation after every dose of Opium; she had previously applied to a physician for an extensive ulceration over her body, and had taken a considerable quantity of mercury; but the effects had subsided, until renewed by the Opium.

† It has been observed under the history of Emetics (p. 87), that in cases of profound intoxication, or in those of violent wounds and contusions of the head, vomiting will not take place, however forcibly the stomach may be goaded by an emetic, whereas if the brain be only partially influenced, as by incipient intoxication, or by a less violent blow on the head, its irritability is increased instead of being paralyzed, and that vomiting under such circumstances is excited by the slightest

So again the system, when it is in that particular condition which is indicated by a hot and dry skin, is unsusceptible of the expectorant powers of Squill, unless it be in union with antimony or some powerful diaphoretic, (*Form.* 134.) Squill is by no means disposed to act upon the urinary organs, when exhibited singly : but calomel, and some other mercurial preparations,* when in conjunction with it, appear to direct its influence to the kidneys, and to render these organs more susceptible of its operation ; (103, 106.) Upon the same principle, *Antimonial Wine* quickens the operation of saline cathartics (69 ;) *Opium* increases the sudorific powers of *Antimony* (124 ;) and the purgative operation of *Jalap* is promoted by *Ipecacuan* (84.) Dr. Aikin asserts that fifteen grains of the former purgative when combined with two or three grains of the latter root, will purge more than double that quantity of *Jalap* when administered without such an adjunct.

Sir John Pringle speaks of the advantages which may be obtained by combining an alkali with a bitter infusion, by which the diuretic effects of the former will be increased, while the latter is calculated to remove any gastric debility, and to impart a general tone to the body : there is no doubt but that *Bitters*, from their invigorating influence upon the *primæ viæ*, (see page 81) increase the effects of remedies whose operation is connected with changes in *transitu*, or with absorption, as in the exhibition of certain diuretics ;† they also frequently render the stomach and bowels more susceptible of bodies that act by impression, as purgatives, emetics, &c.

We may discover the operation of such a principle in some of the more active compounds presented to us by nature : many herbs owe their efficacy to a cause of this kind. *Elaterium*, as I have ascertained by experiment, contains a purgative element *sui generis*, (*Elatin*) and a bitter principle, which in itself is quite inert, and yet its presence in the compound renders the alimentary canal more susceptible of the impression of the active ingredient, and therefore increases its force. See *Extract. Elaterii*. The history of Senna will afford some interesting facts in farther elucidation of this subject ; the leaves of this plant, like *Elaterium*, appear to contain an active principle, in combination with a bitter, which latter ingredient, although destitute of purgative properties, con-

causes ; just so is it with regard to Narcotics, a powerful dose so paralyzes the nervous system, that the stomach cannot be made to reject its contents, as every one must have observed in cases of narcotic poisoning, while smaller doses, like lesser injuries of the head, dispose the stomach to sickness.

* Sir Gilbert Blane has advanced an ingenious hypothesis to explain the cause of the foetid breath of persons under the influence of mercury ; which might perhaps also show why certain remedies are rendered more efficient by combination with mercury. One of the active effects of mercury, says Sir Gilbert, is to alter the *natural sensibility of the Lacteals*, so that when under its influence, they absorb indiscriminately that which is excrementitious and nutritive ; hence the smell of the breath, since the foetid particles are carried into the circulation, and thrown off in the *halitus* of the lungs, or by the salivary glands, in consequence of the mouth of the lacteals losing that selecting tact, whereby in their sound state they reject whatever is offered to them, except the chyle. Now if mercury acts as the "*Soporata Offa*" to the lacteals, it is evident that its combination with active matter may, on some occasions, facilitate the absorption of the latter.

† In some cases, however, the energy of an active bitter would seem to be diminished by an alkali ; and it may therefore be more prudent to administer such substances at different periods. I apprehend that the powers of *squill* are thus invalidated by a fixed alkali.

siderably increases those of the former ; for if this be removed, as happens when Senna is transplanted into the south of France, the purgative principle is weakened, but may be again restored by the artificial addition of some bitter extractive. The fruit or pods of Senna* contain only the purgative principle, and are therefore comparatively feeble, unless the defect be compensated by art : Dr. Cullen has observed that a much smaller quantity of the leaves is required for a dose if they be infused in company with some bitter plant ; and it has been found that the watery infusion of *Rhubarb* is rendered more purgative by the addition of *Calumba*.

The experiments of Seguin have established beyond all doubt that the active principle of vegetable astringents is a peculiar element, to which the name of *Tannin* has been given ; but the efficacy of this ingredient is undoubtedly enhanced by the presence of the gallic acid with which it is usually associated, although this acid, when separated from the native combination, is incapable of producing the least astringent effect : that peculiar flavour which we so commonly experience in unripe fruits, and which we designate by the term *acerbness*, is the result of a combination of the astringent principle with some vegetable acid. The relative sweetness of sugar, when in different degrees of purity, depends upon the operation of the same law of combination ; *pure sugar*, as Dr. Mac Culloch has very justly observed, however paradoxical it may appear, *is not so sweet as that which is impure* ; the sweetness of *mollasses*, compared with that of refined sugar, is too well known to require more than a bare mention ; the vegetable extractive matter in this case, increases the effect of the saccharine principle with which it is combined ; for the same reason grapes, differing very materially in their proportion of saccharine matter, may seem to the taste equally sweet, and such in fact is the case on comparing the luscious grapes of Spain with the *Chasselas* of Paris ; and yet the vinous produce is entirely different, the result of the one being a sweet and luscious wine, while that of the other is hard and dry, because, in truth, these grapes contain very different proportions of sugar ; and however powerfully the extractive matter may modify the effects of this principle upon the palate and organs of taste, it cannot alter the quantity of alcohol resulting from its fermentation.† Crystallized sugar also appears less sweet to the taste than loaf sugar, but this may depend upon the different state of aggregation, and, consequently, the different degrees of solubility possessed by the sugar in these two forms.

In some cases, the addition of certain bodies will induce the absorbents to admit and carry into the circulation remedies which, in a more simple state, they would reject as injurious ; this position is supported by the fact of mercury being more readily absorbed when in combination with animal matter, see *Ung : Hydrarg :* and it is probable that iron, in the form of a *tanno-gallate*, will be more acceptable than when presented in a more purely mineral state : see *Ferri Sulphus*.

Does it not therefore appear from the preceding remarks, that *certain*

* The Arabian and Greek physicians scarcely noticed the leaves, but always employed the pods of Senna ; a fact which will explain the operation of this plant, as observed by them.

† Mac Culloch on Wine. Edit. 2, p. 42.

*elements exist in the composition of vegetable remedies, as furnished by nature, which, although individually inert, confer additional strength and impulse upon the principle of activity with which they are associated.**

The solutions of saline cathartics appear likewise to gain an accession of power and celerity of operation by impregnation with *Carbonic acid gas*, depending probably upon the intestines thus receiving a degree of distention favourable to the action of the salt, (19, 23.) Certain it is that the operation of emetics, as well as that of glysters, is materially increased by the stimulus of distention.

In enumerating the methods to be adopted for increasing the energies

* If the facts stated in this section be true, we are bound to recognise two orders of medicinal elements,—the one comprehending those that possess an inherent and independent activity,—the other, those that are in themselves inert, but which are capable of imparting impulse and increased energy to the former when combined with them. As this is a new view of the subject of vegetable combinations, no apology is necessary for the introduction of new terms for its explanation; I therefore propose to designate the former of these **SUBSTANTIVE**, and the latter, **ADJECTIVE** constituents. When the structure of vegetable remedies shall have been thoroughly examined upon this principle of combination, much medicinal obscurity will be removed, and probably some pharmaceutical improvements of value suggested; at all events it will teach a lesson of prudent caution to the pharmaceutic chymist; it will show the danger of his removing this or that element from a vegetable compound, merely because he finds, upon its separation, that it is inert. I dwell the more upon this point, because I feel that there never was a period in the history of medicine, at which such a caution was more necessary; for while the poly-pharmacy of our ancestors has driven the physician of the present day into a simplicity of prescription that on many occasions abridges his powers and resources, the progress of chymical knowledge has diffused through the class of manufacturing chymists a bold spirit of adventure and empiricism,—a mischievous propensity to torture our best remedies, in order to concentrate or extract the parts which they consider to constitute their essential ingredients.

A Memoir has lately been presented to the **PHILOMATIC SOCIETY OF PARIS**, by M. Robiquet, on the subject of *Aroma*, which affords some important analogies in proof of the law of combination, which I am now endeavouring to elucidate. From the experiments of this laborious chymist it would appear, that odours are not as Fourcroy supposed, *the effect of the simple solution of certain bodies in air*, but that for their developement, some third body (coinciding in its office with my **ADJECTIVE** constituent) possessing in itself none of the characteristic odour, is absolutely necessary as an intermede, varying in its nature according to that of each odorous body, in the same way that the mordant requires to be varied by the dyer, according to the nature of the colouring matter which it is intended to fix on the cloth;—thus *Ambergris* has in itself very little odour, but the addition of Musk develops a very strong and decided one; this also happens in a less degree with Lavender, and the perfumers therefore add a small quantity of musk to the distilled water of this plant. In other cases, Ammonia lends, as it were, its volatility to bodies, the odour of which without such an auxiliary, would be scarcely sensible; this is exemplified by the practice of perfumers exposing their musk and other substances to the atmosphere of privies when they lose their power: (*Paul Amman: Manduct: ad Mat: Med:*) so again in order to give pungency to snuff it is made to suffer the commencement of fermentation, in which case ammonia is generated; and it is a curious fact that the odour of the best snuff may be destroyed by mixing with it a little tartaric acid, by which its ammoniacal salt is neutralized. In some instances the *adjective* ingredient seems to be Sulphur, as in the essential oils of some cruciform plants, and particularly in that of mustard seed, for M. Robiquet found that this oil lost its odour by being kept in contact with a metallic surface, and that an inodorous oil remained, while the metal became a sulphuret: perhaps, adds M. Robiquet, it may be sometimes necessary for the full and exquisite developement of odour in these bodies to add another vehicle, thus the addition of a little Acetic acid heightens the odour of mustard.

Iron has little, or no odour; but when volatilized with hydrogen, its odour is very powerful. The smell of copper and brass must depend upon some circumstance not well understood.

of a remedy, by rendering the system more susceptible of its action, it is right to know that, under certain circumstances, Venesection deserves a distinguished rank amongst the ADJUVANTIA. The fact is strikingly discovered in the exhibition of *Mercurial* Preparations*, and some other alterative medicines. Whether the "*Vis Conservatrix*," which Nature, when in a state of health and vigour, opposes to the admission of poisonous substances into the circulation, be overcome by blood-letting, is a question which I shall leave others to decide; but thus much reiterated practice has taught me, that the system in a strong and healthy condition frequently is overcome the moment the stomach becomes deranged, the circulation languid, or the general tone of the system impaired. I have frequently seen this during my Hospital practice: if a patient who has been using mercurial friction, or taking the preparations of that metal without effect, be transferred into a close and unhealthy ward, his appetite soon fails, the tongue becomes furred, and the system instantly yields to the influence of the remedy. Nauseating doses of *antimony†* frequently repeated, or the accidental supervention of any disease of debility, will be attended with the same phenomena. My practice has also afforded me an opportunity of appreciating the debilitating effects of despondency in a case of this description; a patient had been taking mercurial medicines, and using frictions for a considerable period, without any apparent effect; under these circumstances he was abruptly told that he would fall a victim to his disease; the unhappy man experienced an unusual shock at this opinion, and in a few hours became violently salivated.‡

VENESECTION, moreover, increases the effects of cathartic medicines. I have often noticed this fact in contending with a plethoric diathesis.

* Astruc and other practitioners of the same school, always premised a mercurial course with venesection: it is probable that many of the anomalies observed in the modern application of this remedy may have arisen from an inattention to the diet of those who are under mercurial influence. Mercury is in itself a most powerful stimulant, and ought therefore to be accompanied with depletion and low diet; besides which, the experiments of Majendie have shown how greatly such a state of the system will expedite the effects of the mercurial remedy.

† Dr. Eberle, of Philadelphia, in a work lately published, has quoted the above passage and remarks, that he has long been acquainted with the fact which it announces, although he proposes to account for it by a different train of reasoning; he considers that Nauseants encourage mercurial ptyalism, by favouring an afflux to the salivary glands. The learned author must allow me to congratulate him upon this fortunate discovery; unless his patients be blest with as much apathy as was ever assumed by the Gilbertine order of Benedictines, he need never in future despair of influencing them by mercury. He has only to condemn the refractory to meagre fare, and then to tantalize them, as poor Sancho was in his government, with the sight or rather smell, of a savoury dish, and he will without doubt secure his object,—but, to be serious, if Dr. Eberle's views be correct, how will he explain the *modus operandi* of *fear*, as related in the text? for the tendency of fear is to *diminish* the salivary secretion as will be hereafter mentioned.

‡ Fear, contrary to joy, decreases, for a time, the action of the extremities of the arterial system, as is seen by the sudden paleness which succeeds, and the shrinking or contraction of the vessels of the skin. M. de Haen relates the case of a painter who suffered convulsions, which were succeeded by a return of his colic. In this case the poison which had been, for a long time, admitted into his constitution in consequence of his daily employment, was, by the passion of anger, immediately brought into action. It was formerly observed by Citois, that the inhabitants of the province of Poitou, who had suffered anxiety of mind on account of any misfortune to themselves or family, were particularly susceptible of the disease.

whenever the bleeding preceded the purgative, the effects of the latter have been uniformly more speedy and considerable; in obstinate constipation the same fact has been observed, and mild remedies have been known to act more powerfully, when preceded by blood-letting, than potent ones have when exhibited antecedent to it. Venesection has certainly an extraordinary power in awakening the susceptibility of the *primæ viæ* to remedial impressions; in some diseases, as in the *Cynanche Trachealis*, or Croup, so great is the insensibility of the stomach, that Emetics frequently fail in their effects; and Dr. Hamilton has given as much as a hundred grains of *Calomel* in the twenty-four hours: in such cases previous venesection affords most extraordinary assistance. Dr. Fothergill also remarks that emetics are more beneficial after bleeding, (*Dissert. Med. Inaug. de Emet. usu.*) The effects of *Bark*, *Steel*, and other tonics, are certainly influenced in the same manner; whether in any case it may be prudent or judicious to have recourse to such a practice, is a question not immediately connected with the present inquiry.

Limited must have been the experience of that practitioner who has not frequently witnessed the utility of Venesection in producing a state of system favourable to the operation of various remedies. In acute diseases, how frequently does an opiate succeed in allaying irritation after copious bleeding, which could not be made to occasion any beneficial influence previous to that operation? In *Pneumonia* I have repeatedly seen such a plan of treatment act like a charm upon the patient.

PURGATIVES also awaken the susceptibility of the body to mercurial impressions, and it is remarked by Dr. Chapman that this practice affords a resource which rarely disappoints the practitioner. This class of remedies moreover seems capable of exalting the efficacy, and indeed of accelerating the benefit to be derived from many alteratives, when administered *previous* to the exhibition of these latter substances; the advantages of a course of *Steel* medicines are undoubtedly increased by such means. The febrifugous and antiseptic properties of diluted muriatic acid (see *Form.* 145.) are inconsiderable, unless its exhibition be accompanied with cathartics. I beg to refer the practitioner to some cases published by me in the *Medical and Physical Journal* for December, 1809, in further illustration of these views. Experience enables me also to state that *Diuretics* are considerably assisted by similar means, having many instances in my case book of the failure of these agents before, and their successful operation after, the exhibition of a cathartic. Dr. Darwin observes that "*Absorptions are always increased by Inanition,*" and in support of this position refers to the frequent advantage derived from evacuations in the cure of ulcers. I have certainly seen obstinate sores in the leg cured by small and repeated bleedings. Dr. Chapman arrives at the same conclusion, although by a different train of reasoning; he states that the blood-vessels and absorbents * are to a certain extent "antagonizing powers:" instructed by this obvious fact, we ought, says he, in the exhibition of diuretics to regulate the state of the system by interposing purgatives, or even venesection, as the state of the circulation may indicate.

* How admirably do the results of Majendie's Experiments coincide with this reasoning; see page 86; and yet Dr. Eberle, in a work quoted below, appears unwilling to admit such a theory.

EMETICS also, in certain conditions of the system, would appear to render the stomach more sensible to the impression of other remedies ; Dr. Eberle, of Philadelphia,* has remarked such an effect with respect to the administration of the Peruvian Bark.

CHANGE OF DIET AND OF HABITS may be also classed amongst the *Ajuvantia*, but the young practitioner must be warned that he is not to exercise his *Caduceus* as Sancho's Doctor did his wand. I have seen a young disciple of Esculapius so vex his patient, that his food became more nauseous to him than his medicine, and I verily believe his Physician was more irksome than his disease. It is well observed by Dr. Percival that the prejudices of the sick should never be contemned with wantonness, or opposed with harshness ; for, silenced by authority, they will operate secretly and forcibly on the mind, creating fear, anxiety, and watchfulness. And with regard to diet it may be here stated, that no function of the body is so materially influenced by mental impressions as that series of actions constituting what is termed *Digestion*—the unexpected communication of any distressing event destroys the keenest appetite† and converts the sensation of hunger into one of disgust at the bare idea of food ; a fact which did not escape the penetrating eye of our immortal Shakspeare, for he represents Henry dismissing Wolsey from his government with these words—

———Read o'er this ;
And after, this : and then to breakfast
With what appetite you have.

If feelings of disgust are excited by the repast, the stomach will never act with healthy energy on the ingesta ; and in cases of extreme aversion, they are either returned, or they pass through the alimentary canal almost unchanged : on the other hand, the gratification which attends a favourite meal is in itself a specific stimulus to the organs of digestion, especially in weak and debilitated habits. Dr. Merriman has lately communicated to me a case which affords a striking illustration of the powerful influence of the mind upon these organs ; a lady of rank labouring under menorrhagia, suffered with that irritable and unrelenting state of stomach which so commonly attends that disease, and to such a degree that every kind of aliment and medicine was alike rejected : after the total failure of the usual expedients to appease the stomach and procure relief, she applied to Miss Prescott, and was *magnetised*, when she immediately, to the astonishment of all her friends, ate a beef steak, and continued to repeat the meal every day for six weeks, without the

* A Treatise of the Materia Medica, and Therapeutics, by J. Eberle, M. D. In two volumes. Philadelphia, 1822.

† In the same manner is the salivary secretion immediately influenced by the operation of the mind ; the sight of a delicious repast to a hungry man is not more effectual in exciting it, than is the operation of fear and anxiety in repressing and suspending it. Whence we are led to believe, that the Hindoo Ordeal by Rice may have occasionally assisted in the ends of Justice. This ordeal was conducted in the following manner. The persons suspected of any crime being assembled in a ring, a certain portion of dried rice was given to each, which they were directed to chew for some minutes, and then to turn it out of their mouths upon the leaves or bark of a tree. Those who were capable of returning it in a pulpy form were at once acquitted, while those from whose mouths it came out dry, were pronounced guilty. See Medical Jurisprudence, Introduct. Vol. 1. p. viii.

least inconvenience ! but the disease itself, notwithstanding this treacherous amnesty of the stomach, continued with unabated violence, and shortly afterwards terminated her life.

The diet of a sick person ought never to *combine too much nutriment in too small a space* ;* when so given it will even in health be followed by *fermentation* instead of *digestion* ; and although we may admit the expediency of that domestic maxim, "*a little and often*," yet this is to be received with limitation ; no one, for instance, who possesses any philosophical knowledge, will adapt his practice to the notions of Sir William Temple, who asserted that "the stomach of a valetudinarian was like a school-boy, always doing mischief when unemployed," and that we should therefore not allow it any interval of repose : to this I answer, that the conversion of aliment into blood is effected by a series of elaborate processes, several of which are only perfectly performed during the quiescence of the rest : it would seem, for instance, that the process of *chylification* is incompatible with that by which the first changes are produced in the stomach : this is evident from the well-known fact, that our appetite for food ceases when the former process commences, although the repast should, at the time, have been insufficient to satisfy the craving of nature : whereas, in diseases of imperfect, or depraved digestion, as in *Diabetes*, *Tabes Mesenterica*, &c., we find that the appetite for food is never satisfied by the most nutritive meals. It merits notice also, that whenever the stomach be called into action during the assimilating stages of digestion, the process will, in weak persons, be much disturbed, if not entirely suspended. These views have long since confirmed me in the propriety of treating mesenteric affections in a manner very different from that which is generally pursued ; and I may add that the result has been very satisfactory. The plan to which I allude, consists in enforcing longer intervals between each meal, which should be scanty, and in quantity short of what the appetite may require ; in this way are the unwilling absorbents induced to perform their duties with greater promptitude and activity ; but it is a practice, which, from the extreme anxiety of friends and relatives, the feelings of craving and hunger expressed by the patient, and the mistaken but universal prejudice respecting diet, it is always painful to propose, and generally impossible to enforce ; where, however, circumstances have given me a full and unreserved control, the advantage of the plan has been most decisive.

* The capacity of our digestive organs sufficiently testifies that nature never intended them for the reception of highly concentrated food, while this idea is farther strengthened by perceiving how sparingly she produces concentrated aliment ; the saccharine matter of esculent fruits is generally blended with acidulous and mucilaginous ingredients ; and the oleaginous principle of seeds, kernels, and other similar substances, is combined with farinaceous matter : the capacity observable in the organs of graminivorous animals evidently shows that they were also designed for a *large bulk* of food, and *not* for provender in which the nutritive matter is concentrated ; the gramineous and leguminous vegetables do not present their nutritive matter in a separate state, nor is the animal furnished with an apparatus by which he can separate the chaff and straw from the grain,—the obvious inference is, that he was intended to feed indiscriminately on both.

Some years ago I constructed a Logometric scale of Equivalents, analogous in principle to that which I have now introduced under the title of the "*MEDICINAL DYNAMETER*," to show the relative nutritive strength of different vegetables, and to work problems connected with them ; I soon found, however, that unless *bulk* was taken into calculation, it was incapable of furnishing even an approximation to truth.

There is still another remark which I am desirous of offering, in this place, on the subject of Diet; *viz.*—that in all cases of feeble or imperfect digestion, the *valetudinarian* ought never to take his principal meal in a state of fatigue—and yet let me ask, whether there is a habit more generally pursued, or more tenaciously defended? Aye, and defended too upon *principle*—the invalid merchant, the banker, the attorney, the government clerk, are all impressed with the same belief, that after the sedentary occupations of the day, to walk several miles to their villas, or to fatigue themselves with exercise before their dinner, or rather early supper, will sharpen their tardy stomachs, and invigorate their feeble organs of digestion. The consequence is obvious,—instead of curing, such a practice is calculated to perpetuate, and even to aggravate the malady under which they suffer; by calling upon the powers of digestion at a period when the body is in a state of exhaustion from fatigue. Often have I, in the course of my practice in this town, cured the Dyspeptic invalid, by merely inducing him to abandon so mischievous a habit.

II.

TO CORRECT THE OPERATION OF THE BASIS, BY OBVIATING ANY UNPLEASANT EFFECTS IT MIGHT BE LIKELY TO OCCASION, AND WHICH WOULD PERVERT ITS INTENDED ACTION, AND DEFEAT THE OBJECTS OF ITS EXHIBITION.

A. *By MECHANICALLY separating, or CHYMICALLY neutralizing the offending Ingredient.*

The scientific physician, from his knowledge of the chymical composition of a medicine, and of the principles upon which its different qualities depend, is enabled to remove or render inert the element which imparts to it a deleterious operation; thus it has been found that the peculiar principle in the *Spanish Fly*, which so frequently irritates the urinary organs, is soluble in boiling water; ebullition in water therefore offers the means of depriving it of the power of thus acting upon the kidneys, while it does not effect any alteration in its vesicatory properties. It is upon the same principle that many vegetable substances of a very acrid nature, become harmless by boiling, or by chymical manipulation, and some of them might even in times of scarcity and want, be introduced as wholesome and nutritious articles of diet. The experiments of *Westring* show that the bitterness of the *Lichen Islandicus* may be entirely removed by maceration in an alkaline ley, and a tasteless, but highly nutritious *secula* be thus obtained; in the same manner the *Æsculus Hippocastanum* (Horse Chesnut) may be deprived of its bitterness, leaving a residuum which will afford a kind of bread; and according to *Parmentier* (*Recherches sur les vegetaux nourissans*), excellent starch may be also made from it. *Dr. Darwin* observes, that if the roots of *White Bryony* be rasped into cold water, and agitated with it, the acrid juice of the root along with the mucilage will be dissolved,

or swim in the water; while a starch perfectly wholesome and nutritious will subside, and may be advantageously used as food; by a similar species of address the French prepare from the acrid *Arum* the harmless, but highly prized cosmetic, called *Cyprus powder*.

There are many substances which receive a much pleasanter mode of operation by having their solubilities increased or diminished; thus the griping occasioned by several drastic purgatives is obviated by the addition of some alkali; and the nauseating tendency of *Camboge*, which arises from its too easy solubility, is prevented by incorporating it with some insoluble body; as in the *Pilulæ Cambogiæ Comp*: but the farther consideration of this question will be resumed in the fourth section of the Analysis, (iv. c.)

Numerous attempts have been made to correct the inconvenient effects of *Opium*, such as nausea, headach, and costiveness, by removing the resinous element, upon which such evils have been supposed to depend, and we have accordingly been at different times presented with a variety of *Formulae* for the accomplishment of so desirable an object; (see *Opium*.) More recently, opium has been discovered to possess *two* active principles, viz. *Morphia* and *Narcotine*, which would appear from the researches of M. Majendie to exert very different powers upon the animal system; the former imparting to opium its *soporific*, the latter, its *exciting* properties; whence it is proposed to remove this latter principle in order to render the operation of opium milder, and at the same time to divest it of those objectionable properties which so greatly limit its medicinal utility. See *Opium*.

B. By adding some substance capable of guarding the stomach, or system, against its deleterious effects.

The virtues of our most important remedies are frequently lost, or much invalidated, for want of proper attention to the circumstances comprehended in this section. It may be almost admitted as an axiom that *whenever an ALTERATIVE medicine acts with violence upon the primæ viæ, its energies are uselessly expended, and the object of its exhibition defeated*. So again *Diaphoretics*, *Diuretics*, and many other remedies, suffer a diminution in their effects, whenever they stimulate the stomach or bowels to excess. *Guaiacum* thus loses its anti-arthritic, *Squill* its diuretic, and *Antimony* and *Ipecacuan* their diaphoretic, virtues; the action of these substances may therefore require correction, and a medicine must be selected capable of fulfilling that intention. *Opium* has very extensive powers as a corrigent. See *Form.* 57, 100, 106, 110. Dr. Mead combined alkaline salts, when intended to act as diuretics, with opium, in order to prevent their action upon the bowels. *Acetate of Lead*, when administered in cases of hæmorrhysis, or uterine hemorrhage, should also be guarded by the addition of a small portion of the same narcotic. Dr. Sutton, of Greenwich, has lately written a paper to show, that where we wish to limit the operation of an emetic to the stomach, and to prevent its action on the bowels, we should add five or six drops of laudanum to the emetic draught, which in his experience has answered the purpose in question.* The griping and nauseat-

* Med. Repos. Nov. 1822.

ing tendency of some remedies receives correction by the addition of *Aromatic stimulants*, or *Essential oils*, (69, 71, 78, 84, 85, 92,) or by small portions of a corresponding tincture, (70, 76.) It has been already stated, that the griping from *Senna* and *resinous* purgatives may be, in a great degree, obviated by the addition of alkalies; it remains to be observed, that the same remedies are also mitigated in severity, by *Saline* purgatives, (77.) I learn from Sir Henry Hallford, that in his practice he has found the addition of *Extract of Hyoscyamus* render the operation of the *compound extract of Colocynth* much more mild, and no less efficacious. Of the value of such a combination, I am myself able to bear ample testimony. *Alum* is corrected in its tendency to disturb the bowels by the addition of *Nutmeg*, (*Form.* 53,) or some aromatic; and the drastic operation of *Colocynth* may be mitigated by trituration with *Camphor*. There are several substances which are deprived of their acrimonious qualities by trituration with mucilage, milk, barley-water, &c. The tendency which mercurial preparations possess of affecting the bowels, is, with the exception of *Corrosive Sublimate*, corrected by *Opium*, but the acrid operation of this latter salt is more securely guarded against by the decoction of *Guaiacum* or *Mezereon*, or by the plentiful exhibition of mucilaginous drinks and broths. In certain diseases of the uterus and vagina, astringent lotions are indicated, but it may happen, as in the cauliflower excrescence, or in the oozing tumour of the labium, that such applications are too irritating; in such cases the effect of the lotion is *corrected* by the addition of mucilage. The enfeebling influence of *Digitalis*, *Tobacco*, and some other narcotics, is successfully opposed by aromatics and stimulants. It has already been stated that several attempts have been made to correct the operation of *Opium* by the application of mechanical and chymical resources; it would, however, appear that, for obviating its effects upon the intestinal excretions, the judicious addition of some purgative will offer the most effectual corrigent; and, according to my own experience, the *Aloetic* preparations are to be preferred upon such an occasion, as in *Form.* 11, 12, 13. In some cases, I have found that a combination of the watery infusion of *Opium* with some bitter, will secure the narcotic virtues without those consecutive effects upon the alimentary canal, which we are always so desirous to obviate; the *Decoctum Aloes compositum* also furnishes upon such an occasion a very appropriate adjunct. Let us remember that one of the effects of opium is to paralyze, for a time, the muscular fibres of the intestines: now experience has taught us that the remedies above directed have a peculiar tendency to augment the peristaltic motions of the *primæ viæ*. Upon the same principle the addition of calomel will prevent the paralyzing influence of this narcotic upon the biliary functions. I have known several patients who could never take opium unless in such a form of combination.

In general, a formula contains but one *corrigent*; but circumstances may occur, where two different ingredients are required to obviate two very different effects, as in *Form.* 16, in which the *Nitric Acid* is introduced for the purpose of counteracting the deleterious effects of the opium upon the nervous system, while the *Aloetic* preparation is calculated to obviate its particular tendency upon the alimentary canal.

Sometimes the unpleasant or perverse operation of a medicine may be obviated by changing the form of its exhibition, the period at which it is

taken, or the extent of its dose ; Dr. Cullen, for instance, found that the nauseating operation of *Camboge* might be obviated, by repeating small doses at short intervals. (89.)

Before quitting the present subject, it deserves notice, that there is frequently a *chymical* condition of the stomach that may interfere with the mild operation of a medicine, and may therefore require consideration : this is particularly exemplified in the action of those antimonial preparations which are liable to become emetic and drastic by the presence of an acid ; it is, for this reason, very eligible to guard such substances with antacid adjuncts. See *Antimonii Sulphuretum*, and *Form.* 125, 128. There is also, upon some occasions, an irritable state of the *primæ viæ* depending upon a deficient secretion of mucus, which renders even small doses of any active medicine mischievous ; mucilaginous decoctions in such a case will offer the readiest *corrigent* ; see *Scammonia*.

The vinous infusion of *Colchicum* appears to act more violently when acid is present in the stomach ; small doses of *Magnesia* may therefore precede, and accompany its exhibition, with advantage.

III.

TO OBTAIN THE JOINT OPERATION OF TWO OR MORE MEDICINES.

A. *By uniting those substances which are calculated to produce the SAME ULTIMATE RESULTS, although by totally different modes of operation.*

It has been already stated, (*page 156,*) that we may frequently combine substances together whose modes of operation are dissimilar, with considerable advantage, provided they be not physiologically incompatible with each other. We may illustrate this subject by a reference to the operation of purgatives ; a series of medicinal substances may be produced, each of which has the property of exciting catharsis, but by a very different mode of action ; one for instance stimulates the muscular fibres of the intestines ; a second acts upon the exhalent vessels, and mucous glands ; and a third exerts its influence upon the neighbouring organs, so as to produce an increased flow of their secretions into the bowels ; but since such modes of action are quite compatible with each other, they may be simultaneously established, not only without any loss of efficacy, but with the most decided advantage : suppose for instance we administer a substance which, either from its insolubility or peculiar nature, acts exclusively upon the muscular fibres of the alimentary canal, its peristaltic motions will be undoubtedly thus increased, and the contents of the bowels evacuated, but the operation will be slow, and probably, accompanied with considerable *tormina* ; now it is evident that if to such a remedy we add those which can produce an increased flow of serous fluids, the effect will be both quicker and easier. *The infusion of Senna* is thus quickened and corrected by *Soluble Tartar*. In the same manner various substances included in the class of diuretics, which, although different,

still if they be not adverse in their operation, may be conjoined ; *Digitalis* and *Potass* are not similar, nor are they incompatible ; for while the alkali, through the medium of the circulation, stimulates the secreting organs of the kidneys, the foxglove may, by its sympathetic action, rouse the energy of the absorbents. In the administration of diaphoretics, we shall frequently derive additional force, as well as certainty, by combining those which act by relaxing the cutaneous emunctories, with those which prove diaphoretic by imparting a general increase of momentum to the blood.

B. *By combining Medicines which have entirely different powers, and which are required to obviate different symptoms, or to answer different indications.*

Arrangements constructed upon this principle constitute some of the most valuable remedies with which we are acquainted ; they are in general *extemporaneous*, because their very value depends upon their being varied and modified according to the symptoms and circumstances of each particular case. The following general elucidation of the subject may serve to demonstrate the nature and importance of such combinations.

PURGATIVES with ANTISPASMODICS. The practice suggested by Drs. Stoll and Warren, in the treatment of *Cholica Pictonum*, affords a striking example of the expediency of combinations of this nature. It is found in that disease, as well as in others attended with spasmodic constriction of the intestinal canal, that purgatives produce no effects unless the spasm be allayed by combining them with *Opium*, (*see Form. 71, 75, 76,*) it is from such a cause that the purgatives so popular with tailors and shoemakers, and which consists of *Aloes* with *Sagapenum* or *Galbanum*, affords such prompt relief in the spasmodic colic to which they are subject.

PURGATIVES with TONICS. In the exhibition of cathartics how frequently it occurs in practice that the patient's strength will hardly allow the evacuation ; in such a case the addition of *steel* as a roborant (*Form. 72, 92, 93,*) or even of *æther*, or *ammonia*, as a diffusible stimulant, is strongly indicated ; the Cheltenham waters offer a natural combination of this character. So again in the cure of dropsy we have often two indications to fulfil—to evacuate the water, and to support the strength of the patient ; hence the necessity of combining brisk and stimulating purges, such as *Scammony*, *Jalap*, &c. with active tonics, (83.) In the treatment of amenorrhœa the same medicinal arrangement is not unfrequently indicated.

PURGATIVES with MERCURIAL ALTERATIVES. In habitual costiveness, where there appears to be a deficiency of bile, a combination of *Pilula Hydrargyri*, with certain *Aloetic* compounds, may prove serviceable ; for while the latter remedy, will, in the absence of bile, supply to the intestines a congenial stimulus, the former will tend to restore the bilious secretion by its influence upon the hepatic system. *See Form. 79. 81.*

PURGATIVES with DIAPHORETICS. This combination of effects is often useful in practice, but it is desirable that the latter should not be established until the operation of the purgative upon the bowels has subsided.

This is accomplished by certain doses of *Tartarized Antimony* in conjunction with some purgative. The *Pulvis Aloes Compositus* of our Pharmacopœia produces a somewhat similar effect.

DIAPHORETICS with TONICS. How frequently is the practitioner desirous of determining to the skin and at the same time of supporting the strength of the general system? in the progress of a continued fever we are repeatedly called upon to fulfil such indications. Dr. Bree* also observes that "in the exhibition of *Diaphoretics* the addition of a bitter infusion or tincture, is frequently proper; for the stomach should be gently excited and strengthened during the use of a diaphoretic draught." On the other hand, *Tonics* not unfrequently require the aid of a diaphoretic; for instance, in the cure of *Cynanche maligna*, the use of bark is indicated; but if the skin be hot and dry, it should be accompanied with a diaphoretic. See *Form.* 126.

ANTISPASMODICS with TONICS, or NARCOTICS. Under the history of Antispasmodics, (*page* 80) it is stated that there are certain bodies which seem to exert an absolute control over inordinate muscular action, from whatever general cause it may have arisen; in administering such remedies, however, the intelligent practitioner will not overlook the peculiar condition of the system in its relations to the disease; where debility is present, the *Antispasmodic* will be usefully combined with a *Tonic*; and, in certain morbid states of the nervous system, with a *Narcotic*.

ASTRINGENTS with DIAPHORETICS. Dr. Fordyce has observed, that combinations of this kind are often indicated in cases of *Diarrhœa*, where it is necessary to astringe the vessels of the intestines, and at the same time to relax those of the skin; such an indication, he says, may be fulfilled by exhibiting *Tormentil root*, or any other vegetable astringent, with *Ipecacuan*.

ASTRINGENTS with NARCOTICS, and ABSORBENTS. It has been already observed, that in a *Diarrhœa*, depending upon the influx of acrid fluids into the intestines, there are three modes of treatment by which the malady may be obviated, viz. by a narcotic, *diminishing the irritability of the intestines*; by an astringent, *restraining the serous excretion*; and by an absorbent, *neutralizing the acrid matter*. As the modes of action are not incompatible with each other, they may be simultaneously established with the greatest advantage. See *Form.* 52.

ASTRINGENTS with TONICS. A combination of certain medicines belonging to these two classes is frequently indicated; in the treatment of passive hemorrhage, we have to astringe the bleeding vessels, and, at the same time, to cure the hemorrhagic diathesis by remedies which are capable of restoring the general tone of the system. In the treatment of the chronic and humid coughs of old persons, I have very frequently witnessed the beneficial union of the warm and stimulating influence of *Myrrh* with the astringent effects of *Sulphate of Zinc*. *Form.* 69 presents the combination which I have usually adopted with success on such occasions.

DIURETICS with TONICS. As Dropsy is frequently associated with great debility, the practitioner should combine his diuretics with some tonic medicine; but in forming a judgment upon the case he must be

* A Practical Inquiry into Disordered Respiration, p. 243.

guided by those precepts which have been laid down under the consideration of Diuretics at page 100. See *Form.* 114.

DIURETICS with AROMATIC STIMULANTS. Such a combination will be found advantageous in those cases where the powers of the system require to be excited by more prompt measures than those afforded by the agency of tonics. *Ethereal* preparations with Squill and other stimulating diuretics, are well calculated upon such occasions to afford valuable assistance. *Form.* 101—116.

TONICS with DIFFUSIBLE STIMULANTS. In the cure of dyspepsia, we frequently require a remedy, for the purpose of obviating debility, that is more sudden in its action, and prompt in its effects, than that of a bitter tonic, whose operation is almost imperceptible; while the case may at the same time stand in need of that permanent increase of tone, which the latter remedy can alone supply; such an inclination therefore must be fulfilled by combination. *Form.* 40, 42.

TONICS with PURGATIVES. In the exhibition of tonic medicines it is frequently essential to accompany their operation with purgation; in intermittent fevers, for instance, when attended with a redundant secretion of bile, or any obstruction of the viscera, the bark must be given in combination with some laxative, for which purpose Boerhaave has recommended *Muriate of Ammonia*; Mead, *Rhubarb*; whilst in many cases, experience suggests the propriety of selecting some of the warmer cathartics, especially the *Alloetic*; and I shall take this opportunity to observe, that notwithstanding the opinion so strongly expressed by Sydenham, that "*to add any thing to the bark argues either ignorance or craft*," the most respectable testimony may be adduced to demonstrate the great advantages which have arisen from the various combinations of this heroic remedy. Sir George Baker has said that "*there is less of reason than of severity*" in the above remark of Sydenham; for that it was found in the cure of the intermittent fever, which he describes, that, according to circumstances, sometimes the *Virginian snake root*, and in other cases *Myrrh*, were added with propriety and advantage; and, according to the experience of several practitioners, a drachm of the *rust of iron*, and the same quantity of the powder of *black pepper*, added to each ounce of bark, were the means of subduing the most inveterate agues. *Formula* 44 presents a combination, which we learn from Dr. Petrie's letter to Sir George Baker, constitutes a celebrated Dutch remedy for an ague, and which was tried with success in the hospital at Lincoln, in those obstinate intermittents which prevailed in the year 1781. Hillary speaks of an epidemic intermittent at Barbadoes, in which the bark was of no avail, unless combined with saline remedies, or some of the tonic bitters. Dr. Barton has stated that Bark combined with mercury in a small proportion, is one of the best remedies for removing the swelling of the spleen after an intermittent.

EXPECTORANTS with DIFFUSIBLE STIMULANTS. We have seen that expectorants may be usefully associated with tonics; it sometimes occurs that these remedies require the addition of some diffusible stimulant. In certain states of *Peripneumonia notha*, where the powers of life are ebbing, and the lungs become inundated with viscid mucus, I have experienced the value of a combination of some stimulating expectorant and ammonia.

ANTACIDS with TONICS. In the cure of cardialgia we have obviously

two indications ; to neutralize the offending acid by some chymical agent, and to correct the morbid state of the digestive functions by some appropriate remedy. See *Form.* 152. The same observation will apply in the treatment of certain cases of chlorosis, where cardialgia is not unfrequently a very vexatious attendant, and solicits the union of emmenagogues with antacids, or absorbents, as in *Form.* 99.

LITHONTHRYPTICS with NARCOTICS. As a palliative in calculous irritation, the union of alkalies and opium proves a valuable resource. Henbane may likewise be advantageously combined with a Lithonthryptic ; for, be it remembered, that few narcotics are more efficacious in allaying nephritic irritation. (*Form.* 156.) We have also frequently two important indications to fulfil in the treatment of urinary concretions ; where the lithic acid diathesis prevails, it will be necessary to neutralize any acidity in the first passages, and at the same time to regulate the functions of the skin ; we have moreover to give tone to the digestive organs ; so that, in such cases, the art of medicinal combination is well calculated to extend our resources.

In the formation of these compounds we should rarely attempt to fulfil more than two indications, although cases may occur in which it will be eligible to assail the disease with an engine of *triple* powers, as exemplified by *Form.* 52.

In constructing, however, such complex arrangements the practitioner must of course take care that he does not fall into the error of **CONTRA-INDICATION**, and combine substances which possess properties essentially different, and which are at variance with, or directly opposed to each other ; it is an error of the most serious description, and unfortunately is one of too common occurrence in the lower walks of medical practice ; "*crimine ab uno disce omnes.*" I lately met with a country practitioner who, upon being asked by a lady whom he attended, the intention of three different draughts which he had sent her, replied, that one would warm, the second cool her, and that the third was calculated to moderate the too violent effects of either ; thus it is that discredit and contempt fall upon the use of medicines, which ought only to attach to the ignorant pretenders, or designing knaves who administer them.

Having, in the commencement of this inquiry, stated that all the principles of combination, capable of practical application in the construction of extemporaneous formulæ, are exemplified in the composition of the various productions of nature, I shall conclude the present section by showing, that many of our most valuable vegetables owe their useful properties to the joint operation of the several distinct and different ingredients which enter into their composition. How many substances does nature produce in the vegetable kingdom, in which the permanent tonic quality of bitterness exerts its influence in union with the transient stimulating powers of an aromatic principle ? indeed there is a series of vegetable remedies of this kind ; commencing with those that are simply bitter, we gradually proceed through the different species, each blending as we advance an increasing proportion of aroma, until we arrive at those in which the aromatic quality greatly preponderates. *Peruvian Bark* may be said to combine within itself the properties of *bitterness*, *astringency*, and *aroma* ; a fact which suggested the probability of our being able to produce an artificial compound that might emulate the effects of *Cinchona*, and to a certain extent the idea appears to have been realized ;

for we are told by Dr. Cullen that he frequently succeeded in the cure of an intermittent by a combination of *Oak Bark* and *Gentian*, when neither bitters nor astringents, separately, produced the least impression; and I am informed by Dr. Harrison, that in the Horncastle Dispensary, of which he was for many years physician, he never employed any other remedy for curing the ague of Lincolnshire than equal parts of *Bistorta*, (astringent) and *Calamus Aromaticus* (bitter and aromatic) neither of which plants, *individually*, ever produced the least benefit in such diseases. Berzelius attempted to produce a compound of this description by adding to the bark of the *Ash* some *Tormentil root* and *Ginger*; and he observes that it acted as an excellent tonic, and that according to the experiments of his friends it seemed to cure quartan agues.* In the aromatic barks and woods, such as those of the *Canella*, *Orange-peel*, *Sassafras*, &c, the aromatic principle† is combined with a bitter ingredient; a union which proves of singular service in the formidable bowel complaints so common in tropical climates.

The great superiority of the hop, as an ingredient in our malt liquors, depends upon the fact of its containing within itself several distinct and independent elements of activity, which the other bitter herbs that have at different times been employed as its substitute, do not possess. The philosophy of its operation may be adduced as a striking illustration of the present subject; first then, it contains a *bitter* principle, which imparts to the beverage a tonic quality and an agreeable flavour; while at the same time an *aromatic* ingredient adds a warm and stimulant property and modifies the bitterness; the hop, moreover, contains an *astringent* ingredient (*Tannin* and *Gallic Acid*), the effects of which are to precipitate the vegetable mucilage, and thus to remove from the beer the active principle of its fermentation; every attempt therefore to substitute an ordinary bitter for that of the hop must necessarily fail, unless a compound can be so artfully constructed as to contain in due proportions, the principles of bitterness, astringency, and aroma. *Quassia* must therefore necessarily prove but a sorry substitute; it will impart bitterness enough, but it will not be modified by agreeable aroma; and as it contains no astringent principle, it will fail in precipitating the vegetable mucilage, or gluten; in consequence of which the beer so manufactured will be in a perpetual state of fermentation until it is entirely spoilt.‡ *Rhubarb* is another medicinal plant which may be brought forward in elucidation of the analogies subsisting between natural and artificial combinations; in this case Nature has presented us with a singular and most important union of medicinal powers,—that of an astringent, with a cathartic property! virtues, which we might, without the light of experience, have pronounced to be incompatible with each other; and yet we find that in this instance the property of astringency never interferes with, or opposes the purgative force, since the former does not display itself unless the substance be administered in small doses; or, when given in larger ones, not until it has ceased to operate as a cathartic.

* Dr. Young's Medical Literature, Edit. 2. p. 570.

† The vegetable kingdom presents us with many natural compounds of this kind; several of which might be pressed into the service of medicine with much advantage. With respect to the number and variety of such substances, it must be confessed that our Pharmacopœia contains but a meagre bill of fare.

‡ The same reasoning will explain why English hops, that contain more Gallic Acid and Tannin than those imported from the Continent, are found to be superior as preservatives of beer.

IV.

TO OBTAIN A NEW AND ACTIVE REMEDY NOT AFFORDED BY ANY SINGLE SUBSTANCE.

A. *By combining medicines which excite different actions in the Stomach and System, in consequence of which NEW modified results, are produced.*

This constitutes by far the most obscure part of the subject of medicinal combination, and must ever continue so until we become better acquainted with the laws which govern the action of medicinal substances upon the living system. That the most valuable effects, however, are really produced by such arrangements, we have the testimony of long experience, and examples are furnished in the valuable and well known operation of many officinal preparations; thus the "*Pulvis Ipecacuanhæ compositus*" contains as its active elements, *Opium* and *Ipecacuanha*; and yet, in well regulated doses, it neither possesses the narcotic operation of the former, nor the nauseating effects of the latter; they appear to be mutually lost, and converted into a powerful diaphoretic: so again, the emetic operation of *Sulphuret of Antimony*, and the specific influence of *Calomel*, are changed by combination with each other, giving rise to a remedy eminently distinguished for its powers as an alterative. Dr. Bree observes that *Tincture of Squills* combined with *Extract of Henbane*, and the *Nitric Acid*, have been proved by much experience to be expectorant and sedative in a paroxysm of asthma, although each article, uncombined, had been given without success. See *Form.* 139. The efficacy of *Hemlock*, in quieting Pulmonary irritation, has been frequently adverted to in the course of this work; I have to state, in this place, that its value, on such occasions, is generally enhanced by combination with *Ipecacuanha*.

It is probable that many of our natural remedies owe their efficacy to the results of a similar species of combination. In the fourth edition of this work it was stated that, according to the assertion of Dr. Chapman, "*Kino*, when administered in union with *Calumba*, constituted a pretty certain and powerful purgative;" since the publication of this fact, I have investigated what, if true, would appear to be a most extraordinary anomaly in the philosophy of medicinal combination, and I find that the statement of Dr. Chapman* is not borne out by experiment. That we might arrive at a just conclusion upon this subject, I requested the assistance of my friend Dr. John Davy, whose character for experimental accuracy, and whose situation as Superintendent of the Medical Division of the General Military Hospital at Chatham, seemed to point him out as a person peculiarly adapted for such an inquiry; the result of his trials does not establish that of the experiments of Dr. Chapman, but on the contrary it seems to prove, that neither *Kino* nor *Calumba*, when taken separately, has a constipating effect, and that in the form of powder (especially the *Calumba*) each has an aperient quality, which is not

* Therapeutics, vol. 2, p. 470.

increased by exhibiting the two medicines together in a state of mixture. The trials from which these inferences are drawn were made on different individuals in tolerable health, and they were repeated more than once; in some cases they were given separately, and in others, mixed together, in doses varying from a scruple to a drachm of each.

B. *By combining substances which have the property of acting chymically upon each other; the result of which is the formation of NEW COMPOUNDS, or the decomposition of the original Ingredients, and the developement of their more ACTIVE ELEMENTS.*

A. *The Formation of New Compounds.*

It is not necessary to extend our researches beyond the range of the Pharmacopœiæ,* to collect a variety of interesting and important examples, in illustration of this division of our subject; if we require a striking example of the agency of chymical combination in destroying the identity of the original constituents, and of giving origin to a compound of new powers, it may be exemplified by the well known instance of *Sulphate of Potass*, a substance possessing but a weak affinity for water, and exerting but little energy upon the animal economy; whereas the two ingredients of which it consists are distinguished for the extreme eagerness with which they unite with water, and for the caustic activity which they display in their action upon animal matter.

Under this head the class of metals will also present itself to our consideration, all the individuals of which, with the exception perhaps of iron, are perfectly inert and harmless; even arsenic, lead, copper, and mercury, which in certain states of combination constitute some of the most virulent of known substances, exert no action upon the living system, unless they be in union with some other body; but when so united, how valuable do they become, and what various medicinal effects may they not be made to produce.

The *Acetic Acid* and *Ammonia* become neutralized by combination with each other, affording a compound of new virtues. *Sulphate of Zinc* and *Acetate of Lead*, when mixed together in solution, decompose each other, and the *Acetate of Zinc* which is formed, affords a more valuable remedy than either of the former salts, as an application in ophthalmia. The "*Mistura Ferri Composita*" of our Pharmacopœia offers another example of the same chymical resource. I also beg the reader to refer to the construction of *Formula 82*, which presents an instance of a purgative draught being produced by combination, in which the original properties of every element are entirely changed. See also *Formula 87*, the chymical actions of which are more complicated, but no less instructive than the preceding one; the ingredients of the formula are the *Carbonates of Soda* and *Magnesia*,—*Sulphate of Iron*,—*Diluted Sulphuric Acid*, and *Water*—and when mixed together, the following decompositions would appear to take place; the free *Sulphuric Acid*, together with that which exists in the *Sulphate of Iron*,

* This subject has been ably illustrated by Mr. R. Phillips, in his translation of the London Pharmacopœia, by a series of very striking and instructive diagrams.

being just sufficient to decompose the *Carbonates of Soda and Magnesia*, forms two neutral *Sulphates* (viz. *Sulphates of Soda and Magnesia*), and thereby disengages a volume of *Carbonic Acid gas*, which not only increases the purgative operation of the new saline compounds, but, by its excess, holds in solution the *Carbonate of Iron*, which is formed by the decomposition of the *Sulphate*, and which in that state displays an effect powerfully tonic.

Before we quit the consideration of medicinal compounds as the results, of chymical action, it is expedient to remind the practitioner of the essential difference between *Mixture* and *Combination*, a difference which affects the medicinal virtues no less than the chymical characters of bodies; it is determined by ample experience, that substances will produce effects upon the living system when presented in a state of simple mechanical mixture, very different from those which the same medicines will occasion when they are combined by the agency of chymical affinity, as is well exemplified in the comparative effects of alcohol as existing in ardent spirits, and in wine (see *Vinum*;) or in the relative powers of *Mercury* in the *Unguentum Hydrargyri* of the London College, and the *Unguentum Oxidi Hydrargyri cinerei* of the Pharmacopœia of Edinburgh, (see *Unguent. Hydrargyri*;) the former of which is a true chymical compound, whereas the latter is a simple mixture of its ingredients.

B. The Developement of Active Elements.

The accomplishment of such an effect is in many instances the sole object of a pharmaceutical process. It is thus that we obtain pure *Citric Acid* from the juice of the Lemon; *Tartaric Acid*, from Cream of Tartar; *Benzoic Acid*, from the resinous substance known by the name of *Gum Benzoin*; upon the same principle, the *Muriatic* and *Nitric* acids are elicited from the saline compounds in which they exist. *Ammonia*, in its pungent form, is developed from its inodorous *Muriate*; and the fixed alkalies are obtained in their caustic state, from the comparatively mild *carbonates* in which they naturally exist. But a more striking and instructive instance of the effect of chymical action, in developing an active, or useful principle, cannot perhaps be selected than that of the well known stimulant Plaster, composed of *Muriate of Ammonia*, *Soap*, and *Lead Plaster*, in which the alkali of the soap enters into combination with the muriatic acid, when the *Ammonia*, upon which the virtues of the plaster solely depend, is slowly disengaged in the form of gas, producing a powerfully rubifacient and stimulant effect; the "*Cataplasma Fermenti*," or *Yest Poultice*," is indebted for its antiseptic properties to a similar agency, for they do not depend upon any virtue in the ingredients themselves, but upon their decomposition, and the consequent developement of an active element, which is *Carbonic Acid*. The practitioner unacquainted with the *modus operandi* of these combinations, would inevitably fall into an error by which their efficacy must be lost; he would hardly apply them as soon as they were formed, nor would he be aware of the necessity of repeating them at short intervals.

The decomposition of *Calomel* by lime water, forming the well known "*black wash*," and that of *corrosive sublimate* in the same fluid, con-

stituting the "*aqua phagadenica*," furnish remedies which derive all their peculiar efficacy from the developement of the mercury in different states of oxidation. The reader will find another, and a very striking illustration of the same principle in the history of "*alterative Drops*," under the article "*Hydrargyri Oxy-murias*."

A substance separated by chymical precipitation is often a valuable remedy, being in a much more subtle and impalpable form than any body can be rendered by mechanical triture and levigation;* for example, the *Carbonate of Lead*, (*Cerussa*,) when diffused in water, is, according to the experience of our best surgeons, far less active as a topical application than the same substance when produced at once by precipitation from the *Sub-acetate* of that metal. In some cases, also, the substance obtained by precipitation is in a different state of oxidation from that which is prepared by a different process, see *Mist. Ferri comp*: It is a question well worthy of consideration whether a more active preparation of the *Antimonial powder* might not be formed by obtaining the oxide by the precipitation of *Tartarized Antimony*.

Many interesting and important illustrations have been lately afforded by an extended knowledge of vegetable chymistry, recent analyses having developed principles of extreme activity from several of our most esteemed plants; thus have Sertuerner and Robiquet succeeded in separating a narcotic element from *Opium* (*Morphia*;) Majendie, and *Pelletier*, an emetic principle from *Ipecacuan*, (*Emeta*;) and the last mentioned chymist, together with Caventou, a tonic one from *Peruvian Bark*, (*Cinchonia*,) the properties and applications of which will be fully explained in a subsequent part of this work, under the history of the different substances which contain them.

It is only here necessary to caution the practitioner against those fallacies into which the captivating theories of the chymist may seduce him; and, if the views which I have offered upon the subject of combination be correct, it will follow as a corollary, that the concentration of an active element must in many cases abridge its powers as a remedy; for although the matter thus removed may individually be quite inert, yet, in combination, it may subdivide the particles of the essential constituent, or modify its solubility, and give impulse and steadiness to its operation; thus the vegetable alkali *Quina*, although it indisputably constitutes the active matter of bark, will be found inefficacious when separated from it, unless it be rendered soluble by the addition of sulphuric, or some other acid.

C. By combining substances, between which no other chymical change is induced, than a diminution, or an increase, in the SOLUBILITIES of the principles, which are the repositories of their medicinal virtues.

The degree of solubility possessed by a medicinal substance may perhaps be regarded by some practitioners as a circumstance of but little or no importance; it will however appear in many cases that it not only influences the activity of a remedy, but, like its dose, goes far to determine its specific operation; indeed, where a medicine is not, in itself,

* See my work on Medical Chymistry: Sect. Precipitation.

very soluble, the increase of its solubility by any chymical expedient, is tantamount to an increase of its dose.

It is probably owing to the diversity which exists in the solubility of the active elements of certain purgatives, that so great a diversity occurs in their operation; it is, for instance, easy to conceive that a medicine may act more immediately and specially on the stomach, small, or large intestines, according to the relative facility with which its principles of activity enter into solution; that those which are dissolved before they pass the pylorus are quick and violent in their effects, and liable to affect the stomach, as is exemplified by the action of *Gamboge*, &c. whilst some resinous purgatives, on the other hand, as they contain principles less soluble, seldom act until they have passed out of the stomach, and often not until they have reached the colon. *Colocynth* has a wider range of operation, since its principles of activity reside both in soluble and in insoluble elements. *Aloes* again, being still farther insoluble, pass through the whole alimentary canal before they are sufficiently dissolved, and act therefore more particularly upon the rectum, by which they are liable to produce piles, tenesmus, and the various effects which so usually attend their operation. The characteristic effects of *Rhubarb*, *Senna*, *Saline Cathartics*, and indeed of all individual substances which compose the class of the purgative medicines, will also admit of a satisfactory explanation from the application of these views. It ought moreover to enable the practitioner, by changing the solubilities of these substances, to change their medicinal effects. Experience shows that this is the fact, and that it may be effected either by the intervention of substances that act CHYMICALLY; or, by the addition of ingredients whose operation is entirely MECHANICAL; thus by combining *Aloes* with *Soap* or an *Alkaline Salt*, we quicken their operation, and remove their tendency to irritate the rectum; the *Compound Decoction of Aloes* affords a combination of this kind. *Gamboge*, whose too ready solubility it is an object to obviate, should be intimately incorporated with some insoluble purgative, as for instance *Aloes*; a formula of this nature was introduced by Dr. George Fordyce, and it has been since simplified and admitted into our Pharmacopœia, under the title of "*Pilulæ Cambogiæ Compositæ*." *Tartrate of Potash*, which, on account of its comparative solubility, has gained the name of *Soluble Tartar*, acts with corresponding briskness upon the small intestines; but by increasing its proportion of *Tartaric Acid*, we convert it into a *super-tartrate* or "*Cream of Tartar*," which is a substance characterized by a comparative degree of insolubility, and a correspondent change is produced in the medicinal activity of the salt; its purgative effects are considerably diminished, whilst its diuretic powers are rendered more considerable. We may even extend this experiment by adding to the *Cream of Tartar*, *Boracic Acid*, a substance capable of increasing to a certain extent its solubility, when we shall again find that its purgative properties are strengthened in an equal proportion.

It has been observed that a mixture of different saline cathartics is more efficient than an equivalent dose of any single one, a fact which is strikingly exemplified in the prompt and active operation of *Cheltenham Salts*, in comparatively small doses, as well as in that of sea-water. I submit whether this may not in some degree depend upon increased solubility; for it is a law well known to the chymist, that when water has

ceased to act upon a salt, in consequence of its having obtained the term of saturation, the solution may still take up another salt of a different kind. I apprehend that an advantageous application of this law might be frequently made in practice, and the energies of a remedy thereby considerably extended.*

Where the active principle of a cathartic is not sufficiently soluble, it is apt to vex and irritate the bowels, producing tormina instead of exciting a free and copious excretion; hence the reason why the operation of resinous purgatives is so commonly attended with griping, and why relief may be obtained by combining them with *neutral salts*. Thus also *Senna*, whose virtues reside in extractive matter, is apt by decoction, or long exposure to the air, to act with griping, in consequence of the extractive matter becoming by oxidation, resinous and comparatively insoluble; this effect is best counteracted by the addition of *soluble Tartar*, that will quicken its action, or by an alkaline salt that will increase its solubility.

It appears then to be established as a pharmaceutical maxim, that the intensity and even specific action of a purgative medicine may be modified or completely changed, by changing the degree of solubility possessed by the principles in which its activity resides.

The application of this principle is highly important in practice, directing us in the choice of the different purgatives, according to the objects which we may wish to fulfil by them, and pointing out safe and easy methods by which we may increase, diminish, retard, or accelerate their operation; it thus enables us to construct new and powerful combinations, by imparting to established remedies fresh activity, or by mitigating the acrimony and violence of arrangements in other respects efficacious and eligible.

In the exhibition of solid substances, their mechanical state of division may be capable of modifying their operation, from the influence which this condition must necessarily exert upon their solubilities, although I am by no means disposed to assign to it the importance which Gaubius has ventured to express, "*Sunt quæ ruditer pulverata alvum, subtilius vero urinas, aut alios humores movent*;" and Ray, speaking of the *Asarum* (Hist. p. 208) has the following remark—"Quo tenuius est tritum, eo magis urinas movere minus autem alvum ducere creditur;" and Linnæus† observes that this same plant, when exhibited in the state of very fine powder, uniformly acts as an emetic, but that when coarsely powdered it always passes the stomach, and become cathartic. M. Virey has made a similar observation with respect to Hellebore,—"*L'Hellebore pulverisé fait vomiter; concassé il purge; et en decoction prolongée, il en devient sudorifique ou diurétique.*" I have endeavoured under the article *Pulveres*, to establish some useful precepts upon this subject, to which I beg to refer the reader.

The influence of solubility upon the medicinal energies and specific effects of remedies, may be farther illustrated by a comparative examination of the virtues of the *Acetate* and *Sub-acetate* (Goulard's Extract)

* An ingenious application of this law has been made for the purpose of purifying Epsom Salts. See *Magnesia Sulphas*; and also my work on Medical Chymistry. Art: *Solution*.

† *Amœnitates Academ.* T. 7. p. 307.

of *Lead*: the former preserves its solubility and integrity under any degree of dilution, while the latter, when slightly diluted with the purest water, in consequence of the carbonic acid diffused through it, gives out a copious precipitate; the acetate therefore is undoubtedly the more immediately active application as a preparation of lead, but it is nevertheless perhaps less adapted to remove inflammation and abate irritation than the turbid mixture of the sub-acetate, since the slow and gradual action which is ensured by the latter is more desirable than the instantaneous operation of the same remedy, applied in a more soluble form: the popular injection for gonorrhœa, consisting of a mixed solution of *Sulphate of Zinc* and *Acetate of Lead*, probably owes much of its value to the insoluble precipitate of *Sulphate of lead* which necessarily takes place, and which from becoming entangled in the mucus of the urethra, produces a more permanent stimulus than what could have happened from a soluble salt: (*Form.* 62) thus again the *Sulphuret of Antimony*, and some other preparations of that metal, of slow solubility, establish a more permanent influence than *Tartarized Antimony*, and may be preferable to it in cases where immediate and active evacuations are not required.

Of remedies composed of vegetable tonics, the useful application of this principle is also apparent. Thus the addition of *alkalies*, or *lime water*, to the infusions of *Gentian*, &c., or to the decoctions of *Bark*, by rendering their extractive and resinous principles more soluble, increase their elegance, and exalt their virtues, (*Form.* 39, 41,) although this law admits of an important exception to be hereafter explained. A knowledge of this principle likewise offers many useful hints connected with the successful exhibition of active remedies; it points out the medicines which require dilution in order to promote their operation, and those whose too speedy and violent effects may be retarded and checked by an abstinence from all potation. Thus, in the exhibition of *Diuretics* likely to become cathartic or diaphoretic, no liquid should be given for at least an hour after their administration; the same caution applies with respect to the *Compound Powder of Ipecacuan*, which has a strong tendency to excite vomiting. When the remedy has passed out of the stomach, then the ingestion of fluids may, and ought to be encouraged.

To Sir Francis Milman the profession is highly indebted for hints concerning the importance of accompanying the exhibition of *Diuretics* with plentiful dilution,* the arguments he adduces elucidate in a very satisfactory manner the view which has been just taken of the INFLUENCE OF SOLUBILITY.

The influence of solubility† in increasing the virulence of a poison-

* See also a paper in the MEDICAL TRANSACTIONS, vol. 2, entitled, "Several extraordinary instances of the cure of Dropsy, by GEORGE BAKER, M. D. Read September 9, 1771."

† The most subtle of all poison—the matter of febrile contagion,—is certainly modified in activity by the degree of moisture in the atmosphere influencing its solubility; the Plague is said to be most common in Egypt after the inundation of the Nile, a period at which the atmosphere is necessarily saturated with water; according to the account of Sir Robert Wilson, the English and Turkish armies that marched to Cairo escaped contagion, while the troops that remained stationary on the moist shore of Aboukir, were very severely visited. On the other hand, the *Harmattan*, a wind experienced on the western coast of Africa, between the Equator and fifteen degrees North Latitude, blowing from north-east towards the Atlantic, and which, in conse-

ous substance, has already been illustrated very fully (*page 139,*) and it has also been shown under what circumstance it may be admissible. When these active substances are administered as remedies, in small doses, the precept respecting their solubility is even more important, for in such cases the smallness of the quantity places their operation more immediately under the control of various incidental agents; *destroy* the solubility of a medicine, and you will probably divest it of those properties which render it useful. *Nitrate of Silver*, by coming in contact with a *Muriatic Salt*, is rendered quite inert, and may be discovered unaltered in the *fæces* of persons to whom it has been administered. See *Argenti Nitras*.

Under the article *Plumbi Acetas* the practitioner will also find that the conjunction of this substance with any sulphuric salt, at once deprives it of its valuable properties as a remedy in *Hæmophysis*.

Some practitioners, whose opinions I always receive with respect, have considered these views respecting the influence of solubility as savouring too much of the refinement of theory, and instances have been suggested which would appear to invalidate their pretensions; upon examination, however, it will be found that such exceptions are but apparent, and depend upon the solvent action of the gastric fluid. Thus the *Protoxide of Iron* would appear to be soluble in the fluids of the stomach, and is consequently an active medicine, whereas the *Peroxide* of the same metal, being insoluble under such circumstances, requires to be combined with an acid, as in the *Tinctura Ferri Murialis*, to render it efficacious. The same remark will probably apply to the oxydes of antimony.

I shall conclude this section upon the influence of Solubility, by the relation of an anecdote which may tend to confirm the justness of the views I have offered, more satisfactorily perhaps than any additional arguments derived from a scientific examination of chymical and medicinal facts; in as much as it presents us with a practice, the utility of which has been discovered by unassisted experience, and must consequently be independent of theory. The American Indians, whenever they undertake a long journey, and are likely to be destitute of provisions, employ Tobacco for the purpose of counteracting the uneasy sensations of hunger, and in its preparation for such a purpose they adopt an expedient for modifying its powers, and protracting its effects, which affords

quence of its passage over a very extensive space of arid land, is necessarily characterized by excessive dryness, puts an end to all Epidemics, as the Small Pox; and infection at such a time does not appear to be easily communicable even by art. *Philosophical Transactions*, vol. 21.

The difficulty of communicating infection to animals during a dry state of the air, as remarked on the Western Coast of Africa, during the blowing of the *Harmattan*, agrees with some observations on Plague by the French physicians, as this complaint first made its appearance in the French army during a moist state of the air in Syria, when it lay under the walls of Jaffa in February, 1800.

It is a well known fact that volatile bodies are sooner converted into a gaseous state by the presence of water in the atmosphere; this is strikingly exemplified by the greater rapidity with which *Limestone* is burnt and reduced to quick-lime in moist weather, and by the assistance which is rendered in a dry season, by placing a pan of water in the ash-pit; so again the perfume of flowers is most sensible when the air is humid, as during the fall of the evening dew, or in the morning when the dew evaporates, and is dissipated by the rays of the rising sun; for the same reason the stench of putrid ditches and common sewers, is conveyed to the organs of smell much more speedily in summer previous to rain, when the air is charged with moisture.

an instructive illustration of the influence of solubility; it consists in combining the juice of Tobacco, with the pulverized shells of snails, cockles, and oysters:* the mass is dried, and formed into pills, of a convenient size to be held between the gum and lip, which being gradually dissolved and swallowed, fulfil the intention required.†

V.

TO AFFORD AN ELIGIBLE FORM.

A. *By which the efficacy of the remedy is enhanced.*

After the views which have been submitted in the progress of the present inquiry, it is evident, that the *form* in which a remedy is administered may exert some influence upon its medicinal effects; for additional proofs of this fact, and for more particular directions, see *Decocta, Infusa, Tincturae, Misturae, Pilulae, Pulveres, &c.*

When a substance, or a combination of substances, requires the addition of some other one, for the purpose of imparting a convenient, agreeable, or efficacious form, a *vehicle* should always be selected, whose effects will be likely to correspond with the intention of the other ingredients. This precept may be exemplified by a reference to *Form.* 80, 134, and others, the *key-letters* of which announce the *modus operandi* of their respective vehicles.

B. *By which its aspect or flavour is rendered more agreeable.*

It should ever be the object of the practitioner to accommodate, as far as he is able, the form and flavour of his medicines to the taste and caprice of his patient, provided always that he does not compromise their efficacy, and which often appears to be nearly connected with those sensible qualities which render them disgusting and objectionable.

Some medicines are more grateful to the stomach, as well as more efficacious in their operation, when exhibited in the state of effervescence. To effect this we have only to introduce an alkaline carbonate into the formula, and to direct a portion of some vegetable acid to be added just before it is swallowed. We must, however, take care that the ingredients are of a nature not likely to be decomposed by the alkali, in the first instance, or by the neutral salt, which is formed, in the second. See *Form.* 27, 82, 86.

* They are previously calcined, but not burnt to lime, to an extent only that may destroy their tenacity, and render them fit for levigation.

† A similar custom is common to the Indians of the whole of Asia, and of America; for the practice of the South American Indians, see *Humboldt's Personal Narrative*. In India, Betel, variously compounded, is employed for the purpose above stated. The mixture more commonly used in Ceylon consists of quicklime, Areca-nut, and Tobacco, wrapped in Betel leaf. On ordinary occasions it is only masticated; but to repress the painful calls of hunger, the juice is swallowed.

C. *By which it is PRESERVED from the spontaneous decomposition to which it is liable.*

It is sometimes advisable to add an ingredient for the purpose of preventing the sudden decomposition of a medicine; thus is the *Compound Tincture of Cardamoms* added to the *Compound Decoction of Aloes*, in order that the latter may be preserved a longer period without change. The addition of sugar will prevent ointments from becoming rancid. Vegetable infusions, that are susceptible of mouldiness, are best preserved from such deterioration by some aromatic addition. For the knowledge of this fact we are indebted to Dr. Mac Culloch, who in a very interesting paper, lately published in the *Edinburgh Philosophical Journal*,* has observed, that perfume, such as *Essential Oils*, &c., will prevent the production and growth of those minute cryptogamous vegetables, upon which the phenomenon of mouldiness depends.†

Such are the objects which are to be attained by combining several substances in one *Formula*, and such the laws by which these compositions are to be regulated; but unless a physician can satisfactorily trace the operation of each element in his prescription to the accomplishment of one or more of the objects which I have enumerated, *SIMPLICITY* should be regarded by him as the greatest desideratum. I was once told by a practitioner in the country that the quantity, or rather complexity of the medicines which he gave his patients, for there never was any deficiency in the former, was always increased in a ratio with the obscurity of their cases; "if," said he, "I fire a great profusion of shot, it is very extraordinary if some do not hit the mark." Sir Gilbert Blane† has given us a similar anecdote; "a practitioner being asked by his patient why he put so many ingredients into his prescription, is said to have answered more facetiously than philosophically, '*in order that the disease may take which it likes best.*'" A patient in the hands of such a practitioner has not a much better chance than the Chinese Mandarin who, upon being attacked with any disorder, calls in twelve or more physicians,

* Vol. viii. p. 33.

† Dr. Mac Culloch, in illustration of this subject, states, that ink, paste, and seeds, are among the common articles which suffer from such a cause, and to which this remedy is easily applicable. With respect to articles of food, such as bread, cold meats, or dried fish, it is less easy to apply the remedy, on account of the taste; cloves, however, and other spices whose flavours are grateful, may sometimes be used for this end. It is notorious that gingerbread, and bread containing caraway seeds, are far less liable to mouldiness than plain bread. The effect of cloves in preventing the mouldiness of ink is generally known; and the same result may be obtained by oil of lavender in a very minute quantity, or by any other of the perfumed oils. Russian leather, which is perfumed with the tar of the Birch tree, is not subject to mouldiness, as must be well known to all who possess books thus bound: they even prevent it from taking place in books which are bound in calf, and near which they may happen to lie. Paste is another perishable article, and although *Alum* which is used by the book-binder will certainly preserve it longer than it would remain useful without it, still it is not very effectual. *Rosin*, sometimes used by the shoemaker, answers the purpose better, and appears to act entirely on this principle; it is however far less effectual than even oil of turpentine; *Lavender*, and the other strong perfumes, as *Peppermint*, *Anise*, and *Bergamot*, are perfectly effectual, even in a very small quantity, and paste may be thus preserved for any length of time.

† *Medical Logic*, Edit. 2. p. 192, note.

and swallows in one mixture all the potions which each separately prescribes !

Let not the young practitioner however be so deceived : he should remember that unless he be well acquainted with the mutual actions which bodies exert upon each other, and upon the living system, it may be laid down as an axiom, that *in proportion as he complicates a medicine, he does but multiply the chances of its failure.* SUPERFLUA NUNQUAM NON NOCENT : let him cherish this maxim in his remembrance, and in forming compounds, always discard from them every element which has not its mode of action clearly defined, and as thoroughly understood.

The perfection of a Medicinal prescription may be defined by three words ; it should be **PRECISE** (in its *directions*), **CONCISE** (in its *construction*), **DECISIVE** (in its *operation*.) It should carry upon its very face an air of energy and decision, and speak intelligibly the indications which it is to fulfil. It may be laid down as a position which is not in much danger of being controverted, that *where the intention of a medicinal compound is obscure, its operation will be imbecile.*

A Medicinal Formula has been divided into four constituent parts, a division which will be found to admit of useful application to practice, in as much as it was evidently suggested with a view of accomplishing the more prominent objects which have been related in the preceding pages ; or, in the language of Asclepiades, of enabling the **BASIS** to operate "**CITO**," "**TUTO**," et "**JUCUNDE**." Quickly, Safely, and Pleasantly—thus

I. **THE BASIS**, or Principal Medicine.
(*curare.*)

II. **THE ADJUVANS** ; that which assists and promotes its operation.
(*"Cito"*)

III. **THE CORRIGENS** ; that which corrects its operation.
(*"Tuto."*)

IV. **THE CONSTITUENS** ; that which imparts an agreeable form.
(*"Jucunde."*)

These elements however are not all necessarily present in every scientific formula, for many medicines do not require any addition to promote their operation, and the mild and tractable nature of others renders the addition of any corrective unnecessary ; whilst many again are in themselves sufficiently manageable, and do not therefore require the *intermede* of any *vehicle* or *constituent*. It also frequently occurs that one element is capable of fulfilling two or more of the objects required ; the **ADJUVANS** for instance, may at the same time act as the **CORRIGENS**, or **CONSTITUENS** ; thus the addition of *Soap* to *Aloes*, or *Extract of Jalap*, mitigates their acrimony, and at the same time quickens their operation (80.) So again *Neutral Salts* both quicken and correct the griping which attends the operation of resinous purgatives. The dispo-

sition of the key letters placed opposite to the elements of the following *Formula*, will furnish the practitioner with a farther elucidation of these principles, viz. 70, 71, 76, 77, 101, 102, 105, 135, &c. This coincidence, if possible, should be always attained, for it simplifies the formula, and by decreasing the bulk of the remedy, renders it less nauseous and more elegant.*

This division also affords the best general rule for placing the ingredients of a formula in proper order, for the order should correspond with that of the arrangement; and those elements intended to act in unity should be marshalled together. The chymical and mechanical nature however of a medicinal substance will occasionally offer exceptions to any general rule; thus the volatile ingredients should be those last added, and the constituent or *vehicle* should be placed next the particular element to which it is intended to impart convenience or efficacy of form, or a capability of mixing with the other ingredients, as may be seen in *Formula* 69, 71, 127, 136, &c. This consideration induced the Committee, appointed to revise the late *Pharmacopœia*, to alter the order of the ingredients in the "*Mistura ferri composita*," and to place the "*Spiritus Myristicæ*" next in succession to the "*Potassæ Subcarbonas*," and *Myrrh*. If any substance require decoction or infusion, a question then arises, determinable only by a knowledge of its chymical composition, whether the remaining ingredients should be added previous to, during, or subsequent to, that operation; *Formula* 40, which is recommended by Pringle as a remedy for Typhus fever, may serve to exemplify this principle. The preparation of the ingredients is resolved into three distinct stages, and it is easy to discover that by any other arrangement their several virtues could not be fully obtained, and secured from change. The *Cinchona*, for instance, yields its full powers only by decoction, a process which would necessarily impair those of *Serpentaria*, connected as they are with an essential oil; whilst the addition of the acid at any other stage of the process than that directed, would produce decompositions in the vegetable substances; and it is evident that were the *Spirits of Cinnamon* added previously, it would be entirely lost by vaporization. So in making the *Compound Decoction of Sarsaparilla*, the *Sassafras* should be added after the other ingredients have undergone boiling. The *Decoctions of Lichen Islandicus* and *Sarsaparilla* constitute a popular remedy on the Continent, in certain forms of Phthisis; now it is evident that as the former plant loses its virtues by long coction, and the latter requires a protracted ebullition for the extraction of its virtues, they ought not to be included under the same general directions, each decoction should be separately performed, and the results subsequently mixed.

* It appears from what has been stated under Section I. B. with respect to **DIURETICS**, that some medicines not only *assist*, but actually **DIRECT** the operation of the substances with which they may be associated, and that many remedies act in unison with those they are joined with: thus *Nitre* in conjunction with *Squill* is diuretic; in conjunction with *Guaiacum*, diaphoretic; for these reasons I hesitated whether I ought not to have added a fifth *constituent* and restored the "*Dirigens*" of ancient authors; enough, however, has been said to enable the practitioner to appreciate the importance of such a law of medicinal combination.

COMPOUND MEDICINES have been divided into two Classes, viz.

I. OFFICINAL PREPARATIONS :

which are those ordered in the Pharmacopœias, and kept ready prepared in the shops. No uniform class of medicines however can answer the indication of every case, and hence the necessity of

II. MAGISTRAL OR EXTEMPORANEOUS FORMULÆ.

These are constructed by the practitioner at the moment, and may be either arrangements altogether new, or officinal preparations with additions, or modifications. Too much importance cannot be assigned to the Art which thus enables the physician to adopt and graduate a powerful remedy to each particular case by a prompt and accurate prescription; without this knowledge, the practitioner of the nineteenth century, with all the collateral aid of modern science, will be as helpless in the chamber of sickness as the physicians of ancient Egypt, who were obliged by the laws to follow with servile exactness the unvarying mandates of their medical code. *Extemporaneous* are also preferable to *Officinal Formulæ*, whenever the powers of the compound are less liable to deterioration from being long kept; for examples, see *Mistura Ferri composita*; *Infusum Sennæ*; *Liquor Hydrargyri Oxymuriatis*, &c.

THE CHYMICAL AND PHARMACEUTICAL ERRORS, WHICH MAY BE COMMITTED IN THE COMPOSITION ON EXTEMPORANEOUS FORMULÆ, ARE REFERABLE TO THE FOLLOWING SOURCES.

I.—*Substances are added together which are incapable of mixing, or, of forming Compounds of uniform and suitable consistence.*

This may be termed an error in the *Mechanism* of the Prescription, and has been generally regarded as being more inconvenient than dangerous, more fatal to the credit of the Prescriber than to the case of the Patient: the observations however which are offered in this work, especially under the article *Pilulæ*, must satisfy the practitioner that this error is more mischievous in its effects than has been usually supposed; it is so palpable and self-evident in its nature, that it will be unnecessary to illustrate it by more than one or two examples. *Calomel*, for instance, has been ordered in an aqueous vehicle, and certain *resinous tinctures* have been directed in draughts, without the necessary intervention of mucilage; so again, an intermixture of substances has been formerly ordered in powder that possess the perverse property of becoming liquid by triture (see *Pulveres*,) and bodies have been prescribed in the form of

pills, whose consistence* renders it impossible that they should preserve the globular form ; or else they have been so hard and insoluble, that they might be fired through a deal board.† In the London Pharmacopœia of 1809, an error of this kind unfortunately passed without correction with regard to the Formula for preparing the *Syrup of Senna*.

II.—*Substances are added together which mutually decompose each other, whence their original virtues are changed, or destroyed.*

This is a more serious, but not a less frequent source of error ; it has been already shown in this Analysis (IV. B) that the judicious and scientific application of chymical science has furnished new and endless resources to the physician, by exalting the efficacy and correcting the acrimony of established remedies, or by combining inert substances so as to create new and powerful medicines. With equal truth and confidence it may be asserted, that the abuse of these means not only destroys the virtues of the most valuable articles in the *Materia Medica*, but that the mildest remedy may be thus converted into an instrument of torture, and even of death. In a lecture delivered at Apothecaries' Hall, Mr. Brande stated that he had seen a prescription in which the *blue*, or mercurial pill, was ordered in conjunction with nitric acid, and that the patient was brought to "death's door" from the formation of *nitrate of mercury* in his stomach ! I have myself lately seen a *Recipe*, professing to afford a preparation similar to the "*Black Drop*," and which directed a mixture of a *Tincture of Opium*, made with rectified spirit, with *Nitric Acid* ; in this case, it may be very safely inferred that the author was not only ignorant of the chymical habitudes of these bodies, but that he never performed the experiment in question, or he would have learnt from dire experience, that in consequence of the rapid evolution of *nitric ether*, the contents of the phial will explode with violence, to the imminent hazard of the operator's eyesight. During the course of my professional practice I have witnessed more than an ordinary share of consumptive cases, and I can confidently state that in the treatment of *Hæmoptysis*, the styptic properties of *Acetate of lead* are entirely invalidated by combination with *Alum*,‡ or by its exhibition being accompanied with that of the acidulated *infusion of roses*, or with small doses of *sulphate of magnesia* ; and yet, I would ask, whether this practice is not usual and general ? The practitioner however cannot be too often reminded that he is not to reject a remedy whose value has been ascertained by experience,

* Dr. Percival in his *Essays*, ingeniously exemplifies this error by stating a case which occurred in his own practice. "I ordered," says he, "a combination of Camphor and Balsam of Copaiba in the form of pills, but the apothecary informed me that he was unable to form them into a mass, since they liquefied like treacle." I may here observe that the addition of a small portion of the coagulated yolk of an egg, would have rendered the mixture practicable.

† This would occur, if, in making the *Pilulæ Ferri Compositæ*, we were to substitute the *Liquor Potassæ* for the *Sodæ Subcarbonas*.

‡ The "*Pharmacopœia Bateana*" contains a Formula for a "*Tinctura Anti-phthisica*," which is stated to be "a truly good medicament in those consumptions which proceed from ulcers of the lungs." The following is the Receipt—*R.* Sacch : Saturni : iʒj—Sal Martis ʒj—Infus : Spir : Vin : ꝥj—Dose from twenty to forty drops. In this case an insoluble Sulphate of Lead must be formed, which will render the medicine, as far at least as its saturnine effects are concerned, completely inert !

merely because it appears to be unchymical: the popular and certainly useful pill, consisting of calomel, rhubarb, and soap, may be adduced as an example of this kind. Of the *Mistura Ferri Composita*, I will only say that it is a most valuable combination; and whether it be the product of accident, or the result of philosophical induction, it equally deserves a distinguished place in our list of tonic remedies: but it cannot be denied that many of our esteemed arrangements, which are in apparent contradiction to all the laws of composition, owe their efficacy to the operation of infinities altogether blind and fortuitous.

It has been observed that the practice of combining certain vegetable tonics with lime-water, although very common, is in cases where we are desirous to obtain their *astringent* effects, of very doubtful propriety; for the fact is, that *Tannin* forms with the alkalies and alkaline earths, compounds that are not soluble in water,* and which are therefore probably inefficacious. It may perhaps be said that such an argument cannot avail, because if the astringent matter be even introduced into the stomach in its purest form, it will immediately form an insoluble compound on its contact with *gelatine*.† We know so little of the laws of *gastric chymistry*, that it is difficult to learn what changes take place in the animal laboratory; but it would seem probable that the powers of the stomach rather consist in decomposing the ingesta into simple forms, than in complicating them by favouring new combinations; besides which, if such a compound were formed, it would be subsequently decomposed *in transitu*; for the experiments of Sir H. Davy show that vegetable astringent matter passes through the body unchanged. (Page 84.)

It is impossible to furnish any general rule that may enable the practitioner to avoid mixing together substances which are incompatible with each other; a knowledge of their chymical habitudes must in every case direct him, and these are enumerated in the second part of this work, under the history of each medicinal substance. The physician however will find it useful to retain in his remembrance the simple and beautiful law which has been so ably developed by the eminent author of the "STATIQUE CHIMIQUE," that *whenever two salts in a state of solution are brought together, which contain, within themselves, elements capable of producing a soluble and insoluble salt, a decomposition must necessarily arise*;‡ he illustrates this law by the example of *Nitrate of Silver* and *Muriate of Potass*, whose elements are capable of forming within themselves a soluble salt, *Nitrate of Potass*, and an insoluble salt, *Muriate of Silver*. It deserves also to be remembered, that a table of chymical affinity will not upon all occasions prove to the medical practitioner an unerring pilot; in those cases for instance, where a *super* or *sub salt* is

* This fact has been very satisfactorily proved by the failure of the practical attempts which were made by Dr. Macbride of Dublin, to improve the art of tanning leather by the use of Lime-water, instead of plain water, which he conceived would extract the virtues of Oak bark more completely. The reader who is desirous of a more detailed account of this plan must refer to Phil. Trans. Vol. lxxiii. part 1, Act. 8.

† We trust these observations will not create any alarm in the worthy Citizen; he may with as much safety as pleasure, continue the laudable practice of regaling himself and friends with a cup of strong tea, in spite of the Turtle soup they may have taken, and that too without the least danger of converting their stomachs into tanneries, or their food into leather.

‡ For a highly ingenious, and important extension of these views, see *Aqua Marina*. (Note.)

readily formed, a substance less weakly attracted by another than a third, will sometimes precipitate this third from its combination with the second, thus in the production of *Nitric Acid*, we decompose the *Nitrate of Potass* by virtue of the superior affinity of the *Sulphuric Acid* for its base, the nitric acid is accordingly disengaged, and a *Sulphate of Potass* remains in the retort; now, paradoxical as it may appear, if nitric acid be poured upon the *Sulphate of Potass*, a quantity of nitre will be reproduced, in consequence of the saturation of a portion of the base, in such a proportion as to enable the remaining atoms to form a *Bi-Sulphate of Potass*. In the same manner the *Tartrate of Potass* (*Soluble Tartar*) is, contrary to the usual affinities, decomposed by all *sub-acid* vegetables, which neutralize a portion of the base, and convert the salt into the *Bi-tartrate of Potass* (*Cream of Tartar*.) The same effect is even produced by *Carbonic acid*. *

There are besides certain cases wherein *Triple Salts* are produced, which afford apparent exceptions to the usual affinities of the bodies involved in the combination; we have a very good illustration of this truth in the decomposition of the *Liquor Ammoniae Acetatis* by *Magnesia*; if the practitioner refers to a table of affinities, he will perceive that *Acetic acid* has a greater attraction for *Ammonia* than for *Magnesia*; but if upon this assurance he were to administer these bodies together, he, or his patient would soon discover that ammonia is developed with considerable pungency; now in this case the *Magnesia* forms a *Triple Acetate* with one part of the ammonia, and consequently sets the remainder at liberty.

A popular error exists with respect to the subject of chymical incompatibility, against which it may be here adviseable to caution the inexperienced prescriber, viz. that *no important change is produced, on the admixture of solutions, unless precipitation is occasioned*. This however occurs only when the new compound produced is insoluble; thus *Sulphuric Acid* may be added to *Lime-water*, by which a *Sulphate of Lime* is formed, but as its proportion is not too large for the water to dissolve, no precipitate occurs; so again, a solution of *Nitrate of Silver* is not apparently disturbed by the addition of *Ammonia*, because the resulting *Ammoniuret* is a soluble compound. We should, nevertheless, commit a great error in supposing that, for such a reason, these bodies were not *incompatible*. On the other hand, the medicinal powers of a solution are not necessarily destroyed by the occurrence of a precipitate, although such a result should always be regarded with suspicion.

III.—*The Methods directed for the preparation of the Ingredients are either inadequate to the accomplishment of the object, or they change and destroy the efficacy of the substances.*

The observations already offered upon *Formula 40*, will sufficiently explain the nature of the various errors comprehended under this head:

* M. Dive, an apothecary of Mont de Marson, has lately announced that a current of carbonic acid, when passed through a solution of *Tartrate of Potass*, partly decomposes it: and he ascribes to the same agent the production of the *Bi-tartrate* in the juice of the grape during its fermentation; accordingly, by mixing neutral tartrate with fermentable materials, we shall produce *Cream of Tartar* in the fermented liquor. *Journal de Pharm.* Octob. 1821. p. 487.

so, again, if the virtues of a plant reside in *essential oils*, which are easily volatilized, or in *extractive matter*, which readily becomes oxidized, *Decoction* must necessarily destroy its efficacy; a striking example of this fact is presented us in the history of the *Laurel* and *Bitter Almond*: the poisonous influence of the essential oil and distilled water of these vegetable substances is well known, but their watery extracts are perfectly innocuous. A still more familiar example is to be found in the onion, or in garlic, which by simple coction is deprived of all its acrimonious qualities. On the other hand, an error equally injurious would be committed, by directing a simple infusion of a vegetable, whose medicinal properties depend upon resino-mucilaginous principles. Orfila found that an extract of Hemlock, prepared by boiling the dried powder in water and evaporating the decoction, was entirely destitute of activity. See *Decocta, Infusa, Extracta*.

An instance of the baneful effects which may arise from an erroneous method of preparation happened some time ago to fall under my immediate notice and care; it was in preparing an infusion of the root of the *Veratrum* with *Opium*, as directed by Mr. James Moore, when the dispenser ignorantly substituted a spirituous for a vinous menstruum.

A very common error may be here noticed, which is that of prescribing a substance in such a form, as not to be acted upon with any effect by the solvent; as an example it may be stated, that in preparing an infusion of *Juniper Berries*, unless pains be taken by strong contusion to break the seed, it will contain but little power as a medicine.

The unbruised seeds of Mustard were commended by Dr. Mead,* in *Ascites*, and by Bergius, in intermittents; Dr. Cullen, however, has very properly observed that the seeds given in the above manner are never broken down or dissolved in the stomach, but pass away entire by stool, and cannot therefore occasion any beneficial result.

It is unnecessary to multiply examples in proof of the numerous errors into which a physician must unavoidably fall, who presumes to compose prescriptions without a knowledge of the chymical habitudes of the different substances which he combines. The file of every apothecary would furnish a volume of instances, where the ingredients of the prescription are fighting together in the dark, or at least are so adverse to each other, as to constitute a most incongruous and chaotic mass.

“Obstabat aliis aliud: quia corpore in uno
Frigida pugnabant calidis, humentia siccis,
Mollia cum duris, sine pondere, habentia pondus.”

Ovid Metamorph. lib. 1. 19.

THE DOSES OF MEDICINAL SUBSTANCES are specific with respect to each, and can therefore be only learnt from experience; the young and eager practitioner, however, is too often betrayed into the error of supposing that the powers of a remedy always increase in an equal ratio with its dose, whereas THE DOSE ALONE VERY OFTEN DETERMINES ITS SPECIFIC ACTION. “*Medicines*,” says Linnæus, “*differ from poisons, not in their nature, but in their dose*,” which is but a paraphrase of the

* In one remarkable case related by this Physician, the operation of the unbruised mustard-seed is stated to have been promoted by combining it with a decoction of *Broom-tops*. Query, Was not the adjunct in this case the only efficient part of the remedy?

well known aphorism of Pliny, "*Ubi virus, ibi virtus.*" *—So that food, remedies, and poisons, may be said to branch into each other by indefinable gradations;—Five grains of *Cumpher* act as a mild sedative and slight diaphoretic, but twenty grains induce nausea, and act as a stimulant; so again, *Opium*, in two large doses, instead of promoting, prevents sleep, and rather stimulates the bowels than acts as a narcotic. Two ounces of any neutral salt are apt to be emetic, one ounce even of *Alum* to be cathartic, and two drachms to be refrigerant; in like manner the preparations of *Antimony* either vomit, purge, or sweat, according to the quantity exhibited.

Would it not appear that *powerful doses rather produce a local than general effect?* Experience seems to prove in this respect, that the effect of an internal application is similar to that of an external impression; if violent, it affects the part only to which it is applied, as pinching does that of the skin, whereas titillation, which may be said to differ only from the former in degree, acts upon the whole system, and occasions itching and laughter, and if long continued, weakness, sickness, vomiting, and convulsions; in like manner *Digitalis*, if given in large doses, acts immediately upon the stomach or bowels, becoming emetic and cathartic, but in smaller proportions it produces a GENERAL effect, increasing all the excretions, especially that of urine; so, again, large doses of the *Mercurial Pill* act upon the bowels, and are eliminated from the body, whereas the same remedy in small doses affects the system generally, and excites a universal influence. I am well satisfied that the regulation of the dose of a medicine is even more important than it is usually supposed to be. *Substances perfectly inert and useless in one dose, may prove in another active and valuable.* Hence may be explained the great efficacy of many mineral waters, whilst the ingredients which impart activity to them are found comparatively inert, when they become the elements of an artificial combination; and hence probably the failure of many *alterative* medicines, when no other rational cause can be assigned for it. We need not seek far for an example of the very different and opposite effects which the same substance can produce in different doses: the operation of *Common Salt* is familiar to us all; Sir John Pringle has shown that in quantities such as we usually take with our food, its action is highly septic, softening and resolving all meat to which it is applied, whereas in larger quantities it actually preserves such substances from putrefaction, and therefore, when so taken, instead of promoting, destroys digestion.

* The word "*Venenum*," was employed by the ancients to signify both a *poison* and a *medicine*; in the former of these acceptations it is used by Virgil in the following passage.

"Picus equum domitor, quem capta cupidine conjunx
Aurea percussus virga, versumque VENENIS,
Fecit avem Circe, sparsitque coloribus alas."

Æneid. Lib. vii.

In the latter sense it is used by Plautus—

"Quia sorbitione faciam ego te hodie mea
Item, ut Medea Peliam concoxit senem,
Quem medicamentis, et suis VENENIS dicitur
Fecisse rursus ex sene adolescentulum
Item ego te faciam."

It is moreover probable that medicinal, like nutritive substances, are more readily absorbed into the circulating system when presented in small quantities, than when applied in more considerable proportions. It is upon this principle that a large quantity of food, taken seldom, does not fatten so much as smaller quantities at shorter intervals, as is exemplified in the universal good condition of cooks and their attendants. It is not pressing the principle of analogy too far to suppose that the action of *alteratives*, which require to be absorbed, may be more effectually answered by similar management ; that is, *by exhibiting small doses at short intervals*.

The operation of medicines is influenced by certain general circumstances, which should be also kept in mind when we apportion their dose ; e. g. AGE—SEX—TEMPERAMENT—STRENGTH OF THE PATIENT—HABIT—DIET—PROFESSION—CLIMATE—DURATION OF THE DISEASE—STATE OF THE STOMACH—IDIOSYNCRASY—and THE VARIABLE ACTIVITY OF THE MEDICINAL SUBSTANCE.

Women generally require smaller doses than men. Habit, or the protracted use of a medicine, generally diminishes its power, although certain cathartics appear to offer an exception, for when long continued, their activity is proportionally increased, as is well known to every person who is familiar with the operation of the Cheltenham waters. Dr. Lamb has also stated with regard to the operation of Lead, “that the constitution so far from being reconciled to it by habit, is rendered more and more sensible to its irritation by continuance. Emetics also frequently become more powerful by repetition ; Cullen informs us that he knew a person so accustomed to excite vomiting in himself that the one twentieth part of a grain of tartarized antimony was sufficient to excite a convulsive action of the stomach ; in some cases such an effect may perhaps be referred to the operation of the mind ; for after the frequent use of an emetic, the mere sight of it, or even conversation relative to it, has been found sufficient to excite nausea.

In apportioning the dose of a very active medicine, it is of the greatest moment to determine the relative degrees of power between the system and the remedy, and to know to what extent the latter is likely to be carried, consonantly with the powers of life to resist it ; thus, after a patient has been exhausted by protracted and severe suffering and watching, a dose, different to one at the commencement of the disease is requisite. The importance of the precept is impressed upon my mind from having witnessed, in the course of my practice, several instances of the mischief which has arisen from a want of attention to it ; that disease materially influences the condition of the body, and its susceptibility to remedial impressions, has been already demonstrated. Emetics act very readily in febrile affections, while in those of the Neuroses* they produce their effects with difficulty.

In the application of external remedies to diseased parts, it especially behooves the Surgeon to take into consideration the degree of vitality possessed by such parts, and to graduate their strength accordingly.

Mr. Henry Earle† has published a very interesting case in illustration

* See the dissertation on the operation of *Emetics*, page 86.

† Cases and Observations, illustrating the influence of the Nervous System, in regulating animal heat, by H. Earle, Esq. ; published in the 7th volume of the Medico-Chirurgical Transactions.

of this principle. The arm of a person became paralytic, in consequence of an injury of the axillary plexus of nerves from a fracture of the collar bone; upon keeping the limb for nearly half an hour in a tub of warm grains, "*which were previously ascertained by the other hand not to be too hot,*" the whole hand became blistered in a most alarming manner, and sloughs formed at the extremities of the fingers, and underneath the nails; a considerable degree of inflammation subsequently spread in the course of the absorbents, and matter formed in the axilla, which was soon absorbed, and the inflammation assuaged. Whence it follows, that a limb deprived of its usual supply of nervous energy cannot sustain, without injury, an elevation of temperature which would not be in the least prejudicial to a healthy member. Mr. Earle supports this conclusion by the relation of another case, in which the ulnar nerve had been divided, for the cure of a painful affection of the arm; the consequence of which operation was, that the patient was incapable of washing in water at a temperature that was quite harmless to every duly vitalized part, without suffering from vesication and sloughs.

Before we quit the subject of Dose, it may be necessary to observe, that there are many remedies that do not act with greater violence in a large dose than in one comparatively small; *Ipecacuan*, for instance, is more certain in its operation, but not more violent, when given in a large quantity; the same may be said of *Aloes*, and several other medicines.

THE VARIABLE ACTIVITY OF A MEDICINE should also be appreciated, and perhaps the practitioner would act cautiously if he were to reduce the dose, should it be a very considerable one, whenever a fresh parcel of the medicine is commenced, especially of the powders of active vegetables liable to deterioration from being kept, as those of *Digitalis*, &c.

THE TIME OF THE DAY at which remedies should be administered deserves likewise some attention. *Evacuating Medicines* ought to be exhibited late at night or early in the morning. It would seem that during sleep the bowels are not so irritable, and consequently not so easily acted upon, which allows time for the full solution of the substance; the same observation applies to *Alterative* and other medicines which are liable to suffer from a vexatious irritability of the bowels; it is on this account eligible to exhibit *Guaiacum*, *Pilulæ Hydrargyri*, &c. when they are not intended to purge, at bed time. On the other hand, where the effects of a remedy are likely to be lost by perspiration, as is the case with *Diuretics*, many of which are by external heat changed into *Diaphoretics*, it may become a question with the judicious practitioner whether he cannot select some more favourable period for their exhibition.

In fevers it is of importance to consult in all respects the quiet and comfort of the patient; Dr. Hamilton therefore, in his valuable work on Purgatives, very judiciously observes that, on this account, the exhibition of purgative medicines should be so timed, that their effects may be expected during the day.

In some cases the time of administering a remedy must be regulated by the stage of the disease; thus, in fevers, a dose of opium will either increase the heat of the body, augment thirst and restlessness, or occasion tranquillity and sleep, according to the temperature of the body at the time of its administration; for this reason Dr. Currie advises us not

to give the evening dose of Opium in Typhoid fevers, till very late, or about one or two o'clock in the morning, when the heat is subsiding, and moisture is coming on. Emetics administered for the cure of the slighter cases of Pyrexia should be given in the evening, as their operation leaves a tendency to sleep and diaphoresis, which it is useful to promote. Remedies that require to be *absorbed* will probably be more efficient in the morning after sleep; the old custom of giving medicines on a morning *fasting*, is not quite so absurd as some modern practitioners have been led to suppose. Diaphoretics should be always given after the digestive process is ended, for during the performance of this function the emunctories of the skin are less disposed to action.

THE INTERVALS BETWEEN EACH DOSE must be regulated by the nature of the remedy and that of the objects which it is intended to fulfil, and whether it be desirable or not that the latter dose should support the effects of the preceding one, or whether there be any fear of a reaction or collapse taking place after the effect of one dose has subsided, unless immediately repeated; thus the effects of diffusible stimulants, such as ammonia and æther, are very evanescent, they should therefore be repeated at short intervals; the same may be said of *Diaphoretics*, especially the lenient ones; we ought not to allow the period between the doses to be so remote as to occasion any striking abatement in the impression: so Opium, where its primary and stimulant operation is required, as in diseases of debility, such as fevers of the typhoid type, should be given in small doses at short intervals, so that it may enkindle and sustain a uniform and regular state of excitement: but where the object is to mitigate pain, allay irritation, and produce sleep, it ought to be exhibited in full doses, at distant intervals. There is a caution also which it is very necessary to impress upon the practitioner, respecting the power which some medicines possess of *accumulating** in the system; this is notorious with regard to Lead and Mercury, and probably with the preparations of Arsenic, and some other metallic compounds. Dr. Withering has observed that the repetition of small doses of *Digitalis*, at short intervals, till it produces a sensible effect, is an unsafe practice, since a dangerous accumulation will frequently take place before any signals of forbearance present themselves. I have already alluded to the possibility of mercurial accumulation, and its development at a remote period.

CONSTITUTIONAL PECULIARITIES, or IDIOSYNCRASIES, will sometimes render the operation of the mildest medicine poisonous, "*Virum novi*," says Gaubius, "*qui cum fatuum lapidum cancerorum pulvisculum ingessit, vix mitius afficitur quam alii ab Arsenico*." I have seen a general Erysipelas follow the application of a blister, and tormina of the bowels, no less severe than those produced by the ingestion of *Arsenic*, attend the operation of purgatives composed of *Senna*! In some constitutions Antimony has been known to produce a ptialism; Dr. James assured

* By the use of this word I wish to be distinctly understood as expressing only certain effects, without any regard to the causes that may produce them. The phenomena of *Accumulation* may on some occasions depend upon the absolutely increased quantity of the substance in the body, as in the instance of mercurial action, while in others they may perhaps arise from the system becoming more and more sensible to its stimulus. The history of poisons would afford some interesting illustrations of these views, and in another work (*Medical Jurisprudence*, Vol. 2. p. 148.) I have proposed a new subdivision of these bodies, under the title of "*Accumulative Poisons*."

Sir George Baker that he knew six instances of it, although the patients thus affected had neither their teeth loosened, nor their breath made offensive. The peculiar susceptibility of certain individuals to the effects of particular plants is also very singular; Murray relates that unpleasant symptoms have been experienced by merely keeping *Aconite* for some time in the hand, or on the bosom. I am acquainted with two persons in whom the odour of *Ipecacuan* always produces a most distressing dyspnæa; Mr. Chevalier informs us, that he once knew a lady who could not take *Powdered Rhubarb*, without an erysipelatous efflorescence almost immediately showing itself on the skin, and yet she could take it in the form of *Infusion* with perfect impunity. There are some idiosyncrasies so singular and incredible, that nothing but unimpeachable testimony could sanction our belief in their existence. Schenkus relates a case in which the general law of astringents and cathartics was always reversed. Donatus tells us of a boy whose jaws swelled, whose face broke out in spots, and whose lips frothed, whenever he eat an egg.

The late Pope Pius VII. had such an antipathy to musk, that on one occasion of presentation, an individual of the company having been scented with that perfume, his holiness was obliged to dismiss the party almost immediately.* Education, and early habits certainly establish very extraordinary peculiarities in different countries with respect to various objects of diet and luxury; what shall we say of the refinement of the ancients who regarded the flavour of the Citron with disgust, while the odour of putrid fish was deemed by them so exquisite, that they carried it about in caskets of onyx as a favourite perfume! Custom makes the Greenlander relish his train oil; and Dr. Heberden tells us, that there is a town in North America, where the spring-water is brackish, and that, when the inhabitants visit any other province, they choose to put salt into their tea or punch, in order, as they say, “to make it taste as it should do.”†

CLIMATE. Several observations have already been offered upon the influence of Climate in affecting the activity of our remedies.‡ With regard to its relations to *Dose*, I have only one remark to make to the English practitioner, and that by the way of caution, that he will not allow his own previous experience in hot climates, or the persuasions of other tropical practitioners, to induce him to administer such doses of Mercury, in England, as may have been found salutary in India, or in other Colonies of similar temperature.

The popular scheme of Gaubius for graduating the doses of medicine to different ages which was published in several of the former editions of this work, is now omitted, as being less easy of application than the following simple formula by Dr. Young.

* “Diary of an Invalid.”

† Med. Transact. Vol. 1. p. 5.

‡ See Historical Introduction.

RULE.

For children under twelve years, the doses of most Medicines must be diminished in the proportion of the Age, to the Age increased by 12.

thus at two years to $\frac{1}{7}$ —viz.

$$\frac{2}{2+12} = \frac{1}{7}$$

At 21 the full dose may be given.

Every general rule however respecting the doses of medicines will have exceptions. Thus children will bear larger doses of *Calomel* than even adults, and many medicines which do not effect adults, although exhibited in considerable quantities, prove injurious even in small doses to children.*

In concluding this part of the subject, it is proper to impress upon the practitioner the importance of writing his prescriptions in legible characters, and of avoiding all those abbreviations which are not generally understood, or which are capable of misconstruction.†

ON THE PARTICULAR FORMS OF REMEDIES, AND THE GENERAL PRINCIPLES UPON WHICH THEIR CONSTRUCTION AND ADMINISTRATION ARE TO BE REGULATED.

SOLID FORMS.

PULVERES. *Powders.*

The form of powder is in many cases the most efficient and eligible mode in which a medicinal substance can be exhibited, more especially under the following circumstances.

1. *Simple Powders.*

1. Whenever a remedy requires the combination of all, or most of its principles, to ensure its full effects, as *Bark. Ipecacuan, Jalap, &c.*
2. Where medicinal bodies are insoluble, and indisposed to undergo

* The Mechanical Physicians attempted to adjust the doses of medicines according to the constitution, by a mathematical rule; thus they say, "the doses are as the squares of the Constitution." And in the Edinburgh Medical Essays, there is actually a formal attempt to correct the errors of this rule. See "An Essay towards ascertaining the doses of vomiting and purging Medicines, by Dr. CHARLES BALGUY, Physician at Peterborough." Vol. 1. 167.

† While this sheet was passing through the press, an anecdote was related to me, which is well calculated to illustrate the mischief that may arise from abbreviated prescriptions. One of our most eminent surgeons having occasion to direct the application of a Lead Plaster (*Emplast: Lythargyi. P. L. 1787.*) he abbreviated the term as follows—*Emp. Lyth.*: in the haste of compounding, the *h*, perhaps carelessly written, was easily mistaken for *l*, and the chymist accordingly sent the *Emplast: Lytlæ!* As it was applied to the Pudenda, it is not necessary to state the distress of the patient, and the dismissal of the practitioner, which followed.

those essential changes, *in transitu*, which render them operative; for it must be remembered that by minute division, every particle is presented to the stomach in a state of activity, being more immediately exposed to the solvent or decomposing powers of that organ.

3. Where the mechanical condition of the substance is such as to occasion irritation* of the stomach, as the *Sulphuretum Antimonii*, or in external applications to produce an improper effect upon the skin, as *Hydrargyri nitrico-oxydum*.

The degree of fineness to which substances should be reduced by pulverization, in order to obtain their utmost efficacy, is a very important question. The impalpable form appears to be extremely injurious to some bodies, as to *cinchona*, *rhubarb*, *guaiacum*, and to contain aromatics, in consequence, probably, of an essential part of their substance being dissipated, or chymically changed by the operation. Fabbroni, for instance, found by experiment that *cinchona* yielded a much larger proportion of soluble extractive, when only coarsely powdered. I think it may be laid down as a general rule, that *extreme pulverization assists the operation of all substances whose active principles are not easily soluble, and of compound powders whose ingredients require, for their activity, an intermixture; whilst it certainly injures, if it does not destroy, the virtues of such as contain as their active constituent, a volatile principle which is easily dissipated, or extractive matter which is readily oxidized.*

2. Compound Powders.

The disintegration of a substance is much accelerated and extended by the addition of other materials; hence the pharmaceutical aphorism of Gaubius, "*Celerior atque facilius succedat composita, quam simplex pulverisatio.*" Thus several refractory vegetable bodies, as *myrrh*, *gamboge*, &c. are easily reduced by triturating them with sugar or a hard gum; and some gum resins, as *assafoetida* or *scammony*, by the addition of a few drops of almond oil. Upon the same principle the Pharmacopœia directs the trituration of aloes with clean white sand, in the process for preparing *Vinum Aloes*, to facilitate the pulverization and to prevent the particles of aloes, when moistened by the liquid, from running together into masses; some dispensers very judiciously adopt the same mechanical expedient in making a tincture of *myrrh*; so again, in ordering a watery infusion of opium, it will be judicious to advise the previous trituration of the opium with some hard and insoluble substance, as directed in the *Pulvis Cornu Usti cum Opio*, otherwise its particles will adhere with tenacity, and the water be accordingly unable to exert a solvent operation upon its substance.† It is equally evident that in the

* Camphor, unless it be presented to the stomach in a state of minute division, is liable to occasion heat and uneasiness in that organ. Fothergill's Med. Observ. vol. i. p. 432.

† In some cases the subject to be pulverized has been previously exposed to heat, but the doubtful influence of exalted temperature upon vegetable bodies, ought to afford us a lesson of extreme caution; the astringency of the stalks of the Artichoke is entirely destroyed by being gently heated in an oven, for after this operation they no longer strike a black colour with the salts of iron; another example is afforded us in the effects of heat upon Starch, which is thus changed into a species of gum, no longer producing a blue colour with Iodine, and which is known in commerce under the name of "British Gum."

construction of compound medicinal powders, the addition of an inert ingredient, which the mere chymist might condemn and discard as useless, not unfrequently acts a very important part in the combination, owing to its effects in dividing and comminuting the mere active constituents: the *sulphate of potass* in Dover's powder acts merely in dividing and mixing more intimately the particles of opium and ipecacuan: the *phosphate of lime* appears to act in the same mechanical manner in the Antimonial Powder; so again, in the *Pulvis Contrajervæ compositus*, the prepared oyster shells may be a necessary ingredient: in the *Pulvis Jalapæ compositus* of the Edinburgh College, the cream of tartar greatly increases the activity of the jalap, by breaking down its substance and dividing its particles; and Van Swieten observes that the operation of this resinous purgative is improved by bruising it with sugar, and adding some aromatic. The old combination of *Pulvis Helvetii* consisted of alum and dragon's blood, and there can be no doubt but that the effect of this latter ingredient, which has been often ridiculed, was to retard the solution of alum in the stomach, in consequence of which the preparation was likely to produce less inconvenience, and could therefore be administered in larger doses; the Edinburgh college has substituted gum Kino in their *Pulvis Aluminis compositus*, which may have the same effect in modifying the solubility of the alum.

In rubbing together different substances, it is necessary to remember that there are many saline bodies, which in the dry state become moist and even liquid, by triture with each other, and that, under such circumstances, they are susceptible of mutual decomposition. This change is effected by the action of water, derived from the following sources.

1. *From the water of crystallization.* This always operates when the proportion contained in the original ingredients is greater than that which the products can dispose of; that is to say, whenever the capacity of the new compound for water is less than that of the original ingredients. By previously driving off this water by heat, we shall of course avoid such a source of solution, and no liquefaction can ensue. Thus, if recently burnt quicklime be triturated with calomel, the resulting mixture will be white, showing that no decomposition can have arisen, but add a few drops of water, and it instantly assumes a dark aspect. If *crystallized* sulphate of copper be triturated with Acetate of lead, the resulting mixture will assume a fine green colour, but if the sulphate of copper be previously heated, and its water of crystallization driven off, no change of colour will be produced: if, for Acetate of lead, we substitute muriate of lime, and the sulphate of copper be *crystallized*, we shall obtain a result of a yellow colour, but if the sulphate of copper be *anhydrous*, the product will be colourless, becoming however instantly yellow, like the former, on the addition of a drop of water; and on a further addition of this fluid, the yellow product in both instances will be rendered blue; which proves that a chymical decomposition has taken place, and a muriate of copper resulted; for this salt is rendered *yellow* by a small, and *blue* by a larger proportion of water. The *Cuprum Ammoniatum* presents another illustration, for the ingredients, when rubbed together, become extremely moist, and undergo a chymical decomposition. Certain resinous bodies also, as *myrrh*, become liquid by triture with alkaline salts, in which case the resin and alkali form a soluble compound, which the water of crystallization, thus set at liberty, instantly dissolves.

2. *From aqueous vapour in the atmosphere.* The water of the atmosphere does not act upon these occasions, unless it be first attracted and absorbed by one of the triturated bodies; e. g. if Acetate of lead and recently burnt alum be triturated together, no change will be produced; but, if the burnt alum be previously exposed for a short time to the atmosphere, these bodies will, in that case, become liquid.

The Physician without this chymical knowledge, will be often betrayed into the most ridiculous blunders, an instance of which very lately came to my knowledge in a prescription for the relief of cardialgia and constipation, in the case of dyspepsia; it directed *sulphate of soda* and *carbonate of potass*, in the form of a powder, but the *fiat* of the physician, upon this occasion, only served to excite the ridicule of the dispenser, who soon discovered that the ingredients in his mortar dissolved into liquid.

During the exhibition of powders containing insoluble matter, it is always important to maintain a regularity in the alvine excretions, or an accumulation may take place attended with very distressing symptoms. Dr. Forthergill relates a case of this kind which succeeded the use of powdered bark; and Mr. E. Brande has communicated a similar instance of mechanical obstruction, produced by the habitual use of magnesia. I could also add, if it were necessary, some striking facts of a similar tendency, which occurred from eating bread that had been adulterated with pulverized *felspar*. The precaution seems more particularly necessary in the case of children, whose bowels are very impatient of extraneous and insoluble contents.* The dose of a powder ought not to exceed 3j; and, when taken, should be diffused in water, wine, or any other convenient liquid; resinous and metallic powders require a thick and consistent vehicle, as syrup or honey, since they subside from those which are more fluid.

PILULÆ. Pills.

These are masses of a consistence sufficient to preserve the globular form, and yet not so hard as to be of too difficult solution in the stomach. The subject offers some extremely interesting points of inquiry. The following general rule will enable the practitioner to select those substances to which the form of pill is adapted, and to reject those to which it is not suitable, as well as to direct, *extemporaneously*, the most efficient mode of preparation.

I. THE SELECTION OF SUBSTANCES.

1. *Suitable Substances* are, 1. All remedies which operate in small doses, as *Metallic Salts*; and 2. Those which are designed to act slowly

* It is perhaps not generally known, that the sugared plums sold to children consist very frequently of Plaster of Paris; the introduction of such substance into the intestines may often prove a source of mischief. I also understand, that it is no uncommon fraud to adulterate biscuits with the same substance. I confess I felt a great inclination to oppose the practice, lately suggested, of improving bad flour by the addition of Magnesia; I object to the introduction of any foreign and insoluble substance into our daily bread, and I am satisfied that the result of medical experience will sanction such an objection.

and gradually, as certain *Alterative Medicines*; or 3. which are too easily soluble when exhibited in other forms, as *Gamboge*, &c. 4. Substances which are not intended to act until they reach the larger intestines, as in pills for habitual costiveness; see *Aloes*. 5. Bodies whose specific gravities are too considerable to allow their suspension in aqueous vehicles. *Efflorescent* salts may also be exhibited in this form, but they ought to be first deprived of their water of crystallization, or the pills composed of them will crumble into powder as they dry.

2. *Unsuitable Substances* are, 1. Those which operate only in large doses. 2. Which deliquesce. 3. Whose consistence is such as to require a very large proportion of dry powders to afford them a suitable tenacity, as *oils*, *balsams*, &c. 4. Substances that are so extremely insoluble, that when exhibited in a solid form they pass through the canal unaltered, as certain *extracts*.

Many remedies which are incompatible with each other in solution, may be combined in pills, unless indeed their medicinal powers are adverse or inconsistent, or their divellent affinities sufficiently powerful to overcome their state of aggregation.

II. THEIR FORMATION INTO MASSES.

This is a subject of far greater importance than is usually assigned to it, as will be more fully explained in the sequel.

1. Many substances, as *vegetable extracts*, may be formed into pills without any addition; others, as *gum resins*, become sufficiently soft by being beaten, or by the addition of a drop or two of spirit, or *liquor potassæ*. Some dry substances react upon each other, and produce, without the addition of any foreign matter, soft and appropriate masses. The *Pilulæ Ferri Compositæ*, of our Pharmacopœia afford a very striking example of this peculiar change of consistence, which the mutual reaction of the ingredients produces by simple triture. The *Pilulæ Aloes Compositæ* offer another instance; for the extract of gentian, upon being triturated with aloes, produces a very soft mass, so that the addition of a syrup, as directed by the Pharmacopœia, is quite unnecessary. See *Form. 12*.

2. Many substances are, in themselves, so untractable, that the addition of some matter foreign to the active ingredients, is absolutely essential for imparting convenience of form. It is generally considered that very little skill and judgment is required in the selection of such a substance, provided it can fulfil the *mechanical* intention just alluded to—the fact however is that the *medicinal power of the pill may be materially controlled, modified, or even subverted, by the mode in which it is formed into a mass*. Where the active element of a pill is likely to be improved by minute division, a gummy or resinous constituent may be usefully selected: under the history of *Aloes*, I have alluded to a popular pill, known by the name of the *dinner-pill*, in which case the *mastiche* divides the particles of the aloes, and modifies the solubility of the mass. The *Pilulæ Opii* of the former Pharmacopœia of London, consisted of equal proportions of opium and extract of liquorice, and the mass was so insoluble that its effects were extremely uncertain and precarious; in the pre-

sent edition, soap has been very judiciously substituted; but in certain cases where we wish to protract the influence of opium, or that of any other active body, so as not to obtain its full effects at once, we may very advantageously modify its solubility, by combining it with a gum resin or some substance which will have the effect of retarding its solution in the stomach. The *Pilulae Styrace* of the Dublin college, presents itself as an efficient example of this species of pharmaceutical address; see also *Form.* 10, 11, 12. I am well acquainted with many formulæ whose utility has been sanctioned by experience, and I have no hesitation in believing that their salutary mode of operation would receive a plausible explanation from this simple law of combination. Dr. Young has very justly stated in his *Medical Literature*,* that the *balsam of copaiba* envelopes metallic salts, so as to lessen their activity; he says that the sub-carbonate of iron, made into pills with copaiba, was given for some weeks without any apparent effect; and that a few hours after the same quantity had been given, with gum only, the *fæces* were perfectly black. I do not know a more striking and instructive proof of the influence of a glutinous or viscid constituent, in wrapping up a metallic salt, and defending the stomach from its action, than is presented in the case published by the medical attendant Mr. Marshall, in consequence of the attempt of Eliz. Fenning to poison the family of Mr. Turner, of Chancery-lane, by arsenic, which she providentially administered in a heavy yeast dumpling. Soap is very frequently used for the formation of pill-masses, and it is an excellent constituent for substances likely to be injured by meeting with an acid in the *primæ viæ*; many resinous bodies may also be reduced to a proper consistence by soap, although in prescribing it, its levity should be attended to, or otherwise the pills will be too bulky; in general it will combine with an equal portion of any resinous powder, as *Rhubarb*, *Jalap*, &c.; it is of course ineligible where the substances are decomposed by alkalies, as *Tartarized Antimony*; this last precaution will also apply to *aromatic confection* as a vehicle, on account of the carbonate of lime contained in it. The *Conserve of Roses* has the advantage of retaining its consistency much longer than mucilage, but as it contains an uncombined acid, it is frequently inadmissible; it could not for instance be with propriety employed with the precipitated sulphuret of antimony. Pills made with mucilage, are apt to crumble when they are rolled out; this is the case with the *Pilula Hydrargyri sub-muriatis*; some extract therefore would be a more convenient constituent; in this particular case, however, the addition of a few drops of spirit would supersede the necessity of any constituent. Castor oil, in some cases, especially with some of the harder purgative extracts, will impart an eligible consistence.

Crumb of bread furnishes a convenient vehicle for those salts which are ponderous, active in very small doses, or which are liable to be decomposed by other vehicles; but an objection is attached even to this, for it is liable to become so dry and hard when kept, that pills made with it will frequently pass undissolved. Swediaur mentions this fact with reference to Plenck's mercurial pill, as well as to one of corrosive

* Edition 2. 1823.—I shall avail myself of the present opportunity to recommend this work to the perusal of every student who is ambitious to become acquainted with the Literature of his profession.

sublimate, and he proposes for this reason to substitute *starch*; the addition however of a small portion of sugar will prevent the bread from becoming thus indurated, and with such a precaution it may be very safely employed. For the purpose of forming active vegetable powders into pills, such as *Digitalis*, *Conium*, &c., I am informed by Mr. Hume of Long Acre, that in his experience *molasses* or *treacle* is the best constituent that can be selected; for it undergoes no decomposition by time, but maintains a proper consistency, and preserves the sensible qualities of the plant quite unimpaired for many years. I have deposited in the cabinet of the College, specimens of such pills, of *hemlock* and *foxglove*, which retain the characteristic odour of these vegetables, notwithstanding they have been now made for several years. *Honey* has likewise the property of preserving vegetable substances; *seeds* may be kept in it for any length of time, some of which, on being taken out, washed, and planted, will even vegetate. It has also been used for the preservation of animal matter; the bodies of the Spartan kings, who fell at a distance in battle, were thus preserved, in order that they might be carried home.*

Water will on some occasions be found a convenient expedient; powdered *Rhubarb* or *Jalap* may be thus made into masses without any increase of bulk, but the pills will be apt, if kept, to become mouldy.

3. In the formation of pills the ingredients should be hastily rubbed together, whenever they are liable to be injured by long exposure to the air; thus in the formation of *Pilulæ Hydrargyri submuriatis compositæ*, the compound is rendered less active by too long continued triture. See *Pulveres*.

4. In dividing pill-masses, it is usual to add to them, and envelope them in *magnesia*; where *calomel* is present, I have satisfied myself by experiment that a *muriate of magnesia* is formed under such circumstances, and it is owing to this partial decomposition, that the surface of the pill exhibits a greenish hue; *starch*, powder of *liquorice*,† or *orrice root*, might perhaps, under such circumstances be more judiciously preferred. In Germany, the powder of *Lycopodium* is generally used. Formerly, the pill was covered with gold leaf, which protected it from the influence of the stomach, and frequently rendered it unavailing.

It has been observed that many of the pill-masses directed in our *Pharmacopœias*, are liable to become so hard ‡ and dry by being kept, that they are unfit for that division for which they were originally intended; indeed Dr. Powel considers it doubtful whether the greater

* Dr. Davy informs me that the *Veddahs*, a savage race inhabiting the wilds of Ceylon, even in that hot climate, effectually preserve their venison in honey.

† There is one circumstance which sometimes renders the powder of *liquorice* objectionable upon such occasions; it is liable to irritate the fauces and occasion coughing; for this reason I always avoid its use in cases of pulmonary irritation.

‡ Some extracts become so hard, that in the state of pill they pass unchanged; this has occurred to me with the *extract of logwood*. Astringent vegetable matter, in combination with iron, is frequently characterized by a hardness that is not exceeded by *ebony*, and which is perfectly insoluble; the action of iron upon the petals of the red rose furnishes a very striking instance of this fact; if the petals be beaten in an iron mortar for some hours, they ultimately become converted into a paste of an intensely black hue; which, when rolled into beads and dried, is susceptible of a most beautiful polish, still retaining the fragrance of the rose. I have seen a necklace of this description; indeed these beads form an article of extensive commerce with the Turks, and are imported into Europe, through Austria, under the name of *Rose beads* or *Rose Pearls*.

number of articles had not better be kept in powder, and their application to the formation of pills left to extemporaneous direction; the necessity of this is farther apparent, when we learn that it is a common practice for the dispenser to soften these masses by the application of a hot spatula, or pestle, which sometimes carbonizes, and frequently decomposes them.

III. THEIR FORM OF PRESCRIPTION.

In our extemporaneous directions, it is necessary to apportion with accuracy the quantity of active materials which we may wish each pill to contain, and since the proportion of the *constituent* can rarely be exactly defined, the equable division of the whole mass, into a given number of pills, will be safer than defining the weight of each pill.

A pill, the bulk of whose ingredient is vegetable matter, ought not to exceed five grains in weight, but where the substances which compose it are metallic and ponderous, it may without inconvenience weigh six or even eight grains.

TROCHISCI. *Troches, or Lozenges.*

As these are regarded as objects rather of confectionary than of pharmacy, the Loudon and Dublin Colleges have not condescended to notice them; the Edinburgh Pharmacopœia, however, contains several formulæ for their preparation; and as the form of lozenges offers a very commodious and efficacious method of administering certain remedies, the theory of its operation deserves some notice in the present work. It is principally useful in cases where it is an object that the remedy should pass *gradually* into the stomach, in order to act as powerfully as possible upon the pharynx and top of the trachea, as in certain demulcents or astringents; for instance, *Nitre*, when intended to operate in relaxed or inflamed states of the tonsils, is best applied in this manner; so is *Sulphate of Zinc* in chronic coughs, attended with inordinate secretion. In order to retard as long as possible the solution of the lozenge in the mouth, it ought to be composed of *several* demulcent substances, such as farinaceous matter, sugar, gum, and isinglass; for such a mixture will be found to answer the purpose better than any *one* of these articles taken by itself; thus the farinaceous matter will prevent the sugar and the gum from being too soon dissolved; the viscosity of the sugar and gum will prevent the farinaceous matter from being swallowed so soon as it would otherwise be; and the isinglass will give a softness to the whole, and thus prevent any sharp points from stimulating the membrane.

SUPPOSITORIA. *Suppositories.*

This form of preparation is very ancient, and although it has of late years fallen into disuse, it affords an efficacious mode of administering many powerful remedies, and in some instances of producing effects

which the same medicine would not command if given in any other form ; besides which, it is found that after the stomach by long use has lost its susceptibility to the action of medicine, such a substance will operate with fresh and unabated force if applied to the rectum. There are two great indications which *Suppositories* are calculated to fulfil, viz.

1. *The alleviation of pain and irritation*, especially when it arises from diseases of the bladder, prostate gland, uterus, and other parts in the vicinity. Abortion may be thus frequently prevented. To fulfil these intentions, a mixture of opium with two parts of soap, will be found eligible. I can recommend such an application from a well grounded experience in its efficacy.

2. *The production of Catharsis*. In cases of Apoplexy, from the counter-irritation which these remedies are likely to occasion, much advantage may arise ; and in the failure of more common measures, they may be applied with certain success in the cure of *Ascarides* ; see *Formula* 146. Where a very efficient Suppository is required, one or two grains of *Elaterium* rubbed up with eight grains of hard soap, will present us with a combination of great utility.

ELECTUARIA. *Electuaries.*

This is an ancient form of prescription ; for although the term "*Electarium*" is first used by Cælius Aurelianus, yet the *ἐκλίκτον* of Hippocrates, and the *Antidotus*, *Confectio*, *Mithridatum*, *Diascordium*, *Opiatum*, *Orvietanum*, *Philonium Theriaca*, and *Requies* of other authors, were all Electuaries. They differ from *Conserves* in this, that the sugar in the latter preparations is in a greater proportion, and is intended to preserve the ingredients ; whereas in the former, it is merely intended to impart convenience of form ; see *Confectiones*. Electuaries are in general, *extemporaneous* preparations, composed of dry powders, formed into a proper consistence by the addition of syrup, honey, or mucilage ; when however the latter substance is employed, the electuary very soon becomes dry and hard ; and when common syrup is used, the compound is apt to candy, and in a day or two to grow too hard for use ; this is owing to the crystallization of the sugar ; Deyeux therefore states, that the syrup should be previously exposed to the heat of a stove so long as it forms any crystals, and that the residual liquor, which from the presence of some vegetable acid has no tendency to crystallize, may then be advantageously applied ;—*Molasses* or *Treacle* may in some cases be employed, and from experiments which I have repeated with some care, I am enabled to state that the peculiar flavour of this liquid is entirely removed by a simple operation, which consists in diluting it with an equal weight of water, and then boiling it with about one eighth part of powdered charcoal for half an hour, when the liquor is to be strained, and reduced by gentle evaporation to a proper consistence ;* and moreover it appears, that active vegetable powders retain their characteristic qualities when immersed in *treacle*, longer than in any other excipient.

* Clrell's Annals, 1798. vol. 1.

In selecting and prescribing this form of exhibition, the following general rules should be observed.

- I. Those substances which are nauseous, deliquescent, which require to be given in large doses, or which are incapable of forming an intimate union with syrup, as *fixed oils, balsams, &c.*, should never be prescribed in the form of an electuary.
- II. The quantity of syrup directed must be regulated by the nature and specific gravities of the substances which enter into their composition, viz.
 1. *Dry Vegetable Powders* require twice their weight of syrup, or of honey.
 2. *Gummy and Resinous Powders* require an equal weight.
 3. *Hard Mineral Substances* should be formed into an electuary with some conserve, as they are too ponderous to remain suspended in syrup. It deserves also to be noticed, that in consequence of the readiness with which metallic preparations undergo change, it will be generally adviseable to keep the active ingredients in the form of powder, and to add them to the syrup only just before they are required; the Electuary of the French Pharmacopœia, which is commonly called "*Opiata Mesenterica*," will furnish a good example, "*quantumvis molle fuerit rccens, progressu temporis, ob ferrum quod ipsi inest, mirè indurescit.*"

2. Liquid Forms.

MISTURÆ. *Mixtures.*

These preparations are generally *extemporaneous*, in which, different ingredients are mingled together in the liquid form, or, in which solid substances are diffused through liquid, by the medium of mucilage or syrup: for prescribing mixtures the following general rules may be laid down.

- I. Substances which are capable of entering into chymical combination, or of decomposing each other, ought not to be mixed together unless it be with a view of obtaining the new products as a remedy.
- II. Transparency is not a necessary condition,* and hence insoluble powders may be advantageously introduced into mixtures, if the following precautions be observed.
 1. They must be divisible and mechanically miscible in the liquid.

* A remedy may even owe its virtues to a precipitation, produced by admixture, as I have already stated.

2. They must not possess too great a specific gravity.
3. They must not render the liquid too mucilaginous or thick; *thus, f3j should seldom contain more than 3ss of a vegetable powder, ʒij of an electuary, and conserve; or grs. xv, or ʒj of an extract.*

III. The taste, the smell, and the general aspect of the mixture should be rendered as pleasant as possible; *thus milk covers the taste of bark, of the tinctures of guaiacum and valerian, and that of lime water; and a light decoction of the liquorice root disguises a bitter taste more effectually than sugar.*

The Physician may also produce occasional changes in the appearance of his mixture, in order to reconcile a delicate taste to its continuance; he never ought however to alter the essential part of plans which he finds advantageous.

A DRAUGHT differs merely from a mixture in quantity; it is usually taken at once, and should not exceed f3iss; it should be always preferred when,

1. *The remedy is to be taken in a precise dose.*
2. *Whenever it is liable to spontaneous decomposition.*
3. *Whenever the action of the atmosphere occasions change.*

In apportioning the dose of mixtures, the following proportions are admissible, although not perfectly accurate. A TABLE SPOON full (*Cochlears Amplum*) f3ss. DESSERT SPOON (*Cochleare Mediocre*) more than f3ij. TEA SPOON (*Cochleare Minimum*) f3j. A WINE GLASS (*Cyathus*) although very variable, may be estimated as containing f3iss. The custom of measuring the dose of a liquid by dropping it from the mouth of a phial is very erroneous;* it will therefore be proper to dilute an active medicine that is to be so apportioned, with at least a triple quantity of water, that its real dose may not be essentially altered by any slight variation in the quantity.

The temperature at which a liquid medicine should be given may perhaps merit a few observations. In general, the ordinary degree of heat is that which will best answer the intention, but in cases of dyspepsia, the sense of weight and uneasiness, which often follows a dose of medicine, will be prevented by giving it in a tepid state. This remark will apply to the administration of the *Decoction of Sarsaparilla*; Refrigerants should of course be given as cool as possible; Chamomile Infusion, and other vegetable Ptisans, which are designed to promote the operation of an emetic, will be more efficient when warm. In delicate chlorotic females I have sometimes found chalybeate draughts not only more efficacious, but less distressing to the stomach, when exhibited in a tepid state.

* See my work on MEDICAL CHEMISTRY, Sect. Cohesion.

ENEMATA. *Clysters*.*“*Lavamenta*.”

This form of applying a medicine furnishes the practitioner with many valuable resources, although the remedy has not escaped its due share of persecution. Paracelsus bestowed upon it the epithet “*turpissimum medicamentum*,” and Van Helmont that of “*puerum medicorum subsidium*.”

It is calculated to fulfil the following indications, viz.

1. *To promote the tardy operation of a Cathartic, or to evacuate the bowels, where from delicacy of stomach, medicines cannot be retained, or from debility of body they cannot be safely administered.*

In the administration of a remedy of this kind, there are two essential circumstances, independent of the *strength* of its ingredients, which will modify its activity, viz. IMPULSE and QUANTITY, by which we obtain the stimulus of distention; warm water without any adjunct may thus be made the means of overcoming those unrelenting obstructions which had refused obedience to more common measures: Clysters, however, when most forcibly urged, rarely reach beyond the sigmoid flexure of the colon, and yet when the largest quantity of fluid which the bowels will admit is introduced with considerable impulse, the local impression is so powerful that it is at once extended by the medium of sympathy, through the whole of the alimentary canal, and very thorough and copious discharges result.

2. *To induce extreme relaxation:*

Which is best effected by an infusion of Tobacco. See *Tabaci Folia*.

3. *To produce Astringent and Anodyne, or Carminative effects.*

Common starch, with the addition of Tincture of Opium, is the most common and convenient form for this purpose. See also *Assafœdita*, *Terebinthinæ Oleum*, and *Formula* 8, 9, 29, 30. In some cases the injection of *cold water* acts as a powerful astringent, and from its impression upon the rectum, will frequently afford instantaneous relief in the piles.

4. *To destroy Ascarides.* See *Form.* 164.

5. *To act as an emollient fomentation.*

6. *To convey nutriment.*

In the administration of Clysters, for the fulfilment of any of the last five indications, it is obvious, that the stimulus of distention should be avoided, as being incompatible with our object; the quantity, or bulk of the solution, ought to be also carefully graduated; to prevent, for exam-

* Clyster from *κλύω* eluo, to wash out.

ple, the opiate clyster from being too soon returned, Dr. Cullen has remarked that it seldom should be made of more bulk than that of three or four ounces of liquid, and this also of a very mild kind. In administering a bitter decoction for the cure of *Ascarides*, the same precaution is necessary, or the gut will suddenly contract and expel the clyster, which always acts with more certainty when allowed to remain for some time. The proportions of fluid vehicle necessary for the different stages of life, under ordinary circumstances, may be stated as follows:—An infant, at its birth, or soon after, requires about one *fluid ounce*; a child between the age of one and five years, from three to four *fluid ounces*; a youth of ten or fifteen, from six to eight *fluid ounces*: and an adult may take twelve. With regard to the dose of the active ingredient of a *Lavement*, it may be estimated as triple of that taken by the mouth.

INJECTIONES.

Under this head may be comprehended the various medicinal preparations which are employed as local applications;—to the urethra for the cure of gonorrhœa, and to the vagina for that of the different discharges to which females are liable.

With respect to the former of these it has been truly observed, that “among the whole class of remedies employed for surgical purposes, there is scarcely one which has occasioned a greater diversity of opinion;” to enter however into an examination of this subject would be entirely foreign to the intention of the present work; it is only necessary to state, that for their preparation the same principles of combination, and the same chymical precautions, apply, as have been already investigated under the head *Misturæ*. In some cases the practitioner will find it useful to ensure the entire solution of his active ingredient; while in others, the presence of a precipitate may enhance the efficacy of the application, as illustrated by *Form. 62*.

In the preparation of injections for the cure of female discharges, it must be remembered that, if they be of a vegetable nature, their efficacy wholly depends upon the *Tannin* which they contain, and the prescriber must therefore take care not to invalidate the force of this principle by any incompatible additions.

And it deserves to be remembered, that as *Tannin* has the power of coagulating animal mucus, and of forming with it an insoluble precipitate, its administration, as an injection, is liable to occasion the evacuation of whitish or ash-coloured flakes, which will come away from time to time, and excite in the patient's mind, says Mr. Clarke, the apprehension that she is voiding portions of the internal parts of the body, unless her mind be prepared for the occurrence by a previous explanation, and which the judicious practitioner will not neglect to afford. In some cases it will be necessary to correct the irritating effect of the astringent by the addition of a demulcent, as exemplified in *Form. 61*. In applying this form of remedy an ivory syringe should be always preferred to one of pewter, whenever the solution is likely to be affected by the contact of a metal.

INHALATIONES. *Inhalations.*

Under this general title may be comprehended two distinct classes of volatilized substances, *viz.*

Dry Fumes, (*Suffitus*), and Watery Vapours (*Halitus*.)

Before we enter upon the consideration of this particular form of remedy, it may be necessary to state, generally, that it appears to be capable of affording a very expeditious and powerful mode of affecting the body by certain medicines. If the power of a remedy be so greatly modified by circumstances affecting its solubility, as we have already proved, it cannot be a matter of surprise that the still farther diminution of its cohesion should occasion a corresponding influence upon its energies; indeed it would appear that some few substances are entirely inert, when applied under any other form, see *Hydrargyrum*, in an after part of this work. We are, moreover, enabled by these means, to bring various bodies into immediate contact with organs, which are inaccessible to such remedies in every other state of aggregation. This observation applies more particularly to the lungs, and the subject has lately occupied the attention of a worthy and skilful physician, whose work* is well entitled to the serious consideration of the profession.

The practice of causing patients to inhale various volatilized substances appears to have been of very ancient date. It has been already stated in this work (p. 39) that the fumes of Orpiment were directed to be breathed by Galen, and that the practice has been adopted by practitioners of later date.† Few attempts of this kind however were made, until the time of our countryman Bennet, the author of "*Theatrum Tabidorum*," who arranges volatilized substances into the two classes which have been announced at the head of the present section, *viz.* *Suffitus*, and *Halitus*. The numerous trials which have been since made with the different gases must be in the remembrance of every reader, but unfortunately, the injudicious and empirical spirit with which these inquiries have hitherto been conducted, has thrown such discredit upon the subject, that the practitioner who should resume the investigation, must be prepared to hear his understanding, or his integrity, questioned.

SUFFITUS. Fumes of Burning Substances. The particular forms of pulmonary disease in which Tar fumes appear to be most serviceable, are of the chronic kind; where an inflammatory diathesis prevails, or any tendency to hæmoptysis exists, the practice cannot be said to be free from danger. In the treatment of whooping-cough the inhalation of tar fumes have been also said to be beneficial. For the mode of applying this remedy, see *Pix Liquida*.

The practice of smoking the roots of *Stramonium*, *Tabacco*, &c., might with propriety be noticed under this head. With respect to

* Practical Observations on the Treatment and Cure of several Varieties of Pulmonary Consumption; and on the Effects of the Vapour of Boiling Tar in that Disease. By Sir A. Crichton, M. D. F. R. S., &c. London, 1823.

† Pliny (Nat. Hist. Lib. xxiii. cap. 6,) has the following interesting allusion to the subject of Tar fumes, "Silvas eas duntaxat quæ piscis resinæque gratia raduntur, utilissimus esse phthisicis aut qui longa ægritudine non recolligent vires, satis constat; et illum cæli æra plus ita quam navigationum Egyptiani proficere, plus quam lactes herbedos per montium æstiva potus."

the former of these remedies, much has been said and written, and asthmatic patients have occasionally expressed a belief in its palliative powers ; in my own practice, however, I have never met with any success that has inspired my confidence. See *Stramonii Herba*.

HALITUS. Aqueous Vapours. In certain catarrhal affections, when accompanied with painful and difficult expectoration, benefit may be occasionally obtained from the inhalation of the steam of hot water, or of vinegar and water, the acid in this case assisting the expectoration, while the whole acts as an emollient and soothing application to the tender and inflamed vessels of the internal surface of the bronchial tubes. The same practice is also highly serviceable in Cynanche Trachealis, and Tonsillaris.

In Pneumonia, after the violence of the arterial excitement has been reduced by depletory measures, the inhalation of the steam of hot water, or decoctions of emollient herbs, will often contribute to the support of an easy expectoration.

It has been already stated under the history of Expectorants (page 109,) that in certain dry states of the air, the evaporation of water in an artificially warmed apartment, is frequently attended with considerable relief to the pulmonary patient.

In Dyspnæa, attended with a spasmodic condition of the pulmonary organs, vapours impregnated with sulphuric æther have been recommended for inhalation. Dr. Pearson also states that the efficacy of such an application is materially enhanced by dissolving in it a portion of the extract of Conium. Dr. Böttcher of Copenhagen, has lately announced the utility of vapours of camphor, in complaints affecting the cavities of the nose, throat, and chest. He states that in the worst case of stoppage of the nose from catarrh, a piece of camphor need only be kept for a few minutes before it, to obtain great relief; the same application has been known to produce good in Cynanche Tonsillaris.

In order to apply such inhalations we may employ the inhaler invented by Dr. Mudge, or if that instrument be not at hand, the spout of a tea pot, or a common basin with an inverted funnel, will be found very convenient substitutes.

REMEDIES OF EXTERNAL APPLICATION.

This class of medicinal agents formerly comprised a much wider range of forms than it at present contains ; such as numerous *Epithems* ; *Vapours* ; *Aromatic Bags* ; *Medicated Quilts*, &c.

The external remedies of the present day may be divided into two orders, viz.

1. Those whose effects are entirely *local*, as exemplified in the application of certain *refrigerating* embrocations, *stimulating* cataplasms, and *astringent* unguents.
2. Those which excite general effects, or produce an influence upon parts remote from those to which the remedy is more immediately addressed, as illustrated by the operation of mercurial liniments and unguents, or by the general tonic effects of adhesive plasters.

With respect to the former of these divisions it is unnecessary to multiply our remarks ; the objects which they embrace belong more particularly to the department of surgery, and from the investigation of the different modes and forms of external application we shall hereafter derive very ample and instructive illustrations. In considering the objects of the latter division, a very interesting and important question immediately suggests itself for our consideration—How far a medicinal substance, when locally applied to the surface of the body, may be capable of affecting the general system, or some of its more remote parts ?—the experienced practitioner will feel no hesitation in admitting numerous proofs of the existence of such agency ; and it would seem probable that topical applications may produce general effects by several distinct modes of operation, viz.

1. *By exciting an impression on the nervous system.*
2. *By modifying the cuticular discharge.*
3. *By being absorbed into the circulation.*

In considering the different forms of external applications, it will appear that, for their extemporaneous construction, preparation, and application, the same scientific knowledge, practical skill, and pathological acumen will be required, as we have already stated to be so indispensably requisite to enable the physician to prescribe, and the pharmacist to prepare the various remedies intended for internal administration ; although in regard to the former, it may be stated generally that the prescriber will more frequently be called upon to exercise that species of knowledge and address which enables the practitioner to impart a convenient and efficient *consistency* to his remedy ; for an external application is far more dependent upon this circumstance for its efficacy, than one intended for internal use.

LOTIONES :

Remedies of a liquid nature, designed for external application.

Under this generic term, which strictly signifies a *wash*, may be comprehended several species of medicines, calculated for the fulfilment of different indications, as EMBROICATIONES, COLLYRIA, FOMENTA, LINIMENTA, &c. In some instances these applications are entirely local in their effects, as where a morbid action of the skin is changed by a stimulating lotion, as exemplified in the cure of Psora by the *decoction of Hellebore*, or the relaxed vessels of the tunica conjunctiva of the eye, by an astringent collyrium ; in other cases, they operate upon the parts not in contact with the remedy, through the medium of sympathetic communication, as where colic and disorders of the bowels are abated by the application of warm fomentations to the surface of the abdomen, or where paralytic affections are relieved by pumping cold water on the part affected.

EMBROICATIONES. These, as the term* denotes, are compositions of

* Εμβρῆσκη, from ἑρῆσκη, irrigo.

spirit, decoctions, infusions, or other liquids, applied by *sprinkling* or rubbing them on an affected part.

LINIMENTA* are understood to differ from embrocations in consistence, the former being of an oily, or mucilaginous density, which increases their efficacy by imparting a certain emollient power, in addition to their other virtues. In popular language, however, liniment and embrocation are generally considered synonymous terms. They constitute a valuable class of remedies, and the observations which Dr. Percival has offered on their utility well merit the attention of the medical practitioner. "Volatile and anti-spasmodic liniments are highly useful remedies, and it is to be lamented that external applications of this kind are not more frequently employed, for there is just reason to apprehend that powerful effects might be expected from them in various diseases." In chronic affections of the viscera, such applications appear highly serviceable, not only from the friction to which they give origin, but from the influence of that species of sympathy which appears to depend upon the mere proximity and continuity of parts, and which, as Sir Gilbert Blane has observed, is particularly displayed "in the containing on the contained parts, as that of the integuments on the subjacent viscera."

COLLYRIA†.—Liquid applications to the eyes. The Pharmacopœia Chirurgica contains several different formulæ for lotions of this kind, some of which are simply astringent, while others combine also the virtues of a stimulant.

CATAPLASMATA.‡ *Poultices*, or *Pultices*.

External applications of a pulpy, and somewhat coherent or tenacious consistence.

They are generally extemporaneous preparations, and are calculated to answer several different indications, viz.

1. AS STIMULANTS, e. g. *Cataplasma Sinapis*, L. D. which generally inflames the surface to which it is applied so much as to raise blisters; common salt also, *muriate of soda*, constitutes the active ingredient of a poultice which has lately been brought into considerable repute for the reduction of indolent strumous swellings and enlargements of the glands.§
2. ANTISEPTICS—*Cataplasma Fermenti*, L. (see p. 146.) A powerfully antiseptic cataplasm may be also made by stirring finely powdered charcoal into a common linseed meal poultice. A cataplasm of the boiled carrot, beat into a pulp, has been likewise found very effectual in sweetening foul ulcers.
3. SEDATIVES. The most efficient of these are composed of *Conium*, *Digitalis*, or *Hyoscyamus*, and are eminently serviceable in can-

* *Illinire*, to besmear.

† *κολυρίον*. This term was formerly applied to any medicament, solid or liquid, employed to restrain defluxions; from *καλῶν*, *inhibo* to stop, and *ῥέε fluxio*, a running.

‡ *καταπλασσω* *illino*, to besmear.

§ See *Pharmacopœia Chirurgica*.

cerous and scrofulous sores of a highly irritable and painful nature, to diminish their sensibility and correct the acrid discharges. See *Form.* 18.

4. **REFRIGERANTS.** In the formation of a cataplasm for this purpose we must avoid the introduction of substances that are slow conductors of caloric; suppose for example our object is to apply the *sub-acetate of lead* in this form, it will in such case be judicious to mix the linseed meal, with oatmeal, or crumb of bread; for if the former substance be used singly, it is liable, from its tenacity, to become hard and dry, and in that state to augment the temperature which it was designed to diminish.
5. **EMOLLIENTS.**—(The *modus operandi* of these agents is explained at p. 145.) For which purpose the common farinaceous poultice is the most eligible, made by soaking slices of bread in milk, and simmering them together over a gentle fire until they are reduced to the proper consistence, which ought to be such as to prevent its spreading farther than is designed, and yet not so hard as to occasion any mechanical irritation; the whole is then to be beat smooth with a spoon, and applied as warm as the patient's feelings will readily admit. Some practitioners have doubted the propriety of milk as an ingredient in this composition, and have preferred water as an excipient, not only because the former is very liable to turn sour, but because it does not possess greater powers as an emollient than water; the observations of the editor of the *Pharmacopœia Chirurgica* upon this question are judicious, and worthy our notice; "the objection," he says, "will certainly hold good whenever stale milk is made use of, or if the same poultice be kept too long applied; but if the milk be fresh, and the poultice renewed night and morning, we do not know any thing that occasionally gives such ease and comfort to the patient as this form of cataplasm. If water be substituted for milk, the poultice is seldom of sufficient tenacity; it is true that this inconvenience may be remedied by the addition of a little linseed meal, but in some instances the meal appears to fret and irritate the skin so much, that patients undergo considerable uneasiness from this cause; an objection to which the cataplasm of bread and milk is seldom subject, especially if it be not applied too hot."

Every substance, whether liquid or solid, may become an ingredient in this species of composition, and although judicious and experienced surgeons have of late very considerably improved the form of their cataplasms, yet the principles of medicinal combination, which it has been the object of the present work to investigate and expound, will suggest many important hints for the farther extension of their utility; and although the direction of them is more frequently left to the nurse than to the medical practitioner, yet in adapting them to each particular occasion some share of chymical address may be necessary; we have already seen that attention must be paid to the selection of ingredients, with respect to their powers of conducting heat, and it is evident that care must be taken not to reduce into pulp, by decoction, substances that contain volatile principles; while in the preparation of active liquids to be subsequently mixed with lin-

seed meal, it is equally evident that we must be directed by the chymical nature of their composition.

EMPLASTRA. L.E.D. *Plasters.*

These are solid and tenacious compounds, adhesive at the ordinary heat of the human body; they owe their consistence to different causes, viz.

1. *To a due admixture of wax or fatty matter, and resin, e. g. Emplast: Cerae, &c.*

They may be said to differ only in consistence from liniments, ointments, and cerates; Deyeux* accordingly proposes to distinguish them by the appellation of *Solid Ointments*.

2. *To the chymical combination of the semi-vitreous oxide of lead with oils or fat, e. g. Emplast: Plumbi.*
3. *To the chymical action of the component parts of the plaster on each other, as Emplast: Ammoniacy, &c.*

Plasters are generally kept in rolls, wrapped in paper, and when to be used they are melted and spread on leather; in performing this operation the practitioner ought not to apply a heat above that of boiling water; for if metallic oxides be present, the fatty matter will, at a higher temperature, reduce them, in consequence of the powerful affinity of oil for oxygen at an exalted temperature; and if aromatic substances enter as ingredients they will thus suffer in their strength, besides which the fat itself will undergo a very injurious change by a mismanaged application of heat, and the plaster will be less adhesive.

They are employed as remedies to answer two general indications; *mechanically*, to afford support to muscular parts and to prevent the access of air; and *medicinally*, to operate as stimulants, discutients, rubefacients, or anodyne applications. That by affording an artificial support to the various parts of the body, by the application of plasters, we are capable in certain diseases of effecting much benefit, is a truth to be explained upon the principles of physiology, and is daily confirmed by the results of practice; thus by giving support to the muscles of the back, how frequently the stomach is steadied and strengthened? Diseases of the kidneys are in the same way very frequently relieved by tight bandages around the loins; the existence of an intimate connexion between the external and internal parts is strikingly exemplified by the distressing effects which are often experienced in weak habits, such as sickness, giddiness, and other uneasy sensations, from a want of any usual compression, as that of stays, under-waistcoats, &c. The support afforded to persons who have been tapped in Ascites is another instance. I have also lately met with a case in which a morbidly relaxed state of the bowels had harassed the patient for several years, and set at defiance every astringent medicine; upon the application, however, of a tight bandage around the abdomen, the healthy action of the intestines has been completely restored. Sir Gilbert Blane has suggested the trial of mechanical

* Annales de Chimie, vol. xxxiii. p. 52.

compression of the head in the cure of Hydrocephalus, and several cases, apparently favourable, have been published. Dr. Thackery of Cambridge has related a very interesting history in support of the practice, and judiciously recommends the substitution of straps of adhesive plaster for the bandages of cloth originally proposed by Sir Gilbert. In reasoning upon this treatment, it will be found strictly conformable with the soundest principles of physiology, and with those views in particular, for the illustration of which I have here directed the reader's attention to the subject. Where our object is simple support, we should of course select a plaster which is the most adhesive and the least irritating. Many plasters which have gained great celebrity for their curative virtues will be found to owe all their powers to their adhesiveness, such is the *Emplastrum Oxidi Ferri Rubri* of the Edinburgh Pharmacopœia, for it is impossible that the iron should communicate any tonic effect. The same observation applies to many of those empirical plasters which have at different times acquired so great a share* of popular applause. In the cure of sore legs † the importance of adhesive strapping is generally acknowledged, and on such occasions nothing is superior to the *Emplastrum Resinæ*.

* A respectable Cilman of the name of STERRY, in the Borough, prepares a plaster of this description, which is sought after with great avidity. What a blessing it would be upon the community if every nostrum were equally innocuous!

† Persons who are exposed to fatigue by the standing posture, such as washerwomen, &c., are particularly liable to sores of the legs, which may be prevented and cured by affording this artificial support.

A SYNOPSIS
OF THE
Principles of Combination,
AS INVESTIGATED IN THE PRECEDING PAGES,
ARRANGED IN A TABULAR FORM
SO AS TO AFFORD THE STUDENT AN EASY
REFERENCE TO THE **KEY LETTERS.**

A Synopsis of the Principles of Medicinal Combination.

Key Letters.	Key Letters.		Key Letters.	Key Letters.	
		<p>OBJECT I.</p> <p>TO PROMOTE THE ACTION OF THE BASIS.</p> <p>A —By combining the several different forms, or preparations of the SAME SUBSTANCE.</p> <p>B —By combining the Basis with Substances which are of the SAME NATURE, i. e. which are individually capable of producing the same effects, but with less energy than when in combination with each other.</p> <p>C —By combining the Basis with Substances of a DIFFERENT NATURE, and which do not exert any Chymical influence upon it, but are found by experience, or inferred by analogy, to be capable of rendering the stomach, or system, more susceptible of its action.</p> <p>OBJECT II.</p> <p>TO CORRECT THE OPERATION OF THE BASIS, BY OBVIATING ANY UNPLEASANT EFFECTS IT MIGHT BE LIKELY TO OCCASION, AND WHICH WOULD PERVERT ITS INTENDED ACTION, AND DEFEAT THE OBJECT OF ITS EXHIBITION.</p> <p>D —By CHEMICALLY neutralizing, or MECHANICALLY separating, the offending ingredient.</p>	<p>I a The formation of New Compounds.</p> <p>K b. The Decomposition of the Original Ingredients, and the development of their more active elements.</p> <p>C —By combining Substances, between which no other change is induced than a diminution, or increase in the SOLUBILITY of the principles in which their Medicinal virtues reside.</p> <p>L a. By the intervention of Substances that act CHEMICALLY.</p> <p>M b. By the Addition of Ingredients whose operation is entirely MECHANICAL.</p> <p>OBJECT V.</p> <p>TO AFFORD AN ELIGIBLE FORM.</p> <p>N a. By which the EFFICACY of the Remedy is enhanced.</p> <p>O b. By which its ASPECT or FLAVOUR is rendered more agreeable, or its mode of administration more convenient.</p> <p>P c. By which it is PRESERVED from the spontaneous decomposition to which it is liable.</p>	<p>E B.—By adding some substance calculated to guard the stomach or system against its deleterious effects.</p> <p>OBJECT III.</p> <p>TO OBTAIN THE JOINT OPERATION OF TWO, OR MORE MEDICINES.</p> <p>F A.—By uniting those Medicines which are calculated to produce the SAME ULTIMATE RESULTS, but by modes of operation totally different.</p> <p>G B.—By combining Medicines which have entirely different powers, and which are required to obviate different symptoms, or to answer different indications.</p> <p>OBJECT IV.</p> <p>TO OBTAIN A NEW AND ACTIVE REMEDY, NOT AFFORDED BY ANY SINGLE SUBSTANCE.</p> <p>H A.—By combining Medicines which excite different actions in the stomach and system, in consequence of which NEW, or MODIFIED RESULTS are produced.</p> <p>B.—By combining substances which have the property of acting CHEMICALLY upon each other; the results of which are—</p>	

FORMULÆ
IN
ILLUSTRATION OF THE SUBJECT
OF
Medicinal Combination.

“ Longum est iter per Præcepta, breve et efficax per exempla.”
SENECA.

A COLLECTION OF FORMULAE

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and to furnish the inexperienced Prescriber

WITH A SERIES OF

USEFUL AND INSTRUCTIVE LESSONS.

EXPLANATION OF THE KEY LETTERS.

The *Modus Operandi* of the different elements of each formula is designated by a KEY LETTER, or *Symbol*, which is printed in a different type, (thus **B**) and placed in the margin opposite to each. This letter refers to a corresponding one in the Synopsis, and thereby shows the division containing an exposition of the principle upon which the operation of the ingredient is supposed to depend.

Two or more KEY LETTERS denote that the element against which they are so placed has several modes of operation, whilst the order in which the letters succeed each other, serves to show the relative importance of them.

Where any one of the letters is small, *i. e.* not a capital, it denotes that the operation which it is intended to express is only *incidental* to, or subordinate in, the general scheme of the combination.

When any number of elements are included within a *vinculum* or bracket, it is intended to show that they operate but as one substance, or, that the virtues of each are not independent of the other; in this case the KEY LETTER within the bracket expresses upon what principle this unity depends, whilst that on the exterior shows the action of such a combination upon the base, or the part which it performs in the general scheme of the Formula.

Let us exemplify it by a reference to *Formula 78*, which presents us with a Purgative, in conjunction with a Stimulant. The base is *Aloes*, which is succeeded by *Scammony*, and *Extract of Rhubarb*; these substances appear by the bracket, to act in unison, a concurrence which the interior letter **B** shows to depend upon their being SIMILAR REMEDIES; the letter also on the exterior shows that its operation upon the base depends upon the same principle. We next come to the powdered *Capsicum*, and *Oil of Cloves*; these ingredients are also shown by a bracket to act in unity, and the letter **B** in the interior, denotes that it is in consequence of their possessing a similar mode of action, whilst the letter **G** on the exterior, announces that they act in the general scheme for the purpose of fulfilling a second indication; at the same time the smaller letter *e* informs us that the combination likewise acts as a *corrector* of the base.*

* In my Lectures I have usually employed different colours for the purpose of expressing the objects of each ingredient in a formula; in this manner very useful and instructive charts might be constructed: this hint may perhaps induce the industrious student, who is anxious to become a master in the art of prescribing, to attempt a synopsis upon this plan.

9. R. Opii puri gr. ij
 Mucilag : Acaciæ f3ss. **M. } N.G.**
 Lactis tepefacti f3vj

Misce pro Enemate.

Hartman.

10. R. Opii puri gr. j.
 Pil : Galb : comp : gr. v. **M.F.e.**
 Fiat Pilula, h. s. sumenda.

11. R. Opii puri gr. j.
 Pil : Aloes cum Myrrha gr. iv. **E.M.**
 Fiat Pilula, h. s. sumenda.

12. R. Opii puri gr. ij.
 Extract : Aloes Spicat : gr. x. **E.M.**
 ut fiat Massa in Pil : iij dividend : e quibus sumatur una, h. s.

13. R. Opii puri gr. j.
 Extract : Aloes Spicat : gr. iij **E.1.M.**
 Extract : Gent : gr. v. **E.2.**
 Fiat Massa in Pil : duas dividend : et sint pro dosi.

14. R. Opii puri gr. ij.
 Saponis duri Hispan : gr. iv **L.N.**
 Simul contunde, donec corpus unum sit, et fiat Massa pro Suppositorio.

15. R. Opii puri gr. ij.
 Confect : Aromat : 3ss **G.N.**
 Fiat Massa in Pilulas viij dividenda, e quibus capiatur una, quarta
 quaque hora.
In Typhus.

16. R. Opii duri contriti gr. iv.
 Aquæ bullientis f3ijss **D.**
 Infunde, prope ignem, per horam, et cola.
 R. Liquoris Colati f3j
 Acid : Nitric : dilut : m x **E. 1.**
 Træ Aloes comp : f3j **E. 2.**
 Fiat Haustus.

17. R. Conii foliorum exsiccata : 3j
 Coque ex aquæ oīss ad oij
 et cola.
 Panni lanei hocce decocto calido madefacti, deinde expressi, parti
 affectæ imponantur, et sæpius renouentur.

Collin.

In Carcinomatous, Venereal, and sordid Ulcers.

18. R. Conii Folior : exsiccat : 3ij.
 Medullæ panis 3vj } **N.O.**
 Aquæ oiss }
 Coquantur simul, ut fiat Cataplasma.

19. R. Extract : Conii
 Extract : Hyoscyam : āā gr. v. **B**
 Mucilag : Acaciæ f3ij **N.**
 Tere simul, donec quam optime misceantur, et deinde adde,
 Liquor : Ammon : Acetat : } **G.**
 Aquæ puræ āā f3ss } **O.**
 Syrup : Rhæados f3j }
 Fiat Haustus, quarta quaque hora sumendus.

In Pulmonary irritation.

J. A. P.

ANTISPASMODICS.

20. R. Tincturæ Castorei f3j
 Ætheris : Sulphurici m x **B.**
 Tinct : Opii m vij **G.**
 Aquæ Cinnamomi f3iss **N.O.**
 Fiat Haustus ter quotidie sumendus.

21. R. Moschi gr. xv
 Camphoræ gr. v **B.**
 Spir : rectificat : m ij **L.**
 Confect : Rosæ gall : q. s. **O.**
 Camphoram primùm cum Spiritu tere, et deinde, secundum artem, fiat bolus.

22. R. Moschi 3j
 Acaciæ gummi contriti 3ss **M.**
 Tere optime simul, et adde paulatim,
 Aquæ Rosæ f3j **O.**
 Ætheris Sulphuric : f3j **B.**
 Fiat Haustus, p. r. n, sumendus.

23. R. Assafoetidæ 3j
 Aquæ Menth : Pip. f3jss **L.**
 Tere assafoetidam cum Aquâ paulatim instillata, donec quam optime
 misceantur, et deinde adde
 Tinct : Valerian : Ammoniat : f3ij } **B.**
 Tinct : Castorei f3ij } **B.**
 Ætheris Sulphuric : f3j }
 Fiat Mistura, de qua sumatur Cochleare unum amplum secundis
 horis.
 Signetur.—*Anti-hysterical Mixture.*

24. R. Mist : Camphoræ f3j
Spir : Ammoniaë Fœtid : f3ss **B.**
Fiat Haustus, urgenti flatu, sumendus.

25. R. Valerianæ Radicis, in pulverem redact : ʒj
Tinct : Valerian : Ammoniat : **A.**
Tinct : Castorei āā f3j **B. } B.**
Mist : Camphoræ f3xij
Fiat Haustus ter quotidie sumendus.

26. R. Tabaci Foliorum ʒj
Aquæ ferventis f3viij
Macerate per horam in vase leviter clauso, et cola. Fiat pro Enemate.

27. R. Massæ Pil : Galb : comp. gr. x.
Divide in Pilulas binas, et sint pro dosi.

28. R. Tinct : Opī m̄vj.
Vini Ipecacuanhæ f3j **H.**
Aquæ puræ f3j **N.**
Syrup : Simpl : f3iij **O.**
Sodæ Subcarbonat : gr. xxiv. **G.**
Sumat Infans sextam partem quartis vel sextis horis.

In Tussi Convulsiva.

R. Pearson.

29. R. Assafœtidæ ʒij
Decoct : Avenæ f3x **N.O.**
Misce pro enemate, secundum artem.
In Flatulent Colic.

Bang.

30. R. Moschi gr. xij
Sacch : purificat : ʒij **M.**
Acaciæ Gummi contriti ʒj
Simul tritis admisceantur Jusculi cujusvis tenuioris f3iv, ut fiat enema, alternis vel tertiis horis injiciendum.

Wall.

31. R. Cinchonæ lancifoliæ Corticis contriti ʒj.
Valerianæ Radicis Pulv : ʒiij **G.**
Syrup : Aurantiorum q. s. **O.**
Ut fiat electuarium, cujus devoret drachmam, mane ac vesperi.

Mead.

32. R. Tinct : Digitalis \mathfrak{m}_x —xv
 Mist : Camphoræ f3x F. } G.O.
 Tinct : Calumbæ f3i

Fiat Haustus, bis quotidie sumendus.

In Palpitation of the Heart, accompanied with great nervous irritability.

TONICS.

33. R. Infus : Cascarillæ f3iss
 Tinct : Cascarillæ f3ij A.
 Tinct : Zingiberis f3j G.

Fiat Haustus ter quotidie sumendus.

34. R. Ferri Tartarizati gr. x
 Pulv : Calumbæ gr. xv. F.m.

Fiat Pulvis, quarta quaque hora sumendus.

35. R. Infusi Quassiae f3x
 Tinct : Calumbæ f3j B.
 Tinct : Ferri muriat : \mathfrak{m}_x F.

Fiat Haustus, quotidie, hora meridiana sumendus.

36. R. Ferri Ammoniaci 3j
 Extract : Gentian : F.M.
 et
 Extract : Aloe aa 3ss G.M.

Contunde simul, et divide massam in Pil. xxx quarum sumat binas ter quotidie.

Tonic and Purgative.

37. R. Cinchonæ lancifoliæ contritæ 3ss
 Magnesiae Sulphatis 3vj G.

Tere optime simul, et divide in quatuor partes, ex quibus sumatur una alternis horis inter paroxysmos.

In Intermittents.

Cleghorn.

38. R. Ferri Sub-carbonatis gr. v—x.
 Pulv : Valerian : 3ss G.
 Syrup Zingib : q. s. E.O.

Fiat Bolus.

39. R. Infusi Gentianæ comp : f3j
 Liquor : Potassæ Sub-carb : f3ss. C.L.G.
 Tinct : Cascarillæ f3j B.

Fiat Haustus.

40. R. Cinchonæ lancifoliæ Cort : contus : ʒss.
 Coque ex aquæ puræ fʒxvj
 ad consumpt : dimid : adjectis sub finem coctionis,
 Serpentariæ radicis contus : ʒij B.
 Stent per horam, et Colaturæ admisce,
 Spir : Cinnamomi comp : fʒiss E.
 Acid : Sulphuric : dilut : fʒiss G.
 Sumantur fʒij sexta quaque hora.

Pringle.

- 41* R. Dococt : Cinchonæ fʒiiss
 Infus : Gentian : comp : fʒj B. } B.
 Tinct : Cascarillæ fʒij G. 1.
 Liquor : Potassæ Sub-carb : fʒij
 Fiat Mistura, de qua sumr : Cochl : duo ampla bis de die.

- 42* R. Decoct : Cinchonæ fʒvj
 Tinct : Cinchonæ fʒss A.
 Confect : Aromat : ʒj B. } G.E.
 Spir : Ammon : Aromat : fʒj
 Fiat Mistura.

43. R. Ferri Ammoniat : gr. v
 Rhei Rhad : Contrit : gr. iij G.
 Fiat Pulvis ex quolibet vehiculo idoneo quotidie sumendus.

44. R. Cinchonæ Pulv : subtiliss :
 Potassæ Super-tart : āā ʒj G. 1.
 Caryophyll : contrit : No. xxx G. 2.
 Misce, et detur drachma cum semisse tertiis horis.

Petrie.

AROMATIC STIMULANTS.

45. R. Sinapeos semin : contus :
 Armoraciæ Radicis concisæ āā ʒss B.
 Aquæ ferventis oj N.O.
 Macera per horam, et cola.

- R. Colaturæ fʒvii
 Spir : Ammon : Aromat. fʒj B. } B.
 Spir : Pimentæ fʒss
 Fiat Mistura ; de qua sumr : Cochl : duo ampla ter quotidie.
In Paralysis.

* In these Formulæ the Bark is decomposed by the alkali ; the combination of the Kinic acid and Cinchonia being torn asunder ; but as the preparation is not filtered, the febrifuge principle is taken into the stomach in a state of activity.

46. R. Lactis Vaccini oj
Sinap: Semin: contus: 3j

Coquantur simul, donec pars caseosa in coagulum abierit, deinde coletur serum, et sumatur cyathus subinde.

Disp: Fuld:

47. R. Mist: Camphoræ: f3j
Spir: Ether: Sulphuric: f3ij
Tinct: Cardamom: comp: f3ss
Spir: Anisi f3vj
Olei Carui m xij
Syrup: Zingib: f3ij
Aquæ Menthæ Pip: f3vss

B. } B.

Fiat Mistura, cujus sumantur Cochlearia duo ampla, urgenti flatu.
In Flatulent Colic.

48. R. Ammonia Sub-carb: 3ss
Aquæ Menth: Pip: f3vij
Syrup: Aurant: f3ss.

N.B.
O.

Sumatur octava pars in languoribus.

49. R. Cantharid: in pulverem trit: gr. j.
Ammonia Sub-carb:
Confect: Aromat: aa gr. v
Syrup: q. s.

B. } F.
O.

ut fiat bolus, quartis vel sextis horis sumendus, cum haustu Infusi Armoraciae compositi.

50. R. Olei Terebinthinæ f3ij
Mellis Despumat: 3j
Pulv: Rad: Glycyrrhizæ, q. s.

} O.

ut fiat linctus: de quo sumatur cochl: parv: nocte, maneque, cum haustu cujusvis potus tenuioris tepesfacti.

ASTRINGENTS.

51. R. Quercus Cort: contus: 3ss
Aquæ ferventis f3xij

Macera per horam, et cola.

- R. Hujus Colaturæ f 3iss
Pulv: Gallarum gr. x
Tinct: Catechu: f3ss
Tinct. Cardamom: comp: f3ss
Syrup: Cort: Aurant: f3j

B. } B.
G.E.O.
O.

Fiat Haustus.

52. R. Misturæ Cretæ f 3iss
 Tinct: Opii ℥xv F1.
 Tinct: Catechu f3j F2.

Fiat Haustus, post singulas sedes liquidas sumendus.

In Diarrhœa.

53. R. Aluminis Contriti gr. v.
 Myristicæ Nucl: Contrit. gr. v. E.
 Extract: Gentian: q. s. F.O.

ut fiat massa in Pil: ij dividend:

54. R. Lactis Vaccini bullient: oj.
 Aluminis Contrit. 3ij.

Ebulliant simul ut fiat coagulum; coletur serum, et sumatur cyathus, subinde.

55. R. Gallarum pulverisat: 3j
 Adipis præparat: 3j O.

Fiat Unguentum, parti affectæ applicand:

In Hæmorrhoidibus.

Cullen.

56. R. Infus: Ros: comp: f3iiiss
 Alum: contrit: gr. x. B.
 Oxymel f 3ij B.O.

Sit pro Gargarismate.

57. R. Plumbi Acetat: gr. ij
 Opii puri gr. i B. } B.
 Extract: Conii gr. x.

Fiat Massa in Pilulas tres dividenda; quarum sumatur una bis quotidie, superbibendo haustum ex acido acetico comp:

58. R. Infus: Cuspariæ f 3j
 Tinct: Catechu f 3j B.
 Pulv: Ipecac: gr. x G.

Fiat Haustus.

59. R. Zinc: Sulphat: gr. x
 Myrrhæ in pulv: trit: 3iss G.
 Confect: Ros: q. s, N.O.

ut fiant Pilulæ xx, e quibus sumantur binæ bis quotidie.

60. R. Tinct: Ferri Muriat: ℥x
 Aquæ puræ f 3j N.

Fiat Haustus, tertia quaque hora sumend:

In Uterine Hemorrhage.

61. R. Cort: Quercus contus: 3vj
 Aquæ distillat: f 3x

Coque per sextam partem horæ, et cola.

62. R. Colaturæ et
 Infus: Lini aa f 3iv E.
 Sit pro injectione per vaginam.
*In Uterine Discharges attended with an
 irritable state of the vagina.*

EMETICS.

63. R. Antimonii Tartarizati gr. i
 Vini Ipecac: f 3ij B.
 Aquæ puræ f 3iss N.
 Fiat Haustus.
64. R. Antimonii Tartarizati gr. ij
 Aquæ distillatæ f 3iv N.
 Solve—Hujus danda sunt cochlearia duo mediocria, singulis horæ
 quadrantibus, donec vomitus excitatus sit.
65. R. Pulv: Ipecac: 3ss
 Antimon: Tart: gr. i. B. } B.
 Tinct: Scillæ f 3i }
 Aquæ distillat: f 3viiss N.
 Fiat Mistura, cujus sumat quamprimum cochlearia majora quatuor; et
 cochlearia duo, sexta quaque horæ parte, donec supervenerit vomitus.
66. R. Zinc: Sulph: 3i
 Confect: Ros: canin: q. s, O.
 ut fiat bolus, ex pauxillo Infus: Anthemid: C.
 hauriendus. Post quamlibet vomitionem superbibantur cyathi aliquot
 infusi ejusdem tepidi.
67. R. Tabaci Foliorum 3j
 Aquæ fontis, q. s, N.
 Simul contunde, ut fiat epithema, regioni epigastricæ admovend:
68. R. Cupri Sulphatis gr. x.—3j.
 Aquæ distillatæ f 3ij N.
 Fiat pro haustu emetico.

CATHARTICS.

69. R. Magnesiae Sulphatis B. }
 et
 Sodæ Sulphatis aa 3iij }
 Aquæ Menthæ Viridis f 3vss N.O.
 Vini Antimon: Tart: f 3j C.
 Fiat Mistura, de qua sumr. Cochl: duo ampla ter quotidie.

70. R. Infusi Sennæ f3j
 Tinct : Sennæ B. } E.B.
 et
 Tinct : Jalapæ āā f3j F.E.2.
 Potassæ Tart : 3j A.O.
 Syrup : Sennæ f3j

Fiat Haustus, summo mane sumendus.

71. R. Extract : Colocynth : comp : 3j
 Opii puri gr. iij G.
 Olei nucis Moschat miv E.

Fiat massa in pilulas xii dividend : e quibus capiat duas, omni hora, donec bis dejecerit alvus.

72. R. Magnesiae Sulphat : B. }
 et
 Sodæ Sulphat : āā 3ss G.
 Ferri Sulphat : gr. v. L.O.
 Misturæ Camphoræ f3viiss

Fiat mistura, de qua sumantur Cochl : duo ampla bis indies.

73. R. Jalapæ Radicis contrit : gr. xv.
 Hydrarg : Sub-muriat : gr. v. F.
 Confect : Ros : canin : q. s. N.O.

ut fiat bolus.

74. R. Confect : Sennæ 3iss
 Sulphur : Præcipitat : 3ss G.
 Syrup : Ros : q. s. N.O.

ut fiat Electuarium, de quo, ad nucis Moschatæ magnitudinem, capia-
 tur, ter vel quater quotidie, donec alvus commode purgetur.

In Hæmorrhoids.

75. R. Olei Ricini f3ss
 Vitelli Ovi, q. s. O.
 tere simul, et adde
 Syrup : Papaveris f3ij B. } G.
 Tinct : Opii miv L.
 Aquæ distillatæ f3j

Fiat Haustus tertiis vel quartis horis sumendus.

In Colic from Lead.

76. R. Magnesiae Sulphatis 3vj
 Infusi Sennæ f3iss F.L.
 Tinct : Jalap : f3j E.F.
 Tinct : Opii mx F. } G.
 Tinct : Castorei f3j

Fiat Hanstus, ut supra, dandus.

77. R. Infusi Sennæ f3ij
 Sodæ Tartariz : 3vj F.E.
 Aquæ Cinnamomi f3ss E.O.
 Fiat solutio, duabus vicibus, sumenda.

78. R. Aloës Spicat : 3j
 Scammoneæ gr. xij. B. } F.
 Extract : Rhei 3ij. }
 Bacc : Capsici pulv : gr. vj B. } G.e.
 Olei Caryophyll : ℥v
 Fiant Pilulæ xvj, e quibus sumantur binæ, hora decubitus, p. r. n.

79. R. Pil : Hydrarg
 et
 Aloes Spicat : āā 3j G.
 Fiat Massa in Pil : vj dividend : e quibus sumantur binæ, h. s.

80. R. Pulv : Aloes comp : 3j
 Pulv : Antimon : gr. v C.
 Saponis duri gr. x. L.N.O.
 Decoct : Aloes comp : q. s O.a.
 Fiat Massa in Pilulas xx dividend : e quibus capiantur binæ ad al-
 vum officii immemorem excitandam.

81. R. Extract : Colocynth : comp : gr. xxiv.
 Pil : Aloes cum Myrrha 3j F. } F.
 Hydrarg : Sub-muriat : gr. xv }
 Fiat Massa in Pil : xx dividend : e quibus sumr. una vel altera, p. r. n.

82. R. Sodæ Sub-carbonat : (cryst :) 3iiss. K. } I.
 Potassæ Super-tart : 3iij }
 Aquæ puræ f3viij , }
 Stent in lagena bene obturata per triduum, et deinde sit in promptu
 pro potu cathartico,

Young.

Medical Literature, Edit. 2, p. 481.

83. R. Scammoneæ gr. v.
 Pulv : Rhei gr. xv. F.
 Ammonia, Sub-carbonat : gr. v G.E.
 Fiat Pulvis, ex vehiculo aliquo idoneo sumendus.

84. R. Pulv : Jalap : gr. xv.
 Pulv : Ipecac : gr. v. C.
 Olei Cinnamom : ℥ij E.
 Fiat Pulvis, ut supra, dandus.

85. R. Pulv : Rhei gr. xv.
 Potassæ Super-Sulphat : gr. x. **B.O.**
 Aquæ Cinnamomi f 3j **O.e.**

Fiat Haustus.

86. R. Sodæ Tartarizat : 3ij
 Sodæ Carbonat : ʒj **I.K.** } **C.**
 Aquæ puræ f 3iss
 Fiat Haustus, cum Cochl. : uno amplo
 Succi Limonum
 In impetu effervescentiæ sumendus. Quotidie mane.

87. R. Sodæ Carbonatis 3ij } **I.K.**
 Ferri Sulphat : gr. iij
 Magnesiae Sub-Carb : 3j
 Aquæ puræ oss
 Acidi Sulphurici dilut : f 3x

Infundatur primum lagenæ aqua, deinde immittantur Salina, et denique Acidum Sulphuricum; illico obturetur lagena, et in loco frigido servetur.

NOTE.—The decompositions which take place in this formula are described in the essay on the Art of Prescribing, p. 174. There is, however, a precaution respecting the proportion of Sulphuric acid which it is essential to remember, viz.—that it should never be added in excess; for in that case the Sulphate of Iron would not undergo the necessary decomposition.

88. R. Hydrarg; Sub-muriat : gr. x.
 Pil. Cambogiæ comp : **F.** } **F.**
 et Extract : Colocynth : comp : aa gr. xv
 Syrup : Zingib, q. s. **E.**
 ut fiant Pilulæ xij, e quibus sumantur binæ, hora decubitus, vel summo mane, ad alvum officii immemorem excitandam.

89. R. Cambogiæ Contritæ gr. iij
 Sacch : purificat : ʒj **M.O.E.**
 Tere optime simul, ut fiat Pulvis, tertia quaque hora sumendus, donec alvus commode purgetur.

90. R. Foliorum Sennæ 3iij
 Sodæ Sulphat : 3j **F.**
 Aquæ fervent : ʒj **L.N.O.**
 Infunde, et cola, ut fiat Enema.

91. R. Resinæ Terebinthinæ f 3ss
 Vitelli ovi, q. s. **M.**
 Infus : Lini f 3x **N.O.**
 Tere Resinam cum vitello ovi, hisque, inter terendum Infusum Lini paulatim adjice. Fiat Enema.

92. R. Potassæ Super-tart: ʒij
 Ferri Tartarizat: ʒiij G.
 Zingib: ʒj E.
 Syrup: Simp: q. s. O.
 dosis ʒij ter die.

95. R. Confect: Sennæ ʒij
 Ferri Tartarizat: ʒij G.
 Fiat Electuarium, ad nucis moschatae magnitudinem sumendum.

EMMENAGOGUES.

94. R. Sabinæ Foliorum exsiccant:
 Zingib; rad: contus: āā ʒss. E.
 Potassæ Sulphatis ʒss. G.M.
 M. Fiat Pulvis bis die sumendus.

95. R. Myrrrhæ pulv: ʒj
 Ferri Ammoniat gr. vj G.
 tere simul et adde
 Syrup: Zingib: q. s. ut fiat Electuarium, de quo sumatur
 ad myristicæ nuclei magnitudinem bis quotidie.

96. R. Mist: Ferri comp: f ʒss
 Aquæ Cinnamomi f ʒj O.
 Ft. Haustus bis de die sumendus.

97. R. Tinct: Ferri Muriatis
 Tinct: Aloes comp: āā f ʒss. G.1.
 Tinct: Castorei f ʒij G.2.
 M. de qua sumatur cochl: unum minimum ex cyatho Infus: Anthe-
 mid: Flor: ter quotidie.

Emmenagogue and Antispasmodic.

98. R. Pil: Aloes cum Myrrha
 et
 Pil: Galbani comp: āā ʒj. B.
 Divide in Pil: xxiv, e quibus sumantur binæ bis quotidie.

99. R. Pil: Aloes cum Myrrha
 et
 Pil: Ferri comp: āā ʒj G.1.
 Sodæ Sub-carbonatis ʒj G.2./.
 Divide massam in Pilulas xxx e quibus sumantur binæ bis quotidie.

DIURETICS.

100. R. Scillæ Radicis exsiccat: gr. iij
 Pulveris Opii gr. ss. C.E.
 Cinnamomi Corticis gr. x. E.O.

Fiat pulvis bis quotidie sumendus.

101. R. Potassæ Sub-carbonatis gr. x
 Infus: Gentian: comp: f3iss. C.N.
 Spir: Etheris comp: f3ss. B. } G.E.
 Træ Cinnamomi f3i

Fiat Haustus.

Diuretic and Stimulant.

102. R. Scillæ Radicis exsiccat: gr. xij
 Potassæ Nitratis 3i F.
 Sacchari purificat: B. } M.E.
 et Cinnamomi cort: contrit:
 aa 3i. fiat pulvis in sex partes æquales dividend: Sumatur
 una bis indies.

- 103.* R. Scillæ: exsiccat: gr. iv
 Digitalis Foliorum gr. x. B.
 Hydrargyri Sub-muriat: gr. vj C.
 Myrrhæ Pulv: 3i B. } G.
 simul tere et adde
 Assafoetidæ 3ss.
 Extract: Gentian. q. s. C.O.

Fiat massa in Pilulas xv dividend: e quibus sumatur una, nocte manequ.

104. R. Massæ Pil. Scillæ 3i
 Hydrarg: Sub-muriat: gr. v C.
 Fiat massa in Pilulas xv dividenda, quarum sumantur duæ singulis noctibus.

* This formula is introduced as a combination supported by authority, although it may be questioned whether its adoption can be sanctioned upon principle. Let us decipher the intention of the different ingredients by their KEY LETTERS. The basis is Squill, to which Digitalis is added, for the purpose we perceive of acting in unison with it, and Calomel, which succeeds it, is intended to promote and direct the diuretic Basis; two fetid gums next present themselves to our notice, and these are shown by the bracket to exert a combined action, depending, as the Key Letter announces, upon the medicinal similarity, but acting in the general scheme of the formula, as shown by the exterior letter, for the purpose of fulfilling a second indication, distinct and different from that which the Basis is designed to answer, i. e. to produce, not a diuretic, but an antispasmodic and stimulant effect; an important question then arises for our consideration.—Is the latter part of the formula consistent with the former, or is the stimulant effect of the Gums compatible with the sedative operation of Digitalis?

105. R. Sodæ Carbonat : exsiccat : 3i
 Saponis duri ̄iv **N.B.**
 Olei Juniperi **F.E.**
 Syrupi Zingiberis q. s. **E.N.**

Fiat massa in Pilulas xxx dividenda, e quibus capiat tres, indies,
 contra calculos renum. *Beddoes.*

106. R. Scillæ Radicis exsiccat. gr. ij
 Pilulæ Hydrargyri gr. v. **G.C.**
 Opii gr. ss. **E.C.**

Fiat Pilula hora decubitus per tres vel quatuor noctes consequentes
 capienda.

107. R. Potassæ Sub-carbonat : ̄i **I.**
 Succi Limonum : f 3ss, vel q. s. **K.**
 Aquæ Cinnamomi f 3i
 Aceti Scillæ f 3iss. **B.**
 Tinct : Opii m̄v **C.**
 Syrupi Aurantii f 3ss **O.**

Fiat Haustus bis indies sumendus.

108. R. Potassæ Acetatis 3i
 Oxymel: Colchici f 3ij **B.**
 tere simul cum aquæ puræ f 3i **N.**
 Spir : Juniperi comp : f 3ss **B.O.**

Fiat Haustus, ut supra dandus.

109. R. Baccarum Juniperi contus : 3ij
 Semin : Anisi contus : 3ij
 Aquæ : ferventis oj
 Macera per tres horas, dein cola.
 R. Colaturæ f 3xij **A.**
 Spir : Junip : comp : f 3ij
 Træ Scillæ f 3i **B.**
 Potassæ Nitratis ̄ij **F.**

Fiat Mistura, de qua sumatur cyathus subinde.

110. R. Infus : Digitalis f 3iv. **A.**
 Træ Digitalis f 3ss
 Potassæ Acetat ; 3i **B.**
 Tinct : Opii m̄v **C.E.**

Fiat Mistura, de qua sumatur coch : unum amplum bis terve indes.

111. R. Liquoris Ammonia Acetat : f 3ss
 Potassæ Acetatis 3i **B.**
 Aquæ puræ f 3j **N.O.**

112. R. Potassæ Supertartratis 3i
 Pulveris Scillæ exsiccat : gr. ij **B.**
 Pulveris Zingiberis gr. v **E.**

Fiat pulvis, sexta quaque hora capiendus.

113. R. Spartii cacum : concis : ʒi
 Aquæ puræ oj
 Decoque ad octarium dimidium, et cola.

R. Colaturæ fʒi
 Spir : Etheris Nitrici ℥x **B.E.**
 Sumatur alternis horis.

114. R. Tinct : Ferri Muriat : ℥xv
 Infus : Quassiæ fʒi **C.N.**
 Fiat Haustus tertia quaque hora sumendus.

115. R. Potassæ Nitratis ʒi
 Misturæ Ammoniaci fʒvj **N.**
 Spir : Juniperi comp : fʒiss **B. } B.E.**
 Aceti Scillæ fʒvi
 Fiat Mistura de qua capiat cochl : j amplam quartis horis.

116. R. Tincturæ Lyttæ ℥x
 Spiritus Ætheris Nitrici fʒi **F.**
 Misturæ Camphoræ fʒxij **E.N.**
 Syrup : Zingiberis fʒi **E.O.**
 Fiat Haustus ter in die sumendus.

A highly stimulating Diuretic.

DIAPHORETICS.

117. R. Misturæ Camphoræ fʒʒss
 Liquor : Ammon : Acet : fʒss **F.**
 Liquor : Antimonii Tart : ℥xx **H. } B.**
 Tinct : Opii ℥x.
 Fiat Haustus.

118. R. Potassæ Sulphureti gr. xv
 Saponis duri ʒj **E.L.**
 Balsam : Peru : q. s. **O.**
 Ut fit : Pilulæ xxx ; sumat tres quarta quaque hora ex cyatho Infusi
 calidi Juniperi baccarum.
In Cutaneous Affections.

119. R. Pulveris Antimon : ʒss **H. } B.**
 Opii Pulv : ʒss
 Hydrargyri Sub-muriat : gr. v
 Confect : Opii q. s. **O.B.**
 Ut fiant Pilulæ decem, quarum capiat unam hora decubitus, et repe-
 tatur p. r. n.

120. R. Pulveris Ipecacuanhæ comp: gr. xv
 Pulv: Trag: Comp: ʒij **N.**
 Divide in partes quatuor æquales, quarum sumat unam omni hora.

121. R. Pulv: Ipecacuanhæ comp: gr. xv.
 Pulv. Antimon: gr. ij **B.**
 Ft: pulvis, hora decubitus sumend: superbibendo Haustulum tepidum.

122. R. Guaiaci gum-resinæ gr. x
 Pulv: Ipecacuanhæ comp: gr. v. **F.**
 Confect; Rosæ q. s. **O.**
 Ut fiat Bolus, h. s. sumendus.

123. R. Potassæ Carbonatis gr. x
 Mist: Camphoræ: fʒj **I.K.** }
 Ft: Haust: cum Succo Limonum
 Cochleari uno amplo, in impetu ipso effervescentiæ sumendus.

124. R. Guaiaci gum-resinæ gr. x.
 Antimonii Tart: **H.** } **B.**
 et
 Opii puri āā gr. j
 Syrupi q. s. **O.**
 Fiat Bolus bis quotidie sumendus.

125. R. Camphoræ
 et Pulveris Antimon: āā gr. iij **H.** } **F.**
 Opii puri gr. j **N.**
 Confect: Aromat q. s.
 Fiat Bolus, h. s. sumendus.

126. R. Liquor: Ammoniac Acetat: fʒij
 Decoct: Cinchonæ fʒx **A.** } **G.**
 Tinct: Cinchonæ fʒij **N.**
 Confect: Aromat: ʒss
 Ft. Haustus, tertia vel quarta quaque hora sumendus.

127. R. Guaiaci gum-resinæ ʒij
 Acaciæ gummi ʒij **M.**
 Simul bene tritis adde
 Træ Opii fʒss **C.**
 Pulv: Cinchonæ ʒj
 Træ Cinchonæ fʒij **A.** } **G.**
 Decoct: Cinchonæ fʒviii
 Fiat Mistura cujus sumatur cyathus bis quotidie.
Rheumatism.

128. R. Extracti Aconiti
 Antimonii Sulphureti
 Præcipitati aa gr. j. **E. } B.**
 Magnesiae Carbonatis 3ss
 Tere simul ut fiat pulvis.

129. R. Pulv : Antimon : gr. iij
 Potassæ Sub-carbonatis gr. v. **E.**
 Anthemid. Flor. exsiccata : 3j **N.**
 M. Fiat Pulvis sexta quaque hora, per biduum vel triduum sumendus.

129. R. Pulveris Ipecacuanhæ gr. ij **H. }**
 Pulveris Opii gr. i. **M.F.**
 Potassæ Nitratis gr. xvj
 Fiat Pulvis hora somni sumendus.

EXPECTORANTS.

131. R. Assafoetidæ 3ij
 trituratione solve in
 Aquæ Menthæ vir : f3ij **N.**
 addeque Syrup : Tolu : f3j **G.**
 Fiat Mistura, de qua sumatur cochl : unum amplum tertia quaque hora.

132. R. Myrrhæ gum-resin : 3ss
 Sacchari purificati 3ss **M.**
 Tere optime simul ut fiat Pulvis, partitis dosibus quotidie sumendus, in vehiculo aliquo idoneo.

133. R. Myrrhæ gum-resin : 3iss
 Scillæ exsiccata : 3ss **B.**
 Extract : Hyoscyami 3ij **G.**
 Aquæ q. s. ut fiant Pil. xxx **N.O.**
 E quibus sumantur binæ, nocte manequæ.

134. R. Scillæ exsiccata gr. viij
 Pulveris Ipecacuanhæ gr. v. **C.**
 Camphoræ 3j **G.**
 Pulv : Antimon : gr. vj **C.**
 Sacch : purificat : 3j **M.**
 Tere in pulverem, in quatuor partes æquales dividendum. Pars una sumatur bis quotidie, ex haustu decocti hordei.

135. R. Oxymel : Scillæ
 Syrupi Althææ **B. } F.**
 Mucilag : Acaciæ
 aa f3ss, misce, et fiat linctus, de quo lambat sæpe.

136. R. Misturæ Ammoniac :
 et Aquæ Cinnamomi āā f3iss N.
 Syrupi Tolut: f3ss N.O.
 Tinct: Castorei f3ij B. } G.
 Tinct: Opii ℥v.

Fiat Mistura, cujus sumatur Cochl: unum amplum subinde, ac repetatur dosis p. r. n.

Expectorant and Antispasmodic. Hooping-Cough, &c.

137. R. Mist: Amygdal: f3j
 Vini Ipecacuanhæ ℥x G.
 Potassæ Carbonatis gr. x. I.H. } G.
 Sumatur cum Succo Limon: f3iij
 In impetu ipso effervescentiæ.

138. R. Pulveris Myrrhæ gr. xij
 Pulv: Ipecacuanhæ gr. vj F.
 Pulv: Potassæ Nitrat: 3ss E.

Misce et divide in doses æquales quatuor, quarum sumat unam quartis horis.

139. R. Tinct: Scillæ ℥x
 Acid: Nitric: dilut: ℥vj C.
 Extract: Hyoscyam: gr. iij G.
 Aquæ puræ f3iss N.
 Fiat Haustus tertiis horis sumend:

Bree.

140. R. Acid: Nitric: f3j }
 Aquæ puræ f3iv misce } H.
 dein tere cum
 Ammoniaci 3j }
 donec emulsio evadit
 Dosis cochl: j medioc: ex liquore aliquo demulcenti.

SIALOGOGUES.

141. R. Hydrarg: Oxyd: rubri gr. j.
 Opii tertiam grani partem C.
 Caryophyll: olei ℥j E.
 Fiat pilula, h. s. per hebdomadam sumenda.

J. Hunter.

142. R. Hydrarg: oxy-muriat:
 Ammoniæ muriat: āā gr. v. L.
 Aquæ distillat: f3ss N.
 Glycyrrhizæ rad: contrit: Div. B. } O.
 Mellis 3ss:

Cognatur in massam, quam divide in pil: xl, e quibus sumatur una ter die.

143. R. Pyrethri rad: contrit
Mastiches aa 3j **M.N.**

Fiant lege artis, ad ignem, masticatoria duo; teneat æger sæpius in ore, et manducet hujusmodi medicamentum, exspuatque salivam.

Hartman.

REFRIGERANTS.

144. R. Potassæ Nitratis gr. xv
Ft: Pulv: ex cyatho Aquæ perfrigidæ, illico post solutionem sumend:

145. R. Acidi Muriatici f3j
Decoct: Hordei oj **N.**
Syrupi f3ij vel q. s, **O.**

ad acorem compescendum, et gustum conciliandum. Sumatur quotidie, instar potus, et bibat quantum sitis exigat.

In Typhus and other Fevers.

146. R. Ammoniæ Muriat: 3ij
Acidi Acetici dilut: f3ij **B.**
Spir: Camphor: f3ss **G.**

Misce ut fiat Lotio.

147. R. Liquor: Plumbi Sub-acetat: f3j
Acidi Acetici dilut: f3ij **L.**
Spir: tenuior f3ss **G.**
Aquæ destillatæ f3viij **N.**

Fiat lotio.

148. R. Liquor: Ammon: Acetat: f3vj
Spir: Rosmarini f3ij **G.**
Aquæ puræ oj **N.**

Sit pro Epithemate, capiti raso applicandum.

ANTACIDS AND ABSORBENTS.

149. R. Liquoris Potassæ f3ij
Liquoris Calcis f3vj **F.N.**

M. Cujus capiat æger, acido infestante, cochleare amplum unum, vel alterum, ex poculo jusculi bovini.

150. R. Magnesiae 3ss
Aquæ Menthæ Pip: f3iiss **B. } G.**
Spir: Lav: comp: f3ss
Spir: Carui f3iv
Syrup: Zingib: f3ij

Sumatur cochleare unum mediocre, p. r. n.

Antacid and Carminative.

151. R. Pulv : Cretæ co : cum Opio ʒj
 Pulv : Catechu Extract : gr. xv G.
 Sit pulvis, post singulas sedes liquidas sumendus.
In Diarrhœa depending upon Acidity.

152. R. Ammoniæ Sub-carb : gr. v
 Extract : Rhei gr. viij G.N.
 Fiat massa in Pil : binas dividenda.

153. Magnesiæ Sub-carbonat : gr. v
 Sodæ Sub-carb : gr. v B.
 Zingib : rad : contrit : gr. iv E.
 Glycyrrhizæ rad : contrit : gr. xv M.O.
 M. et fiat pulvis, contra cardialgiam.

ANTILITHICS AND LITHONTHRYPTICS.

A. In the Lithic Acid Diathesis.

154. R. Sodæ Sub-carb : gr. x
 Infus : Quassiæ f3j G.C.
 Tinct : Calumbæ E.
 Fiat Haustus bis quotidie sumendus.

155. R. Magnes : Sub-carbonat : ʒj
 Infus : Calumbæ f3j A. } G.C.
 Tinct : Calumbæ f3j
 Fiat Haustus.

156. R. Sodæ Sub-carbonat : gr. x
 Mist : Amygdal : f3j N.O.
 Balsam : Copaib : (ope mucilag : mist :) f3ss G.1.
 Tinct : Opii ℥v G.2.
 Fiat Haustus, urgenti dolore sumendus.

157. R. Magnesîæ Sub-carbonat : gr. x
 Pulv : Ipecac : gr. j G.
 Sodæ Sub-carbonat : gr. v F.
 Fiat Pulvis, ex vehiculo aliquo idoneo sumendus; superbibendo cya-
 thum Infusi Anthemid: Flor:

B. *In the Phosphatic Diathesis.*

158. R. Acid : Muriatic : \mathfrak{m} v
 Decoct : Hordei comp : $\mathfrak{f}\mathfrak{z}$ iss **N.**
 Fiat Haustus ter quotidie sumendus.

159. R. Infus : Ros : $\mathfrak{f}\mathfrak{z}$ iss
 Magnes : Sulphat : \mathfrak{z} j **G.**
 Tinct : Calumbæ $\mathfrak{f}\mathfrak{z}$ ij **E.**
 Fiat Haustus.

ANTHELMINTICS.

160. R. Stanni Limat : \mathfrak{z} ijj
 Confect : Rosæ Gall : \mathfrak{z} ss **B. } N.**
 Syrupi q. s. ut fiat Elect :
 Capiat coch : amplum, quotidie mane, et repetatur dosis ad tres vices,
 et deinde capiat æger Haustum aliquem purgantem.

161. R. Cambogiæ g. viij
 Hydrarg : Sub-muriat : gr. v. **F.**
 Mucilag : Acaciæ q. s. ut fiat Bolus mane sumendus.
Contra Teniam.

162. R. Sodæ Muriatis \mathfrak{z} ij
 Coccinell : \mathfrak{z} ij **M.O.**
 Fiat Pulvis, et detur drachma dimidia pro dosi, tempore matutino.

163. R. Ferri Sub-carbonat : \mathfrak{z} j
 Sumatur ex vehiculo aliquo crasso, singulis auroris.

164. R. Camphoræ (Alcohole solutæ) \mathfrak{z} j
 Ol : Olivæ $\mathfrak{f}\mathfrak{z}$ ij **L.N.**
 Misce, Fiat Enema.
 Injiciatur h. s. tertia quaque nocte, ad tres vices : dein repetatur al-
 ternis noctibus, ad quartam usque vicem, si opus fuerit.
Contra Ascarides.

165. R. Aloes Spicat : gr. x
 Saponis Duri \mathfrak{z} j **L.N.**
 Fiat Suppositorium post Alvum exoneratam applicand.

DEMULCENTS.

166. R. Olei Amygdal : f3j
 Acaciæ gummi 3iij **M.N.**
 tere simul, et dein gradatim adde
 Aquæ destillatæ f3vi **O.**
 Syrup : Rhæados f3ss **O.**
 Fiat Mistura, de qua sumantur Cochlearia duo ampla ter, quaterve,
 indies.

167. R. Olei Amygdal : f3vj **I. }**
 Liquoris Potassæ m L **N. }**
 Aquæ Rosæ f3viiss. **N.**
 Fiat Mistura, ut supra capienda.

168. R. Mistur : Amygdal : f3j **I.K. }**
 Potassæ Carbonatis gr. x **I.K. }**
 Syrupi Rhæados f3j **I.K. }**
 Ft : haust : cum cochl : Succ : Limon :
 in impetu effervescentiæ sumend :
Demulcent and Febrifuge.

169. R. Pulv : Cetacei
 Pulv : Trag : comp : aa 3ss **B.**
 Syrupi Papaveris q. s. **N.O.**
 Misceantur, et fiat Linctus. Dosis cochl : minimum subinde.

170. R. Cetacei 3ij
 Pulv : Trag : comp : 3j **B. }**
 Syrup : Papaveris **B. }**
 Syrup : Tolu : aa f3ij **B. }**
 Confect : Ros : 3vj **G.**
 Potassæ Nitratis 3ss **G.**
 Fiat Electuarium, de quo capiat ad nucis moschatæ magnitudinem.

171. R. Cetacei 3ij
 Vitelli ovi dimidium **B. }**
 Syrupi f3ss **B. }**
 Aquæ Cinnamomi f3ij **B. }**
 Aquæ destillatæ f3iv **B. }**
 Fiat Mistura, de qua capiat æger cochleare amplum frequenter.

172. R. Amyli 3iij
 Aquæ ferventis f3iv L.
 Solve pro enemate, et adde,
 si opus fuerit,
 Tinct: Opii f3ss G.
173. R. Decoct: Lichenis oss
 Sumatur quotidie, cochleatim,
 instar potus communis.

SUPPLEMENTARY FORMULÆ

FOR CERTAIN REMEDIES

NOT INCLUDED IN THE PHARMACOPŒIA.

1. R. Acid: Hydro-cyanic: dilut: ℥v
 Mist: Amygd: f℥iv } O.
 Syrup: Tolutan: f℥j }

Fiat Mistura, de qua sumatur Cochleare unum amplum tertia quaque hora.

2. R. Acid: Hydro-cyanic: dilut: ℥xij
 Tinct: Digitalis f℥ss F.
 Aquæ Cinnamom: f℥vss O.

Sumatur Cochl: unum amplum quartis horis.

3. R. Acid: Hydro-cyanic: dilut: f℥j
 Aquæ Rosæ f℥iss

Sit pro lotionem contra Impetigines utend:

4. R. Morphiae Acetatis gr. xij
 Aquæ destillat: f℥j N.
 Acid: Acetic: dilut: ℥v L.
 Spir: Rectificat: f℥j P.

Sumantur guttæ x—xx, ad dolorem leniendum, et somnum conciliandum.

5. R. Iodini ℥ij
 Spir: Rectificat f℥j

Solve et fiat Tinctura.

R. Tincturæ Iodini ℥v.
 Aquæ destillat: f℥j N.

Sumr: guttæ x ter quotidie.

6. R. Quinæ Sulphat: gr. ij
 Acid: Sulphuric: dilut: ℥ij L.
 Aquæ destillat: f℥j

Fiat Haustus, bis terve de die sumend:

OF THE

MEDICINAL DYNAMETER.

THIS instrument is capable of showing, on mere inspection, the absolute as well as relative strengths of the different Official Preparations of the Pharmacopœia. The active Principles, or Medicinal Bases, are distinguished by CAPITAL LETTERS, placed in coloured compartments, and each Official preparation is marked by a line corresponding in colour with that of its active ingredient. Where a preparation contains two active ingredients it is distinguished by two coloured lines, as may be seen in the *Pulvis Ipecacuanhæ comp.* By this expedient the eye, at once, recognizes the different classes of medicines; all those, for instance, coloured *red* are Opiates; those *blue*, Mercurials; *green*, Acetic Acid; &c. The introduction of colours, moreover, immediately indicates the basis to which any preparation refers, and thus prevents the possibility of doubt or confusion.

If we wish to learn the actual quantity of active matter contained in any given proportion of a compound, we have only to turn the scale until the name of such compound coincides with the number in question, when the figure opposite to the basis solves the problem; thus—how much opium is contained in 5 grains of the *Pulvis Ipecacuanhæ compositus*? By having brought this preparation to 5, we shall see $\frac{1}{2}$ opposite to Opium, denoting that such a number of grains contains half a grain; for, unless it be otherwise expressed, the figures denote *grains* for the solids, and *minims* for the liquids. And, since the number opposite to the Base denotes the absolute quantity of it contained in those several proportions of its Official compounds, which are expressed by the respective numbers opposite to each, it follows that these latter must all be medicinally equivalent to each other: thus we have seen that 5 grains of *Pulvis Ipecacuanhæ compositus* contains $\frac{1}{2}$ grain of Opium, if we turn our eyes to the other Opiate preparations we shall perceive that each has a different number opposite to it, these figures show the number of grains of each which contains $\frac{1}{2}$ grain of opium, and consequently those numbers must be all Equivalents; thus $2\frac{1}{2}$ grains of *Pil. Saponis comp*: 5 grains of the *Pulv: Corn: ust: cum Opio*, $9\frac{1}{2}$ minims of *Tinctura Opii*, 10 grains of *Pulv: Kino comp*: 18 grains of *Confectio Opii*, 20 grains of *Pulv: Cretæ comp: cum Opio*, and 120 minims, or two fluid-drachms of *Tinctura Camphor: comp*: contain half a grain of Opium, and are consequently all equivalent to each other. This system of Equivalents will be found of much practical value to the practitioner, by enabling him, at once, to substitute one preparation for another, without the risk of altering the dose of its active ingredients. Suppose, for example, a patient had been taking 8 fluid-drachms of *Mist: Ferri Comp.* and that we wish to give the same quantity of Protoxide of Iron in the form of the *Pil: Ferri*

comp. we have only to bring the mixture in question to 8, and we shall see $13\frac{1}{2}$ grs. are equivalent, both these quantities of the respective preparations containing 2-3ds of a grain of protoxide, or a little more than a grain of the Proto-carbonate. Suppose again, that we have an acetic acid of sp. gr. 1.059, and that we wish to produce, by its dilution, two fluid-drachms, or any other quantity, of acid having the strength of distilled vinegar, the question is, what are the proportions of water and strong acid to be employed. We have only to bring the Acidum Aceticum of 1.059, to 120, i. e. to f3ij, and the number opposite to the strong acid, viz. 16, is its equivalent, if therefore we take 16 minims of it, and dilute it with 104 minims of water, we obtain the mixture required.

Those who are acquainted with the sliding rule of Gunter, or the chymical scale of Dr Wollaston, will immediately perceive that the present circular scale is divided upon the same logometric principle, and that the mechanical addition and subtraction of ratios here performed by juxtaposition, corresponds in effect to the multiplication and division of the numbers by which the ratios are expressed in common arithmetical notation. It is not necessary that I should trouble the reader with the numerous difficulties and embarrassments which have opposed themselves to the practical success of this instrument. They have, after repeated failures, been at length overcome, except perhaps with regard to a slight central error, which, as it is found in the most accurate brass instruments, could not be avoided where pasteboard alone had been employed. The error, however, is not of the slightest practical moment, not occasioning the difference of a hundredth part of a grain.

The proportions of active matter, in the several preparations of each class, have been, in general, derived from the best authorities, although in many cases they have been deduced from experiments expressly instituted for the occasion.

PHARMACOLOGIA.

COMPREHENDING

THE MEDICINAL HISTORY AND CHYMICAL HABITUDES

OF THE

DIFFERENT ARTICLES THAT CONSTITUTE THE

MATERIA MEDICA.

"Omnium Simplicium Pharmacorum vires nosse oportet cum quicquid compositum est facturus."

ÆTIUS.

PHARMACOLOGY

The study of the actions of drugs on the body and the body's response to them. It is a branch of medicine that deals with the effects of chemical substances on living organisms. The pharmacologist studies the properties of drugs, their mechanisms of action, and their therapeutic uses. This includes understanding how drugs are absorbed, distributed, metabolized, and excreted, as well as their effects on various organs and systems of the body.

The history of pharmacology is long and varied, with roots in ancient civilizations. The discovery of new drugs and the development of new methods of drug administration have led to significant advances in the treatment of many diseases. The field of pharmacology is constantly evolving, with new drugs being discovered and existing ones being refined to improve their effectiveness and safety.

The study of pharmacology is essential for the development of new drugs and the improvement of existing ones. It is a multidisciplinary field that draws on knowledge from chemistry, biology, and medicine. The pharmacologist works closely with other scientists and clinicians to understand the full range of a drug's effects and to develop safe and effective treatments.

The pharmacologist's role is to ensure that the drugs we use are safe, effective, and of high quality. This involves a thorough understanding of the drug's properties and its effects on the body. The pharmacologist also works to identify potential side effects and interactions between drugs, and to develop strategies to minimize these risks. The field of pharmacology is a vital part of modern medicine, and its continued study and development are essential for the progress of healthcare.

The study of pharmacology is a complex and challenging task, but it is also a rewarding one. The pharmacologist's work is essential for the development of new drugs and the improvement of existing ones, and it is a field that offers many opportunities for research and discovery. The pharmacologist's role is to ensure that the drugs we use are safe, effective, and of high quality, and to develop strategies to minimize the risks of drug use. The field of pharmacology is a vital part of modern medicine, and its continued study and development are essential for the progress of healthcare.

PHARMACOLOGIA.

ABS

ABIETIS RESINA. L. E. D. (*Pinus Abies*, *Resina concreta.*)
Resin of the Spruce Fir.

Olim, *Thus*—*Frankincense*.†

QUALITIES. *Form*, tears or small brittle masses : *Odour*, very fragrant when burning. It has all the chymical properties of a *Resin*, and is used only for external purposes, see *Pix Arida*. **OFFICIAL PREPARATIONS.** *Empl : Aromatic : D. Empl : Galban : comp : L. Empl : Opii L. Empl : Thuris. D.*

ABSINTHIUM. (*Artemisia Absinthium.*) *Common Wormwood.*

QUALITIES. *Odour*, strong and peculiar. *Taste*, intensely bitter, slightly pungent, and very unpleasant, as its name‡ implies. **CHYMICAL COMPOSITION.** Extractive, a small portion of resin, and a green essential oil ; in the first of which its bitterness resides, in the last, a narcotic principle ; hence the watery extract is not possessed of the nauseous flavour of the plant but retains its bitterness almost entire ; the narcotic principle is therefore dissipated by decoction, but its tonic and anthelmintic properties are not impaired by that process. **MEDICAL USES.** The whole plant is powerfully antiseptic ; and its bitterness renders it stomachic. Infused in ale it forms the beverage known by the name of *Purl*. Its powers as a vermifuge has bestowed upon it the name of *Wormwood*. **Dose**, ʒj, ʒij ; and of the infusion, (made in the proportion of ʒj of the plant to oj of water,) fʒi—fʒiss. **INCOMPATIBLE SUBSTANCES.** Precipitates are produced in the decoction or infusion by *Sulphate of Iron*, *Acetate of Lead*, and some other metallic salts. *Tartarized Antimony* is not in the least affected by it. **OFF : PREP : Extract : Absinth : D.**

* *Abies ab abeo, quod in coelum longe abeat.*

† Dr. Maton, in his appendix to Mr. Lambert's work on the genus *Pinus*, observes that the *Thus* of the ancients, (*λίβανος*) does not appear to have been the product of any species of *Pinus*, although we are informed by Dioscorides (Lib. 1. c. 7.) that Pine resin was often substituted for it. He describes, moreover, a method of distinguishing between the two kinds ; " Resin of the Pine," says he, " when thrown into the fire dissipates itself in smoke, whereas Frankincense burns with a brisk flame, and with an odour that serves to detect the imposition." " Some authors," adds Dr. Maton, " have considered the genuine *λίβανος* (*Thus*) to have been obtained from the *Juniperus Lycia*, and to constitute the *Olibanum* of our shops, but I cannot find any passage in the ancient authors sufficiently precise to corroborate this conjecture." *Op. citat.*

‡ From *a* not, and *ψις* pleasure.

ACACIÆ GUMMI. L. (*Acacia vera.*) *Mimosa. Nilotica. E. D. Gum Arabic.*

QUALITIES. It is dry, semitransparent, brittle and insipid ; by exposure to the air it undergoes no other change than loss of colour. *Specific Gravity* 1.515. **SOLUBILITY.** It is soluble in water in every proportion, forming a viscid solution, (*mucilage.*) One part dissolved in six of water affords a fluid of the consistence of syrup ; and in two parts, a medium well calculated for the union of dry powders. Gum is also soluble in pure alkalies and lime water, as well as in vegetable acids, especially vinegar, with which it forms a mucilage that may be used as a cement like the watery solution, and with the additional advantage of not being susceptible of mouldiness.* It is insoluble in alcohol, as well as in æther and oils. By strong sulphuric acid the gum is decomposed and a considerable proportion of carbon deposited.† For a farther history of its habitudes see *Mucilago Acaciæ*. **MEDICINAL USES.** It is demulcent and nutritious ; although it appears in certain states of the body to pass through the bowels without change. When triturated with gum-resins it assists their mechanical division, as in *Form : 30*. **OFFICIAL PREPARATIONS.** *Mucilago Acaciæ. L. E. D. Emulsio Mimosæ Niloticæ. E. Emulsio Arabica. D. Mist. Corn. ust. L. D. (O) Mist. Cretæ. L. D. (O) Mist. Moschi. L. (O) Confect. Amygdal. L. (O) Pulv. Cret. co. L. (O) Pulv. Tragacanth. co. L. (B) Trochisci Carbonat. Calcis E. (O) Troch. Glycyrrh. Glab. E. (O) Glycyrrh. cum Opio. E. (O) Troch. Gummos. E. (O)* **ADULTERATIONS.** Gum Senegal is not unfrequently substituted for it, but this may be distinguished by its clammy and tenacious nature ; whereas genuine *gum arabic* is dry and brittle ; the fraud is of no consequence in a medical point of view. It is also occasionally mixed with the gum of plum and cherry trees ; this fraud, however, is to be easily detected, for such gum has peculiar properties by which it may be chymically distinguished ; see *Mucilago Tragacanth*.

ACETICA. L. E. D. Preparations of Vinegar.

These preparations consist of vegetable principles dissolved in vinegar. **OFFICIAL PREPARATIONS.** *Acetum Aromaticum. E. Acidum Acetosum camphoratum. E.* Medicated vinegars were formerly much extolled ; the first London Dispensatory contained no fewer than ten, at present the number is reduced to two, viz. *Acetum Colchici. L. Acetum Scillæ. L. E. D. which see.*

ACETIS HYDRARGYRI. E. Acetas Hydrargyri. D. Acetate of Mercury.

QUALITIES. *Form,* small flaky crystals ; *Colour,* silvery white ;

* Mouldiness is a peculiar plant, propagated by seeds, infinitely small ; Reaumur found the interior of an addled egg mouldy, hence the seeds must have passed through the pores of the shell ! Dr. Macculloch has lately announced the curious fact, that the propagation of mouldiness may be prevented by the presence of aromatic substances. See p. 182, *Note*.

† This fact has enabled the Chymist to prepare an indelible ink, not affected by acids.

Taste, acrid. CHYMICAL COMPOSITION. Acetic Acid, and Oxyd of Mercury. SOLUBILITY. It is soluble in hot, but very sparingly in cold water, and quite insoluble in Alcohol. FORMS OF EXHIBITION. It should be always given in pills,* it is however seldom used. Dose, gr. j. As an external application, a solution of it, in the proportion of grs. j. to f 3i of rose water, has been commended as a cosmetic.

ACETOSÆ FOLIA. L.E. Rumex Acetosa.

Common Sorrel Leaves.

QUALITIES. *Taste*, grateful, austere and acidulous. CHYMICAL COMPOSITION. All its qualities depend upon the presence of *Super-oxalate of Potass*. In France the plant is commonly cultivated for the use of the table.

ACETOSELLA. L. Oxalis Acetosella.

Wood Sorrel.

The qualities of this plant, like those of the preceding, depend upon *Super-oxalate of Potass*.

ACETUM. L. Vinegar.

Acidum Acetosum, E. Acetum Vini. D.

QUALITIES. Too well known to require description.† CHYMICAL COMPOSITION. Acetic acid largely diluted with water, vegetable gluten, mucilage, sugar, extractive matter, and frequently malic and tartaric acids, together with small proportions of sulphate of lime, sulphate of potass, and alcohol. Its composition however varies according to the fermented liquor from which it is obtained:‡ e. g. wine yields a paler, purer, and stronger acid than fermented malt liquors or solutions of sugar, hence the superiority of that prepared in France and Italy. Vinegar is liable to spontaneous decomposition, or to become mouldy, and consequently for the purposes of pharmacy it should be distilled; as however the change depends upon the presence of gluten, it may if boiled be kept for a much longer time, and if powdered *animal*§ charcoal be previously added, it will become quite colourless like distilled vinegar, and

* KEYSER'S ANTIVENEREAL PILLS consist of this mercurial salt, triturated with Manna.

† Vinegar quenches the thirst, and is particularly refreshing after much bodily exertion. It was this property that invigorated the soldiers of Hannibal in their progress over the Alps; it is absurd to imagine that Livy meant to assert that the rocks were dissolved by Vinegar: the expression is only metaphorical. See Sodæ Murias.

‡ The varieties of vinegar known in commerce, are three, viz. *Wine Vinegar*, *Malt Vinegar*, and *Sugar Vinegar*; to which may now be added that from wood, and which is described under the title of ACIDUM ACETICUM FORTIUS, or Acidum Aceticum, *e ligno destillatum*.

§ I apprehend that the superior power of animal charcoal, over that of vegetable origin, in removing colouring matter, depends upon the peculiar texture of the former. At the same time it must be acknowledged, that there are certain phenomena which would appear to indicate the existence of a chymical difference in these substances; thus if Lime water be boiled with *animal* charcoal, the whole of the lime will be abstracted from the water, whereas the same effect is not produced by the action of charcoal of *vegetable* origin. See Liquor Calcis.

that without being impaired in strength, whereas it always becomes much weaker by distillation. It is a curious circumstance that this is the only vegetable acid, except the *Prussic*, that rises in distillation in combination with water.

ADULTERATIONS. Sulphuric acid, as it does not produce any turbid appearance in vinegar, is generally the acid selected for sharpening it; but it must be remembered, that the maker is allowed by law, to mix one thousandth of its weight of Sulphuric acid* with it; so that the *muriate of baryta* when added to such vinegar may be expected to produce $1\frac{1}{2}$ grain of insoluble *Sulphate* in every fluid-ounce; if a more considerable quantity of precipitate occurs, we may infer that an excessive proportion of sulphuric acid is present; although some allowance ought perhaps to be made for the presence of the sulphates of potass and lime, which are always contained in vinegar. Of this vinegar 1000 grains should saturate 148 grains of crystallized sub-carbonate of soda; a fluid-ounce of the same, $68\frac{3}{4}$ grains.† For the purpose of making the vinegar appear stronger, acrid vegetables, as *grains of Paradise*, *berries of Spurge Flax*, *Capsicum*, *Pellitory of Spain*, &c., are sometimes infused in it, but by tasting it with attention, the pungency of such substances may be easily detected. For the other adulterations, see *Acidum Aceticum*.

The purest vinegar which I have ever examined is that manufactured from malt, by Mr. Mackintosh of Glasgow. The strongest malt vinegar is termed *proof vinegar*, and is called by the manufacturer No. 24; it is estimated to contain 4.73 per cent. of real acetic acid.‡ Its strength in relation to the other forms of acetic acid, will be seen by referring to the MEDICINAL DYNAMETER, and to the table inserted under the article ACIDUM ACETICUM FORTIUS. In the former Editions of this work it was stated, that a Vinegar had of late years appeared in the market produced from the distillation of wood, (*Pyroligneous Acid*.) This article has now come into very general use; and the manufacturers have at length succeeded in divesting it of that empyreumatic flavour which has so long rendered it objectionable. See *Acidum Aceticum Fortius e Ligno destillatum*.

ACETUM COLCHICI. L. *Vinegar of Meadow Saffron.*

Vinegar appears to be a solvent of the acrid and medicinal principle which resides in the bulb of this plant. Dose f 3ss to f 3ij. in any bland fluid. See *Colchici Radix*.

ACETUM SCILLÆ. L.E.D. *Vinegar of Squill.*

This preparation is an acetic solution of the acrid matter of the Squill, upon which its medicinal efficacy depends.§ Dose f 3ss to f 3ij. in cin-

* The sulphuric acid is added for the purpose of preserving the vinegar from decomposition.

† This quantity includes the alkali necessary to saturate the sulphuric acid which is allowed to be added. 145 grains of alkali is the standard fixed by act Parliament, which will be found to coincide with the atomic weights of these bodies.

‡ By real Acetic acid is meant such an acid as occurs in a dry acetate; it cannot exist uncombined with water, or a base.

§ This is a very ancient preparation, thus Ausonius,

“*Scillato decies si cor purgeris aceto*

Anticipitesque tuum Samii Lucomonis acumen.”

namon or mint water. See *Scilla Radix*. FORM. 107, 114. Alkalies and their carbonates are chymically incompatible with these *Vinegars*. This preparation, as well as the *Oxymel*, deposits when long kept a precipitate consisting of *citrate of lime* and *tannin*, but its medicinal efficacy is not on that account impaired.

ACIDUM ACETICUM DILUTUM. L. Acidum Acetosum Distillatum. E. Acetum Distillatum. D.

Common Distilled Vinegar.

QUALITIES. Odour, fainter and less agreeable than common vinegar (*Acetum*): Taste, less acid; Colour, none. **SPECIFIC GRAVITY;** Mr. Phillips states, that when prepared according to the directions of the Pharmacopœia, it varies from 1.007 to 1.009; and that 1000 grains of the latter require for their saturation, 145 grains of crystallized sub-carbonate of soda. I apprehend, however, that it will be found quite impossible to obtain a dilute acetic acid equal in strength or specific gravity, to that last mentioned, by the process of the London College;* it may even be doubted whether it can produced of the specific gravity 1.007. The general run of distilled vinegar, as found in the shop of the druggist, varies from 1.005 to 1.006, and contains from 2.80 to 2.826, per cent. of real acid; when of the specific gravity of 1.009 it would contain about 4.73 per cent. Dr. Powell states (*Translation of the Pharmacop. of London*, 1815) that "one fluid-ounce ought to dissolve at least thirteen grains of *white marble*;" or, what is equivalent to it, 39.67 grains of crystallized *Sub-carbonate of Soda*; acid of this strength corresponds very nearly with six degrees of the Revenue Acetometer, the proportions being as follow, 100 grains of Pharmacopœia strength will saturate 8.68 grains of crystallized *Sub-carbonate of Soda*; 100 grains of acid of 6° of the Acetometer will saturate 8.70 grains of the salt. **CHYMICAL COMPOSITION.** Acetic acid more largely diluted than that in vinegar, with very minute portions of uncombined mucilage and extractive. **SOLVENT POWERS.** It is capable of dissolving all those vegetable principles which are soluble in water, and in some cases, as in *Squill Colchicum*, and in several *Aromatics* and *Narcotics*, its acid appears to extend its solvent powers; at the same time it often modifies or diminishes the medicinal virtues of the substances, as for instance those of *Narcotics*; this circumstance considerably limits its pharmaceutical application; when however it is employed, a portion of spirit should be always added, in order to counteract the spontaneous decomposition to which it is liable, and the acetic compound should be preserved in stoppered bottles. Acetic acid does not dissolve true resins, but it has some action on gum resins. **MEDICINAL USES.** It is refrigerant, and may be advantageously administered in hemorrhage; especially in cases where the acetate of lead has been given, since the solubility of this latter substance is increased by it. See Form. 57; externally, it may be a convenient adjunct to lotions containing lead. See Form. 147. In consequence of its chymical action upon osseous matter, it has been much em-

* In following the directions of the College the first pint is rejected, and this, according to Mr. Phillips (Remarks on the Pharmacopœia) contains a notable quantity of acid. Hence Distilled Vinegar can never be so strong as the Vinegar from which it is distilled.

ployed at the Gloucester Infirmary to hasten exfoliation of carious bone. **ADULTERATIONS.** *Sulphuric Acid* may be detected by a precipitate being produced on the addition of acetate of baryta: this test however will not answer for its detection in common vinegar, for the reason stated under that article. See *Acetum*. *Sulphurous Acid* may be recognized by drawing a little of the vapour into the lungs. The presence of *Nitric Acid* may be discovered by saturating the suspected sample with pure potass, evaporating to dryness, and then treating the product with a highly concentrated alcohol, the acetate of potass will be thus dissolved, but as it exerts no action on the *Nitrate* it will be found in the residuum, and may be recognized by its deflagration, when thrown upon burning charcoal;* *Copper* may be detected by the acid assuming a blue colour, when super-saturated with ammonia; and *Lead*, by a solution of sulphuretted hydrogen, producing a dark coloured precipitate. *Tin* however is the metal with which distilled vinegar is more usually contaminated, for no vegetable acid will act upon lead while any tin is present in the mixture, since the latter being more oxidable than the former, is exclusively dissolved.

ACIDUM ACETICUM FORTIUS. L.

(*Acidum Aceticum.*)
(*e Ligno Destillatum.*)
vulgo, Pyroligneous Acid.

The acetic acid from wood has been very generally introduced to supersede the use of distilled vinegar for the purpose of Medicine and the Arts.† It is at length found to be capable of such complete separation from all foreign matter as to afford a perfectly pure acetic acid, invariable in its acidifying power, and immutable in its chymical properties. In justice to the skill and industry of Messrs. Beaufoy and Co. of South Lambeth, I beg to state that I have examined various specimens of this acid from their manufactory, and that I find it free from those impurities which have hitherto constituted an insuperable objection to its introduction into the *Materia Medica*. The purified *Pyroligneous* acid, manufactured by this company, and sold under the name of "*Improved Dis-*

* Or it may be detected, in very minute quantities, by the elegant test lately employed by Dr. Marcet, and which I have frequently repeated in my Lectures with considerable satisfaction. It consists in adding a little sulphuric acid with a small quantity of muriate of soda, and then immersing a little gold leaf in the mixture, when after boiling it, if any nitric acid should have been present, the gold leaf will be dissolved.

† It had been long known that by the destructive distillation of any kind of wood, an acid is obtained, which was formerly considered of a distinct and peculiar nature, and termed Acid Spirit of Wood, and afterwards pyroligneous Acid. Glauber appears to have been the first chymist who was aware of its true nature, for he speaks of it as the "*Vinegar of wood.*" It was however reserved for Fourcroy and Vauquelin to demonstrate its composition by experiment, and they have accordingly proved beyond doubt that it is merely the Acetic acid, contaminated with Empyreumatic oil and Bitumen. The address of modern chymists has at length enabled them to get rid of every trace of these latter ingredients, and to furnish an acid perfectly devoid of any foreign flavour. The crude pyroligneous acid, as it is first received, is rectified by a second distillation in a copper still, in the body of which about 20 gallons of viscid tarry matter are left from every 100. It has now become a transparent brown vinegar, having a considerable empyreuma: it is then redistilled and saturated with quick-lime, and the liquid acetate is evaporated to dryness and submitted to gentle torrefaction, in order to dissipate the empyreumatic matter, and lastly, the calcareous salt is decomposed by sulphuric acid, when a pure, perfectly colourless, and grateful vinegar rises in distillation.

tilled vinegar," is perfectly free from any unpleasant taste, as well as colour and sediment; and it forms a limpid and colourless solution with ammonia. The common distilled vinegar of the shops varies essentially in strength as well as purity, differing in acidifying power from 30 to 40 per cent. in value: it is sometimes 7 degrees, and at others less than 5, by the Revenue Acetometer;* and hence has arisen the difficulty of procuring an uniform article for medical application, a difficulty which the introduction of the *pyroligneous* acid seems calculated to overcome, as it may be procured from the manufacturers of any degree of concentration,† from 6 degrees of the Acetometer, or 2.826 per cent. of real acetic acid to 130 degrees, or 61.49 per cent. of acid; and even of still higher strength if required; their common, or *Proof* acid is about equivalent in strength to that of the best Malt Vinegar, of which 100 grains will saturate $14\frac{1}{2}$ grains of crystallized *Sub-carbonate of Soda*, and consequently contains 4.73 per cent. of real acid, and will require at least one half part of water to reduce it to the strength of the best common distilled vinegar. It is found that acetic acid of 45 per cent. real acid, or of 95° of acetometer strength, dissolves Camphor and the Essential Oils very readily.

The "*ACIDUM ACETICUM FORTIUS*," which is now introduced into the *Materia Medica* of the London College, is directed to have a specific gravity of 1.046.‡ It is exactly six times the strength of *Proof* vinegar, or the strong Malt vinegar manufactured, but it requires to be diluted with nine times its weight of water to reduce it to the strength of the ordinary samples of distilled vinegar. Mr. Phillips states, that he has not met with acetic acid of greater specific gravity than 1.043,§ being five times the strength of vinegar of specific gravity 1.009.|| The strongest

* This instrument was invented by Messrs. Taylors for this particular purpose; the principle consists in forming a neutral salt with dry hydrate of lime and the acid to be examined, and then taking the specific gravity of the solution. Act 58. G. III. c. 65, § 8.

† It may be necessary to state, that the Pharmaceutist should never purchase acetic acid of greater strength than that of 75° of the Acetometer when it is intended for dilution, for although he might thus avoid the expense of carriage, the saving will be more than counterbalanced by the excessive duty levied upon acids above that standard. There is moreover a great loss in the preparation of strong acids, so that the manufacturer cannot afford to sell them at a price which is merely proportional to their strength. Acid of 75° is regularly kept by Messrs. Beaufoy for dilution, and if mixed with eleven parts of pure water is equivalent to the common distilled vinegar of the Pharmacopœia.

‡ It ought to have been 1.048 of 55° Fah: but the error lies in the scale of Taylor's Acetometer, which appears to be incorrect at this point.

§ I believe that no manufacturer, except Messrs. Beaufoy, makes an acid stronger than this; the College sample was obtained from that house.

|| The Reviewer of Mr. Phillips's Translation of the *Pharmacopœia*, in the *Royal Institution Journal* for July, 1824, has fallen into an important error upon this subject, against which it may be necessary to caution the reader; he says, "the term '*diluted acetic acid*' is properly enough applied to distilled Vinegar, but the process of distillation might well have been rejected; for all medical purposes a dilute acid, composed of one part of the concentrated acid, contained in the *Materia Medica*, and four parts of water, is preferable. Of this mixture, or of distilled vinegar, the specific gravity should be 1.009, and 1000 grains should saturate 145 grains of *Sub-carbonate of Soda*." The reviewer has mistaken the acid of sp. gr. 1.043 mentioned by Phillips, as the strongest he has met with, for the *Pharmacopœia* acid of sp. g. 1.046; for, should he dilute the latter with only four times its weight of water, he would produce a compound containing 5.636 per cent. of real acid, or one considerably stronger than the strongest malt vinegar, and twice the strength of distilled vinegar. The reviewer takes this occa-

acid that can be procured is the *Glacial* acid, which exists in a crystallized state under 50° . *Fah.* It contains 79 per cent. of real acid, and is consequently of the strength of 167.5 of the Acetometer. If this acid be kept perfectly still, it may be reduced several degrees below its crystallizing point in a fluid state, when the slightest agitation of the vessel instantly occasions it to solidify. It will greatly facilitate our inquiries into the strength of different samples of acetic acid to know, that the representative numbers of acetic acid and pure white marble coincide on the scale of equivalents; it therefore follows that the weight of marble dissolved by a hundred grains of any acetic acid, will at once represent the percentage of real acid in such a sample.

The Impure Pyroligneous Acid, as it first comes over, contaminated with Tar, has, it is said, been very successfully employed as a lotion in Leprosy, scrofulous ulcerations, chronic inflammation of the eyes, and edges of the eyelids, and for promoting digestion of irritative ulcers, or those connected with carious bone. It has also been injected into sinuses to produce healthy discharge and adhesive inflammation.* M. Monge discovered that this acid has the property of preventing the decomposition of animal substances; it is sufficient to plunge meat for a few moments in this acid, even slightly empyreumatic, to preserve it as long as you please. "Putrefaction," it is said, "not only stops but retrogrades." To the empyreumatic oil a part of this effect has been ascribed, and hence has been explained the agency of wood smoke in the preservation of tongues, hams, herrings, &c.

ACIDUM ACETOSUM FORTE, E. Acidum Aceticum. D.

Radical Vinegar.

The process for this preparation has not retained its place in the London Pharmacopœia, as it is now universally superseded by the Acetic acid distilled from wood. Since however it possesses peculiar chymical habitudes, it claims some notice in this work. The concentrated acid obtained from the decomposition of acetic salts, by the action of sulphuric acid, is pungent, acrid, and volatile, and when heated with free access of air, it takes the fire very readily. Its solvent powers are much greater than those of distilled vinegar; it is capable of dissolving camphor, re-

sion to indulge his favourite passion for abusing the Pharmacopœia, and he asks with an air of sarcasm, Where was Dr. Paris during the late revision? I answer—engaged in the discharge of my duty as an humble member of the Committee, and I can assure him that nothing which he has yet urged has convinced me that I have failed in its fulfilment, or erred in its execution:—but it is now my turn to inquire, and I do so with perfect good humour, where the reviewer could have been when he composed the above passage? that he was *not at home*, is I think sufficiently evident from the statement which I have just offered.

* A very useful practical application has been made of the pyroligneous acid, for the purpose of correcting the excessive fœtor attendant upon mortification. Dr. Samuel W. Moore, of New-York, (to whom we are indebted for the suggestion,) has detailed the particulars of a case of extensive mortification of the cheek, resulting from the use of mercury, in which the pyroligneous acid was applied, and with the happiest success. In a case of Cancerous breast it was also used, and with similar effect. See New-York Medical Repository. Vol. 22, p. 237. *Ed.*

sins, and essential oils* copiously, but they are precipitated by dilution; it combines with alcohol, and forms a species of ether; with water it unites in any proportion, heat being evolved by the mixture. Gold, platinum, glass, and earthenware can alone retain this acid without being corroded. It blisters the skin immediately.

I shall conclude this article by the introduction of a Table, which I have constructed with considerable care, for the use of the practical Chymist. The accuracy of the results may be depended upon, since it has been tested by several different modes of inquiry. The Medicinal Dynameter will give the equivalents in any other denomination that may be required.

A TABLE EXHIBITING THE ACETOMETER STRENGTHS, SPECIFIC GRAVITIES, PERCENTAGE OF REAL ACID, EQUIVALENT VALUE, AND SATURATING POWER, OF THE MORE IMPORTANT PREPARATIONS OF ACETIC ACID.

ACIDS.	Acetometer strength.	Specific Gravity.	Percentage of real Acid.	Equivalents in Minims.	Grains of Sub-carbonate of soda saturated by 100 grains of acid.
Acetum Destillatum....	5.9°	1.005	2.80	810	8.58
D°	6°	1.006	2.826	803	8.66
D°	7°	1.007	3.42	663	10.48
D°	10°	1.009	4.73	480	14.5
Acetum (Proof).....	10°	1.014	4.73	480	14.5
Acid Acetic : Fort.....	50°	1.043	23.67	96	72.5
Acid Acet : Fort. P.L...	60°	1.048	28.43	80	87.
Acid : Acet : Fort.....	75°	1.059	35.475	64	108.75
Acid : Acetic. D..... Acid : Acetos : Fort. E.	145°	1.070	68.5	33.1	210.25
Acid : Acetic : Fort..... (Glacial.)	167.5°	1.063	79	28.6	242.875

The reader will observe an anomaly with regard to the specific gravity of the acid of 145° of the acetometer, when compared with the *glacial* acid. The fact is that by diluting this latter preparation with a small portion of water we augment its specific gravity, a circumstance peculiar to this acid.

* AROMATIC VINEGAR is merely an acetic solution of camphor, oil of cloves, of lavender, and of rosemary. The acetic acid used for this purpose is of about 145° of

ACIDUM BENZOICUM. L.E.D.

Benzoic Acid. Vulgo, Flowers of Benzoin, or Benjamin.

QUALITIES. *Form*, small feathery crystals of a brilliant white colour, which are not brittle, but possess a kind of ductility and elasticity, and, on being rubbed in a mortar, assume the consistence of paste. *Odour*. As generally met with, it possesses a peculiar aromatic smell, but this depends upon the oily matter which adheres to it, for Mr. Guise informs us, that on dissolving the benzoic acid in as little alcohol as possible, filtering the solution, and precipitating by water, the acid will be obtained pure, and void of smell, the odorous oil remaining dissolved in the spirit. *Taste*, rather acrid and sour; *Specific Gravity*, .667. It is not altered by exposure to air. **SOLUBILITY.** Four hundred parts of cold water dissolve but one, although the same quantity of boiling water dissolves twenty parts, nineteen of which separate on cooling; in alcohol it is soluble in a much greater proportion. **MEDICINAL USES.** It is said to be stimulant and expectorant; in certain cases of tracheal irritation, a pill, composed of two grains of Benzoic acid, and three of Extract of Poppy, has been found serviceable. **OFFICINAL PREPARATIONS.** *Tinctura Camphoræ Composita*, L.D. *Tinct: Opii Ammoniat*; E. **IMPURITIES.** The crystals ought not to be discoloured; they should dissolve without residuum in alcohol, and when subjected to heat, ought to be entirely volatilized.

Although this acid is commonly procured from the resinous substance called Benzoin, yet it exists extensively in other vegetable, and in some animal substances. In the Tonca bean (*Dipterix odorata*) it is frequently to be seen beautifully crystallized on its surface. It exists also in vanello; cinnamon; cloves; ambergris; in the urine of children, and sometimes in that of adults, and always in that of quadrupeds living on grass and hay.

the acetometer, containing 68.5 per cent. of real acid. A preparation of this kind may be extemporaneously made by putting 3j of Acetate of Potass into a phial with a few drops of some fragrant oil, and m xx of Sulphuric Acid.

THIEVES VINEGAR, or MARSEILLES VINEGAR, is a pleasant solution of essential oils and camphor, in vinegar; the Edinburgh Pharmacopœia has given a formula for its preparation under the title of "Acetum Aromaticum." The repute of this preparation as a prophylactic in contagious fevers is said to have arisen from the confession of four thieves, who, during the plague of Marseilles, plundered the dead bodies with perfect security, and, upon being arrested, stated on condition of their lives being spared, that the use of Aromatic Vinegar had preserved them from the influence of contagion. It is on this account sometimes called "De Vinaigre des quatre voleurs." It was however long used before the Plague of Marseilles, for it was the constant custom of Cardinal Wolsey to carry in his hand an orange, deprived of its contents, and filled with a sponge which had been soaked in vinegar impregnated with various spices, in order to preserve himself from infection, when passing through the crowds which his splendour or office attracted. The first plague raged in 1649, whereas Wolsey died in 1531. The French Codex has a preparation of this kind, consisting of an acetic infusion of various aromatic herbs and camphor, which is termed "Acetum Aromaticum Alliatum, seu 'Antisepticum' vulgo 'des Quatre Voleurs.'" p. 108. The German Dispensatories abound with Medicated Vinegars, chiefly aimed against Pestilential Diseases.

ACIDUM CITRICUM. (*Crystalli*) *Citric Acid.**Concrete Acid of Lemons.*

QUALITIES. *Form*, crystals which are right rhombic prisms, white, semitransparent, and persistent. *Taste*, extremely acid, almost caustic. **SOLUBILITY.** f 3j of cold water dissolves 3x, but of boiling, 3ij. 3x of the crystals dissolved in a pint of water, are about equivalent to one pint of lemon juice, the solution however if kept is liable to spontaneous decomposition. The following table of equivalents may be found of practical use; the author is aware that they do not exactly agree with the proportions of Dr. Haygarth, but they are the results of careful and repeated experiments, and as such they are submitted with confidence.

EQUIVALENT PROPORTIONS OF CONCRETE CITRIC ACID AND LEMON JUICE,
NECESSARY FOR THE NEUTRALIZATION OF ALKALINE SALTS.

Citric Acid.	Lemon Juice.	A Scruple of Alkalies.
grs. x.	f 3ij	Carbonate of Potass.
grs. xv.	f 3iiij	Sub-Carbonate of Potass.
grs. xxv.	f 3vij	Sub-Carbonate of Ammonia.

These alkaline citrates are decomposed by the *oxalic*, *tartaric*, and the stronger *mineral acids*, and by the solutions of *lime* and *barytes*. *Form.* 107, 123, 137, 168.

Citric acid decomposes the following salts, *viz.* *The Alkaline, Earthy, and Metallic Carbonates; the Alkaline and metallic Acetates; the Sulphurets of Earths and Alkalies, and Alkaline Soaps.* It is also incompatible with *Tartrate of Potass*, which it converts into citrate and super-tartrate of potass. It curdles the milk of most animals, but it does not produce that effect on human milk, whether applied hot or cold. **ADULTERATIONS** *Tartaric Acid*, with which it is sometimes mixed, may be detected by adding to the solution an excess of *Potass*, which will instantly form with it an insoluble super-tartrate, and precipitate in granular crystals, or, if a little of the suspected acid be saturated with potass, and then boiled with a dilute solution of muriate of Platinum, if tartaric acid be present, a black protoxide of Platinum will be precipitated. If we add the tartrate of potass for this purpose, we may be deceived, for the citric acid, by neutralizing a portion of its base, will convert the remainder into super-tartrate. See *Potassæ Tartras*. *Sulphuric Acid* is known by the acetate of lead producing a precipitate, insoluble in nitric acid. *Muriatic Acid* may be discovered in the same manner, substituting only an acidulous solution of nitrate of silver for the acetate of lead. The presence of *Oxalic Acid* may be inferred, if the solution, when added to that

of sulphate of lime, produce a precipitate. Malic acid has the power of precipitating silver, mercury, and lead, from their solutions in nitric acid, but no doubt or difficulty can arise from this circumstance, for the fact of its forming a soluble salt with lime will prevent every chance of accidental intrusion, and its price at once secures us against its fraudulent introduction; it might moreover be easily detected by throwing the suspected precipitate upon burning coals, when it would be decomposed. Where the presence of *lime* is suspected, it may be known by dissolving some of the crystals in water, saturating the solution with ammonia, and then treating it with the oxalate of that alkali, which, if lime be present, will immediately separate it in a palpable form. The juices of many other fruits besides the lemon and lime, will furnish the citric acid in abundance, and may be obtained from them by a similar process; e. g. *VACCINIUM OXYCOCCUS*, the *Cranberry*; *PRUNUS PADUS*, the *Bird's cherry*; *DULCAMARA SOLANUM*, the berry of the *Nightshade*; *CYNOSBATUS*, vel *ROSA CANINA*, the *hep* or fruit of the *Wild Briar*. There are many plants whose juices contain combinations of the *CITRIC* and *MALIC* acids in considerable abundance, such as *FRAGARIA VESCA* the *Wood Strawberry*, and the common *Raspberry*; *RIBES RUBRUM*, the *Red Gooseberry*; *VACCINIUM MYRTILLUS*, the *Bilberry*; *CRATÆGUS ARIA*, the *Hawthorn*; *PRUNUS CERASUS*, the *Black Cherry*, &c. This fact is interesting, since the juices of such fruits have been long known to possess the property of dissolving the *tartareous* incrustations on the teeth.

ACIDUM HYDRO-CYANICUM.

Hydro-cyanic Acid. Prussic Acid.

This peculiar acid exists in a great variety of native combinations in the vegetable kingdom,* and imparts to them certain properties which have been long known, and esteemed in medicine. It is, however, only

* The more familiar of these are *Bitter Almonds*, the *Cherry Laurel* (*Lauro Cerasus*), the leaves of the *Peach tree*, the kernels of fruit, pips of apples, &c. The Prussic acid would appear to be most abundant in the thin pellicle that envelopes the kernel; the fleshy parts of these fruits do not contain it, and even the berries of the *Lauro Cerasus* may be eaten with impunity; and yet the distilled water and oil of this plant are the most destructive of all narcotic poisons, as was evinced by the murder of Sir Theodosius Broughton, by Laurel Water; and by the untimely fate of Dr. Price, of Guildford, in the year 1782, who professing to convert Mercury into Gold, offered to repeat his experiments before an adequate tribunal, but put a period to his existence before the appointed day, by a draught of Laurel Water. Consistent with theory, the watery extract of Laurel is harmless, a fact easily explained, since the narcotic acid is entirely volatilized before the fluid can assume the consistence of an extract. The Laurel Water as a medicinal agent appears to have been long known. Linnæus informs us, that it was frequently used in Holland, in Pulmonary consumption. (*Amenitat. Academ.* vol. iv. p. 40.) The Bark of the *Prunus Padus*, or *Bird Cherry Tree*, was ascertained to contain Prussic acid, by M. Bergemann, in 1811, and it is certainly a curious fact, as Dr. Granville has observed, that superstitious people should have selected the berries of this shrub to form necklaces, which are hung round the neck of children to prevent fits and allay cough from teething. For farther information upon this subject, the reader may consult "The Chronological recapitulation respecting the Introduction of the Prussic acid into the Practice of Physic," in the work of Dr. Granville, above cited.

lately, that it has been administered in its simple but diluted form. As few practitioners will choose to prepare the acid, it seems unnecessary in the present work to dwell upon the merits of the different processes which have been proposed for its preparation; for a full account of them, as well as for other details of importance, the practitioner is advised to consult a work by Dr. Granville, entitled "*An Historical and Practical Treatise on the use of Prussic Acid. Second Edition, London, 1820.*"

QUALITIES. A colourless transparent liquid, although it occasionally exhibits a yellow tinge; *Odour* like that of bitter almonds; *Taste* bitterish and peculiar; these properties however are soon lost by exposure to air and light, and the acid undergoes spontaneous decomposition. **CHYMICAL COMPOSITION.** The true nature of *Prussic acid* was not ascertained until 1815, when Gay Lussac presented to the royal Institute of France, a memoir which at once developed its real chymical constitution; and it is now admitted to consist of a peculiar gaseous and highly inflammable compound of carbon and nitrogen, to which the name *Cyanogene* has been assigned, and of hydrogen; the latter body acting as the acidifying principle, whence the term *Hydro-cyanic acid* is well contrived to express its composition. The medicinal, or *diluted acid*, however, contains but a small proportion of this concentrated compound; according to M. Majendie, one part of the acid of Gay Lussac and eight parts and a half of water, by weight, or one part of acid with six times its volume of water, constitute the preparation which should be used in medicine; and which, to avoid the possibility of mistake, ought always to be prescribed as the *Acidum Hydro-cyanicum dilutum*, and is, in fact, the *Prussic acid* of Scheele. Dr. Ure, who has lately taken considerable pains upon this subject, has constructed a table exhibiting the relations between the specific gravities, and quantities of real acid, in preparations of different strength; from these experiments it would appear that an acid of specific gravity 0.996 or 0.997 is such as is usually prescribed in medicine.* **MEDICAL USES.** In a sufficient dose, hydro-cyanic acid in-

* See Journal of Science and the Arts, No. xxv. The following table comprehends their results.

Quantity of liquid Acid.	Specific gravity.	Real Acid per Ct.
100.0	0.9570	16
66.6	0.9768	10.6
57.0	0.9815	9.1
50.0	0.9840	8.0
44.4	0.9870	7.3
40.0	0.9890	6.4
36.4	0.9900	5.8
33.3	0.9914	5.3
30.3	0.9923	5.0
28.6	0.9930	4.6
25.0	0.9940	4.0
22.2	0.9945	3.6
20.0	0.9952	3.2
18.2	0.9958	3.0
16.6	0.9964	2.7
15.4	0.9967	2.5
14.3	0.9970	2.3
13.3	0.9973	2.1
12.5	0.9974	2.0
11.8	0.9975	1.77
10.5	0.9978	1.68
10.0	0.9979	1.60

stantly destroys life by extinguishing the nervous energy of the body;* but it has at the same time been observed that animals submitted to its action would often continue to breathe for several hours freely, and to circulate their blood, although no trace of sensibility or muscular contractility could be found after its application. This remarkable property of extinguishing the general sensibility, without any ostensible injury to respiration and circulation, naturally led to a belief that the hydro-cyanic acid or Prussic acid, might be advantageously used in cases of excessive sensibility and irritation, particularly when these two morbid states are likely to affect either the respiratory organs or the circulation generally. This kind of analogical reasoning, it is said, induced Professor Brera, ten years ago, to administer it in cases of high pulmonary and other inflammations, in doses of four drops twice a day; when, as we are told the violence of the disease was quickly subdued. The remedy, however, does not appear to have excited much attention, until after the first essay of Dr. Majendie, who deserves whatever credit may belong to its introduction. Seven years of trial have elapsed, and the general sense of the medical profession with respect to its utility may now be collected. As a palliative in certain spasmodic coughs, there is reason for supposing that it *may sometimes* be useful, but in that species of pulmonary irritation for which it was at first so greatly extolled, I will venture to assert that it is far inferior in efficacy to well directed doses of *Conium*. But there is another class of diseases in which its exhibition is said to prove useful in dyspeptic affections attended with heartburn; where it is supposed to be capable of reducing the morbid irritability of the stomach, and thereby of enabling the juices of that organ to be more slowly secreted and of a more healthy character. Dr. Elliotson has published the result of his treatment of stomach complaints with this medicinal agent, and would appear to appropriate to himself the merit of originating the practice, a claim which Mr. Thomson, in the third edition of his Dispensatory refuses to concede.† As a local remedy, Prussic acid has also received no small share of commendation, and it has been said that it is the only application that can be depended upon for allaying the cutaneous irritation so frequently attendant upon certain impetiginous affections. It must, however, be confessed that this medicine is rapidly declining in popularity.‡ Any prejudice raised against it, upon the ground of its poisonous activity in large doses, is too absurd to be believed; the knife and the caustic are unquestionably powerful, and may therefore become dangerous instruments; but whoever blames the surgeon for employing a sharp knife or an active caustic, seeing that both are to be directed by his eye, and guided by his hand? FORMS OF EXHIBITION. It may be conveniently administered in any liquid vehicle, as distilled water, camphor mixture, or in some vegetable infusion. See *Supplementary Formulæ*, 1, 2, 3. A question has lately arisen whether the effects of the Prussic acid might not be more conveniently ensured by

* For a detailed account of this poison, see my work on medical Jurisprudence, vol. ii. p. 393.

† It seems to be a contest for a shadow.

‡ We agree with our author in the general estimate which he forms of the Prussic acid. The experience of practitioners in this country by no means confirms the high expectations originally entertained of this article. *Ed.*

the administration of some vegetable* in which it exists as a native ingredient; a company of associated Physicians, Surgeons, and Naturalists at Florence, have accordingly expressed their joint opinion, that the essential oil of the *Prunus Lauro Cerasus* is to be preferred in medical practice to all other preparations which contain the hydro-cyanic acid; for, say they, unlike the distilled water of the plant, and pure Prussic acid, it contains the same proportion of active matter, and of the same power, whether recently prepared or not; whether made in one place or another; or whether it has been exposed or not to air, light, or heat. They are also of opinion that olive oil forms the best vehicle for its exhibition in the proportion of one ounce to twelve drops of the essential oil. Other practitioners again prefer *Laurel Water*, made by distilling two drams of the fresh leaves chopped, with four ounces of water, recommitting the distilled water twice afterwards on the same quantity of fresh leaves, and making ultimately four ounces of the menstrum, of which from ℥xxx to f3j every six hours may be given until a sedative effect is produced. See *Oleum Amygdalæ Amaræ*. INCOMPATIBLE SUBSTANCES. Hydro-cyanic acid is decomposed by most of the *oxydes* usually employed in medicine, particularly by those of *Mercury* and *Antimony*. The alkalies do not appear to diminish its efficacy. *Nitrate of Silver*, and the salts of iron occasion precipitates; nor ought the *sulphurets*, the *mineral acids*, or *chlorine* to enter with it into prescriptions. DOSE. Of the medicinal, or *diluted* hydro-cyanic acid, ℥ij,—viiij. There is however considerable difficulty with regard to the strength of the dilute acid employed in medicine, since the density is a criterion of greater nicety than can be conveniently used by the majority of practitioners; in fact, as Dr. Ure has observed, the liquid at 0.996, contains about double the quantity of real acid, which it does at 0.998. Dr. Ure has accordingly proposed another test of the strength of this powerful and dangerous medicine, which is not only easier in use, but more delicate in its indications;† it is as follows. To 100 grains, or any other convenient quantity of the prussic acid, contained in a small phial, add in succession, small quantities of the peroxide of mercury, (the common *red precipitate* of the shops) in fine powder, till it ceases to be dissolved on agitation. The weight of the red precipitate taken up, being divided by four, gives a quotient representing the quantity of real prussic acid present. By weighing out before hand, on a piece of paper, or a watch glass, forty or fifty grains of the peroxide, the residual weight of it shows at once the

* The only mineral substances in which this acid has been found is the *Fer Asuré* of Haüy, and a new substance which is found accompanying Welsh Calm, and of which I have given an account in the first volume of the Transactions of the Royal Geological Society of Cornwall, although in this latter instance it is probably a product, not an educt.

† The following is the chymical reasoning upon which this process is founded. "The prime equivalent of Prussic acid is exactly one eighth of that of the mercurial peroxide. But as the prussiate of mercury consists of two primes of acid to one of base, or is in its dry crystalline state a *By-cyanide*, we have the relation of one to four in the formation of that salt, when we act on the peroxide with cold prussic acid." Hence is derived the above simple rule of analysis. (Journal of Science and the Arts.) Upon the same principle it has been already stated, that the quantity of real acetic acid, in any given sample of distilled vinegar may be discovered by the test of carbonate of lime, see *Acid. Acetic. Fort.* They furnish beautiful illustrations of the practical importance of the doctrine of Definite Proportions.

quantity expended. The operation may always be completed in five minutes, for the red precipitate dissolves as rapidly in the dilute prussic acid, with the aid of slight agitation, as sugar dissolves in water. **ADULTERATIONS.** If, says Dr. Ure, the presence of muriatic acid be suspected, then the specific gravity of the liquid compared with the gravity of the peroxide dissolved, will show how far the suspicion is well founded; thus if 100 grains of acid, specific gravity 0.996, dissolve more than 12 grains of the red precipitate, we may be sure that the liquid has been contaminated with muriatic acid. *Nitrate of Silver*, in common cases, so valuable a reagent for muriatic acid, is unfortunately of little use here, for it gives with prussic acid a flocculent white precipitate, soluble in water of ammonia, and insoluble in nitric acid, which may easily be mistaken by common observers, for the *chloride* of that metal. But the difference in the volatility of prussiate and muriate of ammonia may be had recourse to with advantage; the former exhaling at a very gentle heat, the latter requiring a subliming temperature of about 300° *Fah.* After adding ammonia in slight excess to the prussic acid, if we evaporate to dryness at a heat of 212°, we may infer from the residuary sal ammoniac, the quantity of muriatic acid present.

ANTIDOTES. To counteract the poisonous effect of prussic acid, Orfila recommends, after full vomiting has been excited, the exhibition of three or four spoonful of oil of turpentine, in the infusion of coffee, at intervals of half an hour. M. Virey conceives that sulphate of iron in solution is the best antidote, he having observed that the salt restored a cow that was nearly killed by the essential oil of bitter almonds. When an overdose has been taken, hot brandy and water, and the ammoniated tincture of iron are recommended by Mr. Thomson: on the former I should rely with much greater confidence than upon the latter antidote, or in other words, it is from vital agents, counteracting its sedative influence, rather than from chymical substances, changing its composition, that we can expect any benefit upon such an occasion. For the chymical processes by which the presence of this acid may be ascertained, the reader may consult my work on Medical Jurisprudence, vol. 2, p. 408.

ACIDUM MURIATICUM. L.E.D.

Muriatic Acid.

QUALITIES. *Form*, a liquid of the specific gravity 1.16, a fluid-ounce of which weighs about 527 grains, and according to Dr. Powell ought, when diluted, to dissolve 220 grains of limestone. *Odour*, strong and pungent; if exposed to the air it emits white fumes. *Taste*, intensely sour and caustic; it is however the weakest of the three mineral acids; and no remarkable elevation of temperature is produced by dilution. **CHYMICAL COMPOSITION.** The liquid acid is a solution of muriatic acid gas in water; when of the specific gravity 1.16, according to Davy, it contains 32.32 per cent of the gas, which recent experiments have shown to be a compound of *Chlorine* (*Oxy-muriatic acid*) and hydrogen in equal volumes. It has therefore received a name expressive of its com-

position, and is called *Hydro-chloric* acid*. We accordingly find that the former element is disengaged from muriatic acid by adding any substance capable of uniting with its hydrogen. For the purpose of obtaining *Chlorine*, we may take three parts of common salt, one of black oxide of manganese, and rather less than three of strong sulphuric acid.† Accounts have been received from Spain, that in the midst of the dreadful contagion which reigned in that country, the inhabitants always escaped in those houses where fumigations of chlorine had been used. In our own country, the Penitentiary has lately undergone fumigation by this gas, under the superintendence of Mr. Faraday.‡ Muriatic acid gas has also been strongly recommended for the same purpose; it may be easily evolved by pouring sulphuric acid on common salt. If nitric and muriatic acids be mixed, a mutual decomposition takes place, of which water, chlorine, and nitrous acid are the results; this constitutes “nitro-muriatic acid,” the *Aqua regia* of the older chymists. A bath acidulated with an acid of this kind has been recommended by Dr. Scott, as a powerful remedy for diseases of the liver in particular, and as a substitute for mercury in general. On the possible influence of this bath, I would beg to make one observation,—that the extensive application of a dilute acid to the surface of the body, is, under certain circumstances, capable of affecting the bowels. I have witnessed such an effect from sponging with vinegar and water. In this way the acidulated bath may occasionally produce benefit, but it is extremely difficult to conceive how it can be indebted for its utility to any other mode of operation. (See *Journal of Science and the Arts*, No. 2.) FORMS OF EXHIBITION. Muriatic acid should be administered in some bland fluid, as barley water, gruel, &c. (*Formula* 145.) I have uniformly exhibited it with success in the most malignant cases of typhus and scarlatina, during several years extensive practice in the Westminster Hospital. See vol. 1, *Page* 290. We should be careful not to apportion its dose in a leaden or pewter spoon. The antiseptic properties of this acid have been long known; Sir Wm. Fordyce relates that a “dry-salter” acquired a large fortune from possessing a secret that had enabled him to send out provisions to India in a better state of preservation than any others of the trade; his secret consisted in adding a small quantity of muriatic acid to the contents of each cask. After a copious evacuation of the bowels, it is in my experience the most efficacious remedy for preventing the generation of worms; for which purpose the infusion of quassia, stronger than that of the Pharmacopœia, is the best vehicle. Dose, ℥v—xx, frequently repeated. It may be here observed that where the permanent influence of an acid is required, a mineral one should be always preferred, as

* This offers a striking example of the confusion produced by the constant changes in chymical nomenclature: in the former editions of this work, the term *Hydro* was prefixed to *Muriatic Acid*, as an epithet expressive of the presence of *water*, whereas the same word is now used to denote the existence of *Hydrogen* as one of its elements.

† Dr. Powell directs only *two* parts of acid; but this is evidently too little, for it appears by Dr. Wollaston’s scale, that 3 parts of salt require 2½ of oil of vitriol for their decomposition; and in addition to this, the oxide of manganese will require a farther addition to convert it into a sulphate.

‡ As Chlorine is by pressure condensable into a liquid, tubes containing a small quantity of it, and hermetically sealed, might be very usefully employed for this purpose, since by breaking off the extremity, the chlorine would instantly assume the gaseous state and diffuse itself through the apartment.

such bodies appear to be beyond the control of the digestive process,* and are incapable of being decomposed by it; see *Form.* 158, whereas on the contrary it seems probable that the organs of assimilation have command over those of a vegetable nature, and generally decompose them. Dr. Marcet has very judiciously noticed this fact in his luminous work on the treatment of calculi, and I have ventured to offer some farther observations upon this subject, which may be of practical value, under the consideration of *Lithonhryptics*, p. 127. **ADULTERATIONS.** *Sulphuric acid* is detected by diluting the acid with six parts of distilled water, and adding a few drops of the muriate of baryta, which occasions a white precipitate if any be present. *Iron*, by saturating a diluted portion with pure carbonate of soda, and adding prussiate of potass, which will indicate its presence by a blue precipitate; or by a solution of ammonia, which, when added slightly in excess, throws down the peroxide of iron of a reddish yellow colour. *Copper*, by the production of a blue colour when supersaturated with ammonia. The yellow tinge of the acid usually met with in commerce, may depend either upon the presence of iron, vegetable extractive, or a small portion of chlorine. This latter body may be recognised by the odour, or by its power of dissolving gold leaf.

ACIDUM, NITRICUM. L.E.D. *Nitric Acid.*

Aqua Fortis.

QUALITIES. A limpid liquid of the specific gravity 1.500, a fluid-ounce of which is equal to about 11 drachms 1 scruple by weight, and ought to decompose of pure limestone an ounce; it emits white fumes of a suffocating odour. *Taste*, extremely acid; it is highly corrosive, and tinges the skin indelibly yellow; an effect which is considerably heightened by the subsequent application of an alkali, so that these agents afford the means of detecting minute portions of animal matter, and were ingeniously employed for such an object by Mr. Hatchett. **CHYMICAL COMPOSITION.** When of the specific gravity 1.500, it contains 74.895 per cent. of dry acid; (whose ultimate elements are one portion of nitrogen and five of oxygen) the complement 25.105 parts is water. It is decomposed with violent action by all combustibles, and when mixed with volatile oils, it causes their inflammation. It boils at 210° , and when its specific gravity is below 1.4, it is strengthened, when stronger than 1.45 it is weakened by ebullition. **USES.** It is principally employed as a pharmaceutical agent; viz. for the preparation of *Argenti Nitras*; *Liquor Ferri Alkalini*; *Hydrargyri Nitroco-oxydum*; *Spiritus Etheris Nitrici*; and *Unguentum Hydrargyri Nitratis*. As an escharotic it has been frequently employed for the destruction of tumours, and is certainly of value where an immediate destruction of diseased parts is required. The method of using the strong nitric acid in such cases is to smear all the sound parts in the immediate vicinity of the ulcer with

* There is a curious illustration of this fact in the German "*Ephemerides*:" the case of a person is described who had taken so much Elixir of Vitriol that his keys were rusted in his pocket, by the transudation of the acid through his skin!

Ung: Resin: Nig: and then to apply pledgets of lint firmly upon the ulcer for a few seconds, by which the whole surface will be deadened, and a deep slough remain, underneath which healthy suppuration, and granulations will ensue.* **ADULTERATIONS.** *Sulphuric acid* may be detected by a precipitate being produced on the addition of nitrate of baryta; in the application however of this test, Mr. Hume has shown that unless this as well as the nitric acid be diluted, a precipitate will occur, although sulphuric acid should not be present; a circumstance which depends upon the barytic salt yielding its water of solution to the acid under examination, and becoming insoluble. *Muriatic acid* is discovered by nitrate of silver, affording a precipitate at first white, but becoming coloured by exposure to light; the nitric acid ought to be perfectly colourless, but to preserve it in such a state it must be closely stopped, and kept in a dark place, or it will soon be converted into nitrous acid.

ACIDUM NITRICUM DILUTUM. L.

Acidum Nitrosum Dilutum. E.D.

Dilute Nitric Acid.

It is much to be regretted that the proportion of water directed for the dilution of the acid, varies considerably in the different pharmacopœias; that prepared according to the Edinburgh and Dublin formulæ, being in strength to that of the present Pharmacopœia of London, as 4 to 1.: *specific gravity*, 1.080; each fluid-drachm contains nearly $8\frac{1}{2}$ grains of the concentrated acid, and saturates 18 grains of crystallized sub-carbonate of soda. **DOSE** $\mathfrak{m}\times$ to $\mathfrak{x}\mathfrak{l}$. The acid is a very powerful antiphlogistic remedy; it has been much extolled in diseases of the liver, and in syphilis. Mr. Pearson however observes that we ought not to rely upon it in any form of lues venerea, although it may be often serviceable in restraining the progress of the disease when an impaired constitution or other circumstances render the exhibition of mercury improper: when sufficiently dilute, it forms an excellent lotion for old indolent ulcers. It proves also expectorant, see *Form.* 139, 140; and it is occasionally used with success for the purpose of counteracting the consecutive effects of opium. See *Form.* 16.

ACIDUM NITROSUM. E.D. *Nitrous Acid.*

QUALITIES. A liquid emitting fumes of a flame-red colour, and of a very pungent and remarkable odour. The acid is either blue, green,

* Nitric acid may be considered as one of the most efficient agents in our possession for exciting prompt vesication. For this purpose, we believe it was first used in the epidemic cholera of the East Indies, and the success which attended it in that fatal disorder, suggested its application in a variety of other diseases. The best mode of using it is to rub the surface, intended to be vesicated, with the pure acid, and as soon as pain is produced to neutralize the acid by washing the part with a solution of salt of tartar. If the object is to continue the irritation, a common blister may be laid upon the part. This mode of vesicating is more especially serviceable where the condition of the patient does not admit of venesection. *Ed.*

straw-coloured, clear orange yellow, or deep orange yellow, according to the proportion of nitrous acid gas* with which it is charged. **CHYMICAL COMPOSITION.** This acid is improperly denominated *Nitrous*, for it is nitric acid, holding nitrous acid gas loosely combined; by dilution this last constituent is disengaged, and the acid, after passing through a succession of different colours, becomes pure nitric acid; the application of a gentle heat effects the same changes.

ACIDUM SULPHURICUM. L.E.D.

Sulphuric Acid.

Oil of Vitriol, Vitriolic Acid.

QUALITIES. *Form*, a thick liquid of an oily consistence, specific gravity 1.85; a fluid-ounce weighs a fraction of a grain more than fourteen drachms. *Colour* none, but it acquires a brown tinge from the smallest portion of carbonaceous matter; mere exposure to the air is sufficient for this purpose, in consequence of the acid disorganizing and carbonating the vegetable and animal matter suspended in the atmosphere; it is therefore evident that bottles in which it is preserved ought not to have stoppers of cork, but those of glass. **CHYMICAL COMPOSITION.** Like the other mineral acids, it has never been obtained in an insulated state without water: according to Davy, the composition of the strongest acid may be thus expressed: sulphur 30, oxygen 45, water 17. It has a very powerful affinity for water, and produces when mixed with it a very considerable heat; exposed to the atmosphere it imbibes at least seven times its own weight of water, and so rapidly as to double its weight in a month; when of the specific gravity 1.85, it arises in vapour at about 550°, and distils unaltered, whereas weaker acids lose water by being boiled, and are brought to that degree of concentration; when diluted with 12 or 13 per cent. of water, an acid results of the specific gravity 1.780, and in this state of dilution it boils at 435°, and freezes sooner than water; a knowledge of this curious fact suggests to the prudent chymist an important precaution; Mr. Parkes, in his *Chymical Essays*, vol. ii. relates the occurrence of a terrible accident which happened in consequence of this circumstance not having been attended to.—“Carboy after carboy burst by the expansion of the acid in the act of freezing, and had not the packed carboys that remained been immediately immersed in tepid water, not a single one would have escaped the general wreck.”

ADULTERATIONS. The ordinary acid of the shops contains in general 3 or 4 per cent. of saline matter, which consists of about twothirds of sulphate of potass, and onethird of sulphate of lead. Dr. Ure observes, that even more is occasionally found, in consequence of the employment of nitre to remove the brown colour given to the acid by carbonaceous matter; the amount of adulteration, he observes, may be readily determined by evaporating a definite weight of the acid in a small capsule of platinum; these impurities however in a medical point of view

* *Nitrous acid gas* is a combination of nitrous gas and oxygen.

are immaterial, since they are at once separated by dilution, but in a commercial sense they deserve attention, as their presence considerably increases the specific gravity of the acid. Dr. Ure is of opinion that genuine commercial acid should never exceed 1.8485, and that any density beyond this is the effect of saline combination. *Journal of Science and the Arts*, No. 7.

ACIDUM SULPHURICUM DILUTUM. L.E.D.

Dilute Sulphuric Acid.

By the dilution of this acid two objects are accomplished,—it is purified, and its dose is more easily apportioned: but it is a circumstance of regret that the strength of this preparation should so materially vary in the different Pharmacopœias.

After the acid is diluted, the sediment ought to be carefully removed, and the water employed for the purpose should be distilled, for although it be in its purest natural state, it will nevertheless contain impregnations capable of affecting the acid. **USES.** In addition to the antiseptic and refrigerant virtues which it possesses in common with the other mineral acids, it has astringent properties that render it a most valuable medicine, especially in weakness and relaxation of the digestive organs, in colliquative sweats, and in internal hæmorrhage; in Epistaxis and Hemoptysis it was Sydenham's favourite remedy; on the same account, when sufficiently dilute, it has been successfully used as a collyrium in the atonic stages of ophthalmia, and as an injection in protracted gonorrhœa. Dose $\text{℥} \text{ x to } \text{xl}$. the quantity of strong sulphuric acid in any given quantity of the dilute may be found by the Dynameter. To prevent it from injuring the enamel of the teeth it may be sucked through a quill, and the mouth should be carefully washed after each dose. The *Infusum Rosæ* furnishes an elegant vehicle for its administration. See *Form.* 40. **OFFICIAL PREPARATIONS.** *Acidum Sulphuricum Aromaticum.** *E. Infusum Rosæ.* L.

ACIDUM TARTARICUM. L.

Tartaric Acid.

QUALITIES. *Form,* Crystals of considerable size, whose primary form is an oblique rhombic prism; they do not deliquesce when exposed to the air, but melt at a heat a little exceeding 212° *Taste,* very acid and agreeable. **SOLUBILITY.** Water at 60° dissolves about one fifth of its weight, and when boiling, a much greater proportion. The solution, which, if saturated, has the specific gravity 1.230, acquires, when dilut-

* **ELIXIR OF VITRIOL.** The preparation sold under this name is the Acid Sulph: Aromat: E. and is perfectly ætherial in its nature. It is a grateful medicine. A spurious article is often sold for it, which is nothing but the diluted acid, coloured by the addition of a tincture.

I will take this occasion to state, that the term Elixir is of Arabian origin, viz. Elechschr, or Elikscr, i. e. an Essence, or pure mass without any dregs.

ed, like that of most vegetable acids, a mouldy pellicle by keeping. The saturating power of crystallized tartaric acid is almost exactly equal to that of crystallized citric acid, the atomic weight of the former being 76, and that of the latter 75. **CHYMICAL COMPOSITION.** When uncombined with water, as it exists in tartrate of potass, it is composed of 5 atoms of oxygen, 3 atoms of hydrogen, and 4 atoms of carbon. The crystals consist of 1 atom of acid and 1 of water. **INCOMPATIBLE SUBSTANCES.** Alkalies, Earths, and their carbonates; the salts of lime and lead. The solutions of the salts of potass are converted by it into bi-tartrate, or super-tartrate. **MEDICINAL USES.** It is introduced into the Pharmacopœia as a cheap and efficient substitute for the citric acid. It is also used in the preparation of *Sodaic powders*, *Seidlitz powders*, &c. **ADULTERATIONS.** When carelessly prepared it will contain sulphuric acid, to detect which, let a portion be dissolved in distilled water, and a solution of acetate of lead be added. A precipitate will appear, which, if the acid be pure, will be entirely redissolved by a few drops of acetic acid, or pure nitric acid. If any portion remain undissolved, sulphuric acid is the cause. Muriate of Baryta also, when sulphuric acid is present, but not otherwise, gives a precipitate insoluble by an excess of muriatic acid.

ACONITI FOLIA. L.E.D. (*Aconitum Napellus*.*) *Aconite.*

Woolfsbane, Monkshood.

QUALITIES. *Taste*, moderately bitter, and acrid, leaving in the mouth a painful sensation of heat and roughness, followed by numbness in the gums and lips which continues for two or three hours. *Odour*, faint and narcotic; their peculiar properties are considerably deteriorated by drying. **CHYMICAL COMPOSITION.** M. Brandes has ascertained that the narcotic principle of this plant is a peculiar alkali, to which he has given the name *Aconita*.† **SOLUBILITY**, water and alcohol only imperfectly extract their virtues. **MEDICINAL USES.** It is narcotic, and occasions, in over-doses, nausea, vomiting, vertigo, hyper-catharsis, cold sweats, convulsions, and death; effects which entirely depend upon its action on the brain. It was first administered in 1702, by *Stöerck*, of Vienna, in chronic rheumatism, gout, schirrus, and paralysis; more lately it has been employed in scrofula, cancer, and intermittents, and it is said with much effect. On account of the variable strength of the leaves they can hardly be given with safety and effect; the extract (*which see*,) presents the more eligible form of exhibition. The leaves are, however, sometimes given in the form of powder, generally combined with some mercurial alterative, or with antimonials, camphor, and other diaphoretics. **DOSE** gr. i—x. **OFFICIAL PREP:** *Extractum Aconiti.* L. E.

* The Dublin college, on the authority of Willdenow, admits the *A. Neomontanum*, as the species of Aconite which has always been used in medicine; although the other colleges, in consequence of a botanical error of *Stöerck*, who introduced it into practice, direct the *A. Napellus*.

† See note under the article opium.

ADEPS PRÆPARATA. L. ADEPS SUI SCROFÆ, *vulgo Axungia Porcina*. E. ADEPS SUILLUS PRÆPARATUS. D.

*Prepared Hog's Lard. Fat. Axunge.**

QUALITIES. *Consistence*, soft or nearly semifluid. *Odour and Taste*, none: at 97° it melts. CHYMICAL COMPOSITION. It consists of two distinct bodies which appear to exist together in a state of mechanical mixture, viz. *Stearin*, (from *στέαρ* tallow) which is white, brittle, and in appearance somewhat resembling wax; and *Elain* (from *ελαιον*, oil) very similar to vegetable oil in appearance, and is liquid at 59°. According to the experiments of Braconnot, the proportion of *Elain* is to that of *Stearin*, in hog's lard, as 62 : 38. SOLUBILITY. It is insoluble in water and alcohol; with the alkalies it unites and forms soaps. INCOMPATIBLE SUBSTANCES. *Extracts, Spirituous Preparations, Tinctures, and Infusions*, are incapable of uniting perfectly with lard, without some intermedium; the following substances on the contrary are capable of contracting with it a most intimate union. 1. *All dry powders*, whether of a vegetable or mineral nature. 2. *Fixed and Volatile Oils*. 3. *Balsams*. 4. *Camphor*. 5. *Soaps*. It is principally employed in the formation of ointments, plasters, and liniments.

ÆRUGO. L. D. (Sub-acetas Cupri) SUB-ACETIS CUPRI. E.
Impura.

Verdigris.

QUALITIES. *Form*, a dry mass composed of minute crystals, not deliquescent; *Colour*, bluish green. CHYMICAL COMPOSITION. Several constituents enter into its composition, viz. Acetate and sub-acetate of copper, carbonate of copper, and copper partly metallic and partly oxidized; it contains also the stalks of grapes and other extraneous substances. SOLUBILITY. Boiling water dissolves it in part, and produces in it a chymical change, by transforming one portion of the sub-acetate into the soluble acetate, and another into an oxyd of copper, which is precipitated; with cold water this substance demeans itself differently, the acetate is dissolved by it, whilst that portion which is in the state of sub-salt remains suspended in the form of a fine green powder. Vinegar converts all the *Ærugo* into a soluble acetate, this liquid therefore ought never to be employed for favouring vomiting in cases where an overdose has been swallowed, for the reasons stated in preceding part of this work, p. 139. Sulphuric acid poured on powdered *verdigris* decomposes it with effervescence, and vapours of acetic acid are disengaged. It appears from the experiments and observations of Duval and Orfila, that sugar exercises a chymical action on it, by which its solubility is diminished, and that on this account it acts as a specific against its poisonous effects. USES. It is so uncertain and violent in its operation that it is rarely em-

* Axunge, from its being used as the grease of wheels, ab Axe rotarum quæ unguntur.

ployed, except externally,* when its acts as a powerful detergent, and mild escharotic; and in the form of ointment, is a valuable application for many cutaneous affections, especially the aggravated kinds of Tetter. **OFFICIAL PREPARATIONS.** *Ærugo Præparata*, D. *Linimentum Æruginis*. L. D. **ADULTERATIONS.** There is a spurious article sold under the name of *English Verdigris*, which consists of sulphate of copper, triturated with acetate of lead; and to make the fraud still more complete, the soft mass is mixed with the stalks of Raisins.

ÆTHER SULPHURICUS RECTIFICATUS. L.

Rectified Sulphuric Æther.

QUALITIES. A colourless liquid of specific gravity 739°. *Odour*, pungent and fragrant; it is highly volatile, and when perfectly free from alcohol it boils at 98°; it is extremely inflammable, a circumstance which should be remembered when it is poured from one vessel to another by candle light. **CHYMICAL COMPOSITION.** When pure it consists of oxygen, hydrogen, and carbon; the rectified æther however still contains some water and alcohol, for Lovitz obtained an æther of 632. **SOLUBILITY.** One part requires for its solution ten of water; with alcohol and ammonia it unites in every proportion. **SOLVENT POWERS.** It is one of the most powerful solvents known in vegetable chymistry, as it dissolves balsams, resins, gum-resins, wax, camphor, extractive, &c.; it takes up about a twentieth of its weight of sulphur, but it exerts no solvent power upon the fixed alkalies. **FORMS OF EXHIBITION.** In any liquid vehicle, if in decoctions or infusions, they should be previously cooled. See *Formulae* 20, 22, 23. **MEDICAL USES.** It is highly valuable as a diffusible stimulant, narcotic, and antispasmodic. **DOSE**, f 3ss to f 3ij, which, in order to produce the full effect of the remedy, must be repeated at short intervals. Æther, independent of such virtues, has another valuable property consequent upon its rapid evaporation, that of producing cold and dryness; it is therefore, when externally applied and allowed to evaporate, a most powerful refrigerant, and has proved valuable in scalds or burns, in facilitating the reduction of strangulated hernia, and in diminishing excessive circulation in the brain; if however it be so confined, that its rapid evaporation is prevented, a very opposite effect is produced, and it proves stimulant, rubefacient, and even vesicatory. With regard to the other property incidental to it, that of producing dryness, I am not aware that it has hitherto been applied to any pharmaceutical purpose; the fact may be satisfactorily shown by a very simple experiment,—by rinsing a phial with æther, to the interior of which drops of water obstinately adhere, when by exposing it to a current of air, it will be completely dry in a few minutes. It may be noticed in this place that a mixture of sulphuric and muriatic æthers evaporates instantaneously, and produces a degree of cold considerably below 0 of Fahrenheit. **OFFICIAL PREPARATIONS.** *Spiritus Æther: Sulph: L.* *Spir: Æth: Sulph: comp: L.* *Spir: Æth: Aromat: L.* **ADULTERATIONS and IM-**

* DR. SMELLOME'S OINTMENT FOR THE EYES. It consists of half a drachm of Verdigris finely powdered and rubbed with oil, and then mixed with an ounce of yellow Basilicon, (*Ceratum Resinæ*, P. L.)

PURITIES. Its specific gravity affords the best indication of its purity; *Sulphuric Acid* may be detected by a precipitation on the addition of a solution of baryta, and to its reddening the colour of litmus; *Alcohol*, by its forming with phosphorus a milky instead of a limpid solution. M. Gay Lussac has observed that when kept for a considerable time without disturbance, it undergoes spontaneous decomposition, and that acetic acid, perhaps some alcohol, and a particular oil, are produced from it.

ALCOHOL.* L.D. *Alcohol. Ardent Spirit.*

QUALITIES. A transparent, and colourless liquid of the specific gravity .815; it has not hitherto been rendered solid by any diminution of temperature; it boils at 176° , and if water be added, its boiling point is proportionably raised; hence, says, Dr. Henry, the temperature at which it boils is not a bad test of its strength; it is combustible, and burns with a blue flame, leaving no residue. **CHYMICAL COMPOSITION.** Alcohol, in a state of complete purity, consists of carbon, hydrogen, and oxygen, in proportions not hitherto determined with accuracy; this preparation, however, contains 7 per cent. of water; Lovitz and Saussure succeeded in obtaining it at a specific gravity of .791, which may be considered as nearly pure. Alcohol unites chymically with water; and caloric is evolved during this union; the quantity of alcohol and water in mixtures of different specific gravities, may be learned from Mr. Gilpin's tables, *Philosophical Transactions*, 1794, or *Nicholson's Journal*, 4to. vol. 1. The Edinburgh Pharmacopœia has no process for the preparation of alcohol, but it most incorrectly assigns the title to that which is the "Rectified Spirit" of the other Colleges. **SOLVENT POWERS.** Alcohol dissolves soap; vegetable extract; sugar; oxalic, camphoric, tartaric, gallic, and benzoic acids; volatile oils; resins, and balsams; it combines also with sulphur, and the pure fixed alkalies, but not with their carbonates: for its other habitudes, and applications, see *Spiritus Rectificatus*.

ALLII RADIX. L.E.D. *Allium Sativum.*

Garlic.†

QUALITIES. This bulbous root has when recent a foetid smell, and acrid taste, which are extracted by watery infusion; by decoction they

* Alcohol is a term of Alchymical origin, and signified the pure substance of bodies, separated by sublimation from the impure particles, as *Alcohol Antimonii*, &c.

† Garlic, leeks, and onions constitute a tribe of culinary vegetables that has undergone great vicissitudes in reputation: amongst the Egyptians the onion and leek were esteemed as divinities, thus Juvenal,

"O sanctas gentes quibus hæc nascuntur in hortis
NUMINA!"

while by the Greeks, garlic was detested, although their husbandmen had been from the most remote antiquity in the habit of eating it, which Æmilius Macer explains by

are early lost; by expression, the root furnishes almost one fourth of its weight of a limpid juice, and by distillation, an odorous, acrid, essential oil is procured, in which the existence of sulphur may be detected. Garlic has a considerable analogy to squill and onion, and like them, exerts a diuretic, diaphoretic, expectorant, and stimulant operation; (see page 106.) It is a very common domestic remedy for the expulsion of tænia, and it is undoubtedly of advantage in such cases; it is usually administered in the form of a decoction, with milk, on an empty stomach; it is however but rarely used in modern practice, as it possesses no superiority over remedies less nauseous and objectionable; the bruised root, externally applied, is highly stimulant, and rubefacient. Sydenham speaks highly of the application of garlic to the soles of the feet, as a powerful means of producing revulsion from the head. **OFFICIAL PREPARATION.** *Syrupus Allii.* D.*

ALOES EXTRACTUM. *Aloes.*

There are three species met with in the shops, viz.

- | | | |
|---------------------|----------------------------------|------------------------------|
| 1. ALOE SPICATA. L. | Socotorina, D. | } Socotrine Aloes. |
| PERFOLIATA. E. | | |
| 2. ALOE VULGARIS.† | L. Hepatica, E.D. | } Common or Barbadoes Aloes. |
| | | |
| 3. ALOE CABALINA. | Fetid, Cabaline, or Horse Aloes. | } Employed only by Farriers. |
| | | |

QUALITIES. The above varieties of aloe differ in their purity, and likewise in their sensible qualities; the *Socotrine* is the purest, it is in small pieces of a reddish brown colour; the *Barbadoes* is in large masses, of a lighter colour, and having an odour much stronger and less pleasant; the *Cabaline* is still more impure and less powerful. All the kinds are characterized by an intensely bitter taste, which, in the *Socotrine*, is accompanied by an aromatic flavour. **CHYMICAL COMPOSITION.** In this

supposing that its strong odour was useful in driving away the venomous serpents and insects by which they were infested.

Horace alludes to this custom in his 3d Epode, which he composed in consequence of having been made violently sick by garlic at a supper with Macænas.

“Cicutis Allium nocentius
O dura Messorum ilia!”

The most powerful antidotes to the flavour of this tribe of vegetables are the aromatic leaves and seeds of the *UMBELLIFERÆ*; thus the disagreeable odour of a person's breath after the ingestion of an onion is best counteracted by parsley; and if leek or garlic be mixed with a combination of aromatic ingredients, its virulence will be greatly mitigated and corrected; nor does the fact seem to have escaped the observation of the husbandman in Virgil,

“Allia, Serpyllumque, herbas contundit olentes.”

Eclog. 2. line 11.

And the fact itself offers an additional illustration of the important principle of combination, discussed at p. 152 of this work.

* **TAYLOR'S REMEDY FOR DEAFNESS.** Garlic infused in oil of almonds, and coloured by alkanet root.

† Dr. Sibthorpe, in his *Flora Græca*, states that the *Aloe Vulgaris* is the true *Aloe* described by Dioscorides.

there appears to be some obscurity : M. Braconnot (*Ann. Chim. tom. 68.*) conceives it to be a substance, *sui generis*, which he terms "*bitter resin*," while others regard it as composed of resin, gum, and extractive, the proportions of which are supposed to vary in the different species, but that their peculiar virtues reside in the extractive part. **SOLUBILITY.** It is to the slowness with which aloe undergoes solution in the *primæ viæ*, that it is indebted for the medicinal properties which distinguish this substance ; by boiling water it is dissolved, but on cooling a precipitation ensues, and by long decoction it becomes quite inert ; weak acids dissolve it more abundantly than water, but proof spirits is the most perfect solvent : its solubility is increased by the addition of alkaline salts and soaps, but by such a combination it undergoes a material change in its medicinal properties ; the bitterness is diminished, its purgative effects impaired, and it ceases to operate specifically upon the large intestines, a fact so far valuable, as it enables us in certain cases to obviate its irritating action upon the rectum. **MEDICINAL USE.** Aloe is a bitter stimulating purgative, emptying the large intestines, without making the stools thin ; it likewise warms the habit, quickens the circulation, and promotes the uterine and hemorrhoidal fluxes. **DOSE**, gr. v.—xv. No greater effect is produced by a large dose than from one comparatively moderate ; its tendency, however, to irritate the rectum renders it in many cases, an objectionable remedy ; and its sympathetic action on the uterus, may occasionally produce mischief, in irritable habits, while in other states it may, for reasons equally obvious, prove beneficial. **FORMS OF EXHIBITION.** The form of pill should be preferred on account of its extreme bitterness, as well as being, for the reasons above mentioned, the one most likely to fulfil the intention of its exhibition ; for in addition to what has been stated in the first part of this work, on the important influence of solubility, it may be here observed that since the aloe does not undergo solution in the stomach, it is admirably adapted for the basis of remedies intended to obviate constitutional costiveness, for in our endeavours to supply the deficiencies of nature by the resources of art, we should at least attempt to imitate the modes of her operation ; the natural stimulus of the intestines, the bile, is poured into them below the stomach, and whenever it regurgitates into that organ it produces disease ; so it happens with our cathartic medicines, and unless we so modify their solubility that their operation cannot commence until after their passage through the stomach, we shall find that we only increase the evil we are endeavouring to obviate, and that, in addition to the torpor of the intestinal canal, we shall induce the stomach to participate in the disease, or excite a morbid fretfulness of that organ which will be attended with the most distressing symptoms.* See *Formulae* 12, 13, 79, 80, 81. Aloes

* **ANDERSON'S PILLS** consist of the Barbadoes Aloes with a proportion of Jalap, and Oil of Aniseed.

HOOPER'S PILLS.—Pil. Aloes cum Myrrha, (Pil. Rufi) Sulphate of Iron, and Cinnamon Bark, to which is added a portion of Ivory Black.

DIXON'S ANTIBILIOUS PILLS.—Aloes, Scammony, Rhubarb, and Tartarized Antimony.

SPEEDIMAN'S PILLS.—Aloes, Myrrh, Rhubarb, Extract of Chamomile, and some Essential Oil of Chamomile.

DINNER PILLS.—**LADY WEBSTER'S, or LADY CRESPIGNY'S PILL.** These popular pills are the "*Pilulæ Stomachicæ*," vulgo, "*Pilulæ ante cibum*" of the *Codex Medicamentarius Parisiensis*. Editio Quinta, A. D. 1758. viz. R. Aloes optimæ ʒvj,

in combination with assafœtida furnishes an eligible purgative in the dyspepsia of old persons ; it is also well calculated to obviate the costiveness so generally produced by Opium, (*Form* : 11, 12, 13.) See also page 166. OFFICINAL PREPARATIONS. *Pulv* : *Aloes comp* : L. *Pil* : *Alœs cum Myrrha*. L.E.D. *Pil* : *Alœs comp* : *Pil* : *Alœs cum Assafœtida*. E. *Pil* : *Alœs cum Colocynthide*. E. *Pil* : *Cambogiæ comp* : (B.M.) L. *Pil* : *Rhei comp* : (F.) E. *Pil Scammon, cum Aloes*. D. *Decoctum Aloes comp* : L. *Extractum Alœs purificatum*. L. D. *Extractum Colocynthidis comp* : L. D. (F.) *Tinct* : *Alœs* L.E.D. *Tinct* : *Alœs comp* : L.E.D. *Tinct* : *Alœs Ætherea*, E. *Tinct* : *Benzoin comp* : (G.) L.E.D. *Tinct* : *Rhei et Alœs* E. *Vinum Alœs*. L.E.D. ADULTERATIONS. It is frequently adulterated with common resin, but the fraud more generally committed is that of mixing with, or substituting the inferior species for the Socotrine, but the *Barbadoes Aloes* may, independent of its want of aromatic flavour, be distinguished from the *Socotrine* by a simple test, for the latter dissolves entirely in boiling water and alcohol, whereas the former, when treated in a similar manner, leaves a considerable residue ; sometimes the *Horse Aloes* is made to appear so bright and pure, as not to be easily distinguished by the eye even from the *Socotrine*, but its rank odour, of which no art can divest it, will readily betray the fraud.

ALUMEN. (*Super-sulphas Aluminæ et Potassæ*) Sulphas Aluminæ. E.

Alumen. D. Alum.

QUALITIES. *Form*, octohedral crystals, whose sides are equilateral triangles ; they are slightly efflorescent. *Taste*, sweet, rough, and acidulous. CHYMICAL COMPOSITION. It is a triple, or sometimes a quadruple salt, with excess of acid, consisting of sulphuric acid and alumina, with potass, or ammonia, or frequently both of them ; the nature of the alkali however does not in the least appear to affect the properties of alum, although it produces a crystallographic modification ; for where potass is present the summit of the crystal will exhibit a truncation. Dr. Ure has lately produced alum with soda, and the combination differs from common alum only in its greater degree of solubility, a property

Mastiches, et Rosarum rubrarum aa ʒij. Syrupi de Absinthio q, s, ut fiat massa,—the mass is divided into pills of 3 grains each. The operation of this pill is to produce a copious and bulky evacuation, and in this respect experience has fully established its value. It is difficult to explain the *modus operandi* of the Mastiche, unless we suppose that it depends upon its dividing the particles of the Aloes, and thereby modifying its solubility.

FOTHERGILL'S PILLS.—Aloes, Scammony, Colocynth, and Oxide of Antimony.

PETER'S PILLS.—Aloes, Jalap, Scammony, and Gamboge, equal part ʒij—Calomel ʒi.

RADCLIFFE'S ELIXIR.—R. Aloes, Socot : ʒvi, Cort : Cinnamon et Rad : Zedoar : aa ʒss—Rad : Rhei ʒi—Cocinel : ʒss—Syrup : Rhamni f ʒij—Spirit : Tenuior : oj—Aque Puræ f ʒv.

BEAUME DE VIE, see Decoct : Aloes compositum.

THE ELIXIR OF LONGEVITY, of Dr. Jernitz of Sweden. This is an aromatic tincture, with Aloes.

which at once recommends it to the attention of the pharmacist and physician. **SOLUBILITY.** A fluidounce of cold water dissolves 30 grains, but if boiling four drachms; it is insoluble in alcohol. **INCOMPATIBLE SUBSTANCES.** *Alkalies* and *alkaline salts*, after neutralizing the excess of acid, precipitate the alumine. It is also decomposed by *carbonate* and *muriate of ammonia*, *carbonate of magnesia*, and *tartrate of potass*, by *lime-water*, *acetate of lead*, and the *salts of mercury*, as well as by many vegetable and animal substances, especially *galls* and *kino*. It is on this account very injudicious to combine alum with any vegetable astringent with a view to increase its virtues; thus the "*Pulvis Sulphatis Aluminæ compositus*" of the Edinburgh college, is less powerful than any of the ingredients of which it is composed; and the addition of alum to the decoction of bark, undoubtedly diminishes its efficacy as an astringent injection. **MEDICINAL USES.** Alum is internally a powerful astringent in hæmorrhages and inordinate fluxes, and is externally useful for repellent and astringent lotions, gargles, and collyria. Dioscorides and Hippocrates praised its effects as a lotion in various kinds of ulcers, and particularly in sores of the mouth, and in spongy, swelled gums. Van Helmont was the first person who employed alum in uterine hæmorrhage, and the success of the practice very considerably enhanced his reputation. *Boerhaave's* astringent powder for the ague consisted of *Alum* and *Nutmeg* with the addition of *Armenian bole*. Dose, gr. x. In large doses it is liable to excite nausea, and to act upon the bowels. Nutmeg or some aromatic should therefore be joined with it. **FORMS OF EXHIBITION.** In solution, or in substance made into pills with extract; (*Form: 53, 56,*) it is sometimes given with advantage in the form of whey (*Alum-whey—Serum Aluminosum*) made by boiling 3ij with a pint of milk, and then straining, the dose of which is a wine glass full; (*Form: 54.*) By briskly agitating a drachm of alum with the white of an egg, a coagulum is formed, (*Alum curd of Riverius; Albumen Aluminosum*) which is serviceable in some species of ophthalmia, when applied between two pieces of thin linen rag. As alum is not decomposed by sulphate of lime, hard water may be safely used for its solution. It has the effect of retarding, and in some instances of preventing, the acetous fermentation in vegetables; thus when added to common *paste* it prevents its becoming sour; animal substances, as *glue*, are preserved by it in a similar manner. It has also the property of clearing turbid water, wine, and spirituous liquors, for which purpose it is extensively employed. **OFFICIAL PREPARATIONS.** *Liquor Alum: co. L. Pulv: Alum: co. E.*

ALUMEN EXSICCATUM, L. Ustum. D. Dried Alum. By the action of heat alum undergoes watery fusion, yields its water of crystallization, and loses more than one third of its weight; if the heat be too intense, or long continued, it is deprived of a great part of its acid. It has been recommended in doses of a scruple, in colic, when it has been said to operate gently upon the bowels, and to relieve the pain: I have myself experienced this good effect when the colic has been produced by the action of lead: Dr. Grashuis, a Dutch Physician, first recommended its use in Cholica Pictonum. The preparation however is principally used as an external application, having a degree of escharotic power, which renders it serviceable in venereal chancres, as well as in other ulcers having weak and spongy granulations; it is also very frequently employed to destroy fungous excrescences, but it should be remembered that, as it owes such

power to an excess of acid, unless it be carefully prepared, it must be inefficient. It ought to redden syrup of violets.

ALUMEN RUPEUM. *Roche or Rock Alum.* This variety was originally brought from Roccha, formerly called Edessa, in Syria, in fragments of about the size of an almond, covered with an efflorescence of a pale rose colour; that however which is now sold under this name is common English alum, artificially coloured. It is unimportant.

ALUMEN ROMANUM. *Roman Alum* is in irregular octohedral masses, powdery on the surface; it is the purest kind, and contains no ammonia in its composition.

AMMONIACUM. L.E.D. (*Heracleum Gummiferum.*)

Ammoniac.

QUALITIES. *Form*, masses composed of fragments, of tears, yellow on the surface, and white within; *Taste*, a nauseous sweet, followed by a bitter flavour; *Odour*, faint but not unpleasant. *Specific gravity*, 1.200.

CHEMICAL COMPOSITION. Gum-resin, gluten, and some volatile matter.

SOLUBILITY. It is partly soluble in water, vinegar, alcohol, æther, and in the solutions of the alkalies; when triturated with water a milky liquor is formed, which is a solution of gum holding the resin in suspension, and if the yolk of an egg be employed the mixture is more permanent; water appears to be its proper solvent. **USES.** Stimulant antispasmodic, and expectorant: in large doses gently purgative and sometimes diuretic; after the exhibition of smart purgatives, in combination with rhubarb, it proves valuable in mesenteric affections by correcting the viscid secretion of the intestines; dissolved in nitric acid, it is said to prove an excellent expectorant in cases where large accumulations of purulent or viscid matter exist with feeble and difficult expectoration.

See *Form*: 140. **FORMS OF EXHIBITION.** In solution, see *Mist: Ammoniac*: it may also be given when dissolved in the *Liquor ammoniac acetatis*; ʒij of the former may be dissolved in ʒiij of the latter; or it may be exhibited in pills with bitter extracts, myrrh, and other gum-resins; if rubbed with camphor a mass is at once produced very suitable for pills; vinegar renders it soft, and adapts it for plasters. **DOSE**, grs. x to xxx. **OFFICIAL PREPARATIONS.** *Mist: Ammoniac: L.D. Pil: Scillæ co: L. E. (B) Emplast: Ammoniac: L. Emplast: Gummos: E. Emplast: Ammoniac cum Hydrargyro. L.* **ADULTERATIONS.** Two varieties are met with in the market, that in tears, *gutte ammoniaci*, ought to be white, clear, and dry; and that in lumps, *lapis ammoniaci*, which sells for one third the price of the former, being very impure, is generally adulterated with common resin, from which it may be purified by softening the mass in a bladder which is immersed in boiling water, and straining it while fluid.

AMMONIÆ SUBCARBONAS. L. Carbonas Ammoniaë. E.D.

Sub-carbonate of Ammonia.

QUALITIES. *Form*: white, semi-transparent masses, of a striated or crystalline aspect, which on exposure to air effloresce; *Odour*, pungent

and peculiar; *Taste*, acrid but cooling. **CHYMICAL COMPOSITION.** It will be found to vary materially in its composition according to the temperature employed for its preparation; the quantity of alkali varying from 20 to 50 per cent.* Mr. Phillips considers the *Sub-carbonate* of ammonia to be a *Sesque-carbonate*, composed of 3 atoms of carbonic acid, 2 atoms of ammonia, and 2 of water; or that it is a definite compound of *Carbonate* and *Bi-carbonate*, one atom of each, with two atoms of water; one hundred parts, by experiment, consist of 54.2. *carb : acid*, 29.3 *Ammonia*, and 16.5 *water*; if we consider it as a *Sesque-carbonate*, its constitution, according to Dr. Wollaston's scale, will be 55.72 *Carbonic Acid*, 29 *Ammonia*, 15.28 *water*. **SOLUBILITY.** According to Duncan it is soluble in twice its weight of cold water; Mr. Philips states four times; the mean of these will be found nearly correct. Its solubility however is increased by increase of temperature, but when dissolved in boiling water it effervesces, and undergoes a partial decomposition; it is quite insoluble in alcohol, and hence on the addition of spirit to a strong solution, a dense coagulum is produced. **INCOMPATIBLE SUBSTANCES.** It is decomposed by *acids*, *fixed alkalies*, and their *sub-carbonates*, *lime*, *solution of muriate of lime*, *magnesia*, *alum*, *supertartrate of potass*, and all the *acidulous salts*, *sulphate of magnesia*, *acetate*, *sub-muriate*, and *oxy-muriate of mercury*, *acetate*, and *sub-acetate of lead*, and the *sulphates of iron and zinc*. If it be added to decoctions and infusions they must be previously cooled. **FORMS OF EXHIBITION.** Since by exposure to air its virtues are impaired, it ought not to be kept in powdered mixtures; in the form of pill it is preserved much longer, especially if it be combined with some vegetable extract. **USES.** It is stimulant, antispasmodic, diaphoretic, powerfully antacid, exceeding in this respect the fixed alkalies, and in large doses it is emetic. It is highly useful as a stimulant in those gastric affections which supervene habits of irregularity and debauchery; combined with opium it affords a powerful resource in protracted diarrhoea attended with debility of the alimentary canal; and in cases of muscular atony so frequently witnessed, as the *sequela* of chronic rheumatism, ammonia, in large doses, offers the best remedy; I have moreover witnessed the beneficial effects of this remedy in hoarseness depending upon relaxed states of the throat. In typhus fever it has been particularly recommended by Huxham, Pringle, and many other physicians, and some have considered it superior to any other stimulant upon such occasions. It is also useful in syncope and hysteria, in the form of smelling salts; with respect to its application for making saline draughts, see *Acid: Citricum*: **DOSE**, grs. v to ʒj: to produce emesis ʒss. See *Form.* 48, 49, 83, 152. **OFFICINAL PREPARATIONS.** *Liquor Ammoniae sub-carbonatis*, L. *Liquor Ammoniae acetatis* (I) L.E.D. *Liniment: Ammoniae Sub-carbonatis*. L. *Cuprum Ammoniatum*, (I) L.E.D. **ADULTERATIONS.** This salt ought to be entirely volatilized by heat; if any thing remain it may be considered impure; it ought also to be free from all fetor; should this not be the case it may be corrected by subliming it in conjunction

* **GODFREY'S SMELLING SALTS.** This highly pungent preparation is obtained by resubliming the common sub-carbonate of ammonia with pearlash, and a proportion of rectified spirit. The sub-carbonate of potass in this case, abstracts a fresh portion of carbonic acid from the ammoniacal salt. Its atomic composition has not yet been ascertained, but it will probably be found to consist of equal atoms of carbonic acid and ammonia, and must therefore be a true Carbonate.

with powdered charcoal; there is at present a large quantity of this impure article in the market, which has been manufactured from the residue sold by the gas light companies.* When long exposed to the air, it becomes opaque and friable, and the excess of ammonia, upon which its odour depends, escapes, carbonic acid is absorbed, and an inodorous bicarbonate remains, consisting of carbonic acid 55.70, Ammonia 21.52, and water 22.76, or 2 atoms of carbonic acid, 1 atom of ammonia, and 2 atoms of water.

AMMONIÆ MURIAS. L.E. Sal Ammoniacum. D. vulgo *Sal Ammoniac*.

QUALITIES. *Form*, dense striated concavo-convex cakes which are persistent in the air, or crystallized conical masses; in this latter form it generally contains other salts, especially muriate of lime, which render it deliquescent. *Taste*, bitter, acrid, and cool. **CHYMICAL COMPOSITION.** In consequence of the present unsettled opinions respecting the nature of muriatic acid and ammonia, and the changes which they undergo by combination with each other, the composition of this salt is involved in some obscurity. According to Dr. Thomson, it consists of equal volumes of muriatic acid gas and ammoniacal gas, although he has subsequently observed that from the peculiar properties of the substance, it may be a compound of *Chlorine* and *Ammonium* (the hypothetical base of ammonia.) Unlike all the other ammoniacal salts, it does not undergo decomposition by heat. **SOLUBILITY**, f3j of water at 66° dissolves about two drachms and a half; at 212° it dissolves its own weight; it is also soluble in 4½ parts of alcohol; its solution in water is accompanied by considerable reduction of temperature. **INCOMPATIBLE SUBSTANCES.** The sulphuric and nitric acids unite with the ammonia, and disengage the muriatic acid, whilst ammonia is disengaged by the action of potass and its carbonate, carbonate of soda, lime, magnesia, &c., which combine with its muriatic acid: with oxy-muriate of mercury it combines and increases its solubility, see *Hydrarg: Oxy-murias*. When united with acetate of lead, it decomposes it, and a muriate of lead is precipitated. It is obvious also that nitrate of silver, and all the metallic salts whose bases form insoluble compounds with muriatic acid, are incompatible with it. **USES.** Rarely employed as an internal remedy, externally it is employed in lotions, either for the cold produced during its solution, in which case it should be applied as soon as the salt is dissolved, or for the stimulus of the salt, on which principle it acts as a powerful discutient in indolent tumours (*Form. 146.*) It is also an ingredient in a very useful plaster, in which it undergoes chymical decomposition: this plaster consists of *Soap* 3j, *lead plaster*, 3ij, liquefied together, to which, when nearly cold, are added of *muriate of ammonia* finely powdered 3ss. The alkali of the soap enters into combination with the muriatic acid of the muriate of ammonia, and forms thereby muriate of potass, or soda, and ammoniacal gas (on which the virtue of

* It appears that this is not the only article that has suffered in its quality by the cheap materials which have been brought into the market from those works. I understand that the practical chymist can obtain little or no Naphtha from the Barbadoes Tar, owing to its adulteration with the residue of the gas light process.

the plaster depends) is slowly but abundantly liberated, acting as a powerful stimulant and rubefacient; it should be applied immediately after it is formed, and be renewed every twenty-four hours, otherwise the intention is lost; (*Pharmacopœia Chirurgica.*) I have often applied this plaster with evident advantage to the chest in pulmonary affections, and I wish to recommend it to the attention of practitioners. It is very useful also in that rheumatic affection of the muscles of the chest, which is so frequently met with in persons in advanced life; during the last winter I was consulted in two cases where the distress after exercise was so considerable as to resemble angina pectoris. OFFICINAL PREPARATIONS. *Ammonia Sub-carbonus* (I.) L.E.D. *Liquor: Ammonia* (K.) L. *Aqua Ammonia.* E.D. *Hydrarg: præcip: alb:* (I.) L. *Alcohol Ammoniatum,* (I.) E.D. *Ferrum Ammoniat:* (G.) L.E.D. ADULTERATIONS. This salt, if pure, may be entirely volatilized by a low heat; the sulphate of ammonia, however, as it is also volatile, cannot be discovered except by the muriate of baryta, which will indicate its presence by a copious precipitate.

AMYGDALÆ DULCES.	{ Varieties of "Amygdalus" Communis." }	{ Sweet and Bitter Almonds.
AMYGDALÆ AMARÆ.		

QUALITIES. The *sweet almond* is inodorous, and has a sweet, bland taste; the *bitter almond*, when triturated with water, has the odour of the peach, and a pleasant bitter flavour.* CHYMICAL COMPOSITION. Boullay has lately confirmed the analogy which Proust had stated to exist between the emulsion of sweet almonds and human milk, viz. the former consists of sweet oil 54, albumen 24, sugar 6, gum 3, with traces of acetic acid; the indigestible property of the almond depends upon its albuminous matter. The *bitter almond*, in addition to those constituents, contains hydro-cyanic acid, (Prussic acid,) in union with a peculiar volatile oil, upon which its narcotic properties depend: but this deleterious element is so modified by the natural state of combination in which it exists with sweet oil and albumen, that they may be eaten without inconvenience. The bitter almond has long been regarded as an antidote to drunkenness; Plutarch states it as a fact on the authority of his physician Claudius. Other bitters were, however, supposed to possess similar powers in this respect, hence the *Poculum Absinthiatum*, to which we have before alluded. See page 81. Both sorts of almonds yield by expression a large quantity of fixed oil, which is perfectly mild. See *Oleum Amygdal.* The water distilled from the bitter almond, when strongly impregnated, has been found to exert a deleterious action on the human body, and to prove fatal to many animals. SOLUBILITY. By trituration with water a milky mixture is produced, (*an emulsion*,) for which purpose the sweet almonds should be previously freed from their

* NOYAU.—Crème de Noyau. Bitter almonds blanched 1 oz. Proof spirit half a pint, Sugar 4 oz. It is sometimes coloured with cochineal. The foreign Noyau, although differently prepared, is indebted to the same principle for its qualities. It is a liquor of a fascinating nature, and cannot be taken to any considerable extent without danger: the late Duke Charles of Lorraine nearly lost his life from swallowing some "Eau de Noyau," (water distilled from Peach kernels) too strongly impregnated. *Journal des Debats*, 22 Decembre, 1814.

cuticle, (*blanched*,) and this ought to be performed by infusing them in tepid water; for when hot it separates a portion of their oil, as is evident from their being thus rendered yellow, and the emulsion is therefore more liable to ferment, and be decomposed. 3ij of almonds saturate about f3vj of water; since, however, this extemporaneous preparation is tedious and inconvenient, the London Pharmacopœia very judiciously directs a confection to be ready prepared, 3j of which, when triturated with f3j of water, immediately forms an elegant emulsion. See *Mistura Amygdal.* Almonds form a useful intermedium for suspending in water many substances which are of themselves not miscible with it, as camphor, and several of the gum resins; they also assist in the pulverization of refractory substances, as Ipecacuan, &c. OFFICIAL PREPARATIONS. *Confectio Amygdalarum.* L. *Emulsio Camphoræ* (M.) E. *Emulsio Acaciæ Arab*: E. D.

AMYGDALÆ PLACENTA. *Almond Cake* is the substance left after the expression of the oil, which when ground forms ALMOND POWDER, so generally used for washing the hands.*

OIL OF BITTER ALMONDS. For obtaining this oil, the expressed cake is submitted to distillation, when a highly volatile, pungent oil passes over. See *Oleum Amygdalæ Amaræ*.

AMYLUM, L.E.D. (*Triticum Hybernum*) *Starch.*
Amylum.†

QUALITIES. *Form*, white columnar masses; *Odour* and *Taste*, none. CHYMICAL COMPOSITION. Fecula is one of the proximate principles of vegetable matter, and *Starch* is the fecula of wheat.‡ SOLUBILITY. It is soluble in boiling water, forming with it a semi-transparent, insipid, inodorous, and gelatinous paste, very susceptible of mouldiness, but which is retarded by the addition of alum; it is insoluble, but falls to powder in cold water; nor is it dissolved by alcohol or ether; although potass dissolves starch, yet the solution of it is not disturbed by potass, carbonate of potass, nor ammonia, but an alcoholic solution of potass produces a precipitate; acetate of lead, and infusion of galls occasion also precipitates. Starch is susceptible of several interesting and important changes;

* ALMOND PASTE. This Cosmetic for softening the skin and preventing chaps, is made as follows: Bitter almonds blanched 4 oz.: the white of an egg; rose water and rectified spirit, equal parts, as much as is sufficient.

† For the derivation of this term, and remarks thereon, see p. 38. (Note.)

‡ The fecula of various grains are employed as articles of diet for the sick, e. g. SAGO, prepared from the pith of the *Cycas Circinalis*, its granular form is imparted to it by passing it, when half dry, through a coarse sieve. SALOP, from the *Orchis Masculæ*. TAPIOCA from the root of the *Jatropha Manihot*. By expressing the root of this plant, the juice of which is extremely acrid, and baking the cake that is left, an alimentary substance is prepared called CASSAVA, the peculiar merit of which, like tapioca, is to swell and soften in water, and thus to make an excellent pudding. ARROW ROOT is from the *Maranta Arundinacea*. The arrow root, however, usually sold, is the fecula of potatoes; 100 lbs. of which would yield about 10 lbs. of fecula, and it is worthy of remark that for this purpose frozen potatoes answer as well as those not spoiled by the frost. Dr. Ainslie, in his *Materia Medica of Hindostan*, informs us that "an excellent Arrow root, if it may be so called, is now prepared in the Travancore country from the root of the *Curcuma Angustifolia*, no way inferior to that obtained from the *Maranta Arundinacea*."

thus, if it be exposed to heat until its colour becomes yellow, its properties are so far altered that it is no longer insoluble in cold water; and according to the experiments of Saussure, if it be mixed with water, a spontaneous decomposition takes place, and a quantity of sugar is formed, amounting in weight to one half of the starch employed, in addition to which a peculiar gummy matter results, and a substance intermediate between gum and starch, to which the name of *Amidine* has been given. Starch moreover is convertible into saccharine matter by the agency of sulphuric acid. **USES.** Being demulcent it is generally employed as a vehicle for the exhibition of opium in the form of enema. The ordinary blue starch is coloured by a solution of smalt and alum, and is unfit for medicinal use; formerly it was tinged yellow with saffron or turmeric, but this went out of fashion on the execution of the famous midwife, Mrs. Collier, who was hanged in a ruff starched with that colour. **OFFICIAL PREPARATIONS.** *Mucilago Amyli.* L. E. D. *Pulvis Tragacanth: comp:* (B) L. *Pil: Hydrargyri* (M) E. *Droschisi Gummos:* E.

It has been lately observed that Iodine is a delicate test of the presence of starch; if a drop or two of a solution of this substance in alcohol be added to an aqueous solution of starch, a blue compound is formed which eventually precipitates. Iodine may therefore be employed for ascertaining the goodness of starch, a test which is very important, for much of what is sold under the name of starch, does not possess its peculiar characters; it ought however to be stated, that the blue indication is prevented from taking place by a variety of different bodies, as *Arsenious acid*, *corrosive sublimate of Mercury*, &c. &c.

ANETHI SEMINA, L. E.

(*Anethum Graveolens. Semina.*) Dill Seed.

These seeds when dry have an aromatic sweetish odour, and a warm pungent taste, qualities residing in an essential oil, which is extracted by distillation with water and by digestion with alcohol; the bruised seeds yield their flavour to boiling water by simple infusion. The seeds are but rarely used. The distilled water is a valuable carminative for children.

ANISI SEMINA. L. E. D.

(*Pimpinella Anisum. Semina.*) Anise Seeds.

Like the dill seeds warm and carminative; water extracts very little of their flavour: rectified spirit the whole. It may be remarked in this place that the value of aniseed, as well as those seeds which yield essential oil by distillation, may be estimated by their specific gravity, the heaviest yielding the largest proportion of oil; a chondrometer employed by corn-chandlers might be very conveniently applied to such a purpose.*

* The method of deducing the value of seeds, from their relative weights, appears to have been one of the earliest instances of the art of taking specific gravities: thus Pliny (Nat. Hist. lib. xviii.) estimated the relative weights of several species of grain.

The seeds imported from Spain, which are smaller than the others, contain most oil, and are to be preferred.

ANTHEMIDIS FLORES. L.E.

(*Anthemis Nobilis.*) *Chamomile Flowers.*

QUALITIES. The *Odour* of the flowers is strong and fragrant; *Taste*, bitter and aromatic, with a slight degree of warmth. **CHYMICAL COMPOSITION.** The active principles are essential oil, resin, and bitter extractive. **SOLUBILITY.** Both water and alcohol take up the active parts of the flowers; hot water, by infusion, dissolves nearly one fourth of their weight, but boiling dissipates the essential oil, on which account they should never form an ingredient in a decoction. **USES.** The flowers given in substance are said to have cured intermittents; they are however but rarely used; externally they are applied in fomentations. See *Infusum Anthemidis*. **OFFICINAL PREPARATIONS.** *Decoctum Athemidis nobilis*. E.D. *Infusum Anthemidis*. L.* There is a great variety in the quality and price of chamomile flowers; those which are large and whitish are to be preferred as the freshest; by keeping they become invalid, and are deprived of their aromatic principle and essential oil. They are always inferior in wet seasons. The double flowered varieties are also less powerful than the single kind, since the qualities reside in the disc florets.

ANTIMONII SULPHURETUM. L.

Sulphuret of Antimony.

QUALITIES. This article appears in the market in conical loaves, which are dark gray externally, but internally possess a bladed structure and considerable brilliancy; the Edinburgh and Dublin colleges direct this substance to be levigated with water, and kept in the state of powder; it should however never be purchased in that form, as it is not unfrequently adulterated with sulphuret of lead, whereas it cannot contain such admixtures when its form is characteristically crystalline and bladed. **CHYMICAL COMPOSITION.** Antimony 100, Sulphur 35.572. From the time of Basil Valentine to the present, this preparation has been known in the market by the name of *Antimony*, a name which it is evident can only with propriety be applied to the pure metal. **SOLUBILITY.** It is insoluble in water and alcohol; since however it is slightly acted upon by vegetable acids, cups were formerly made of it, which imparted to wine that stood in them for some time, an emetic quality.† **USES.** It is prin-

* **CHAMOMILE DROPS.** The nostrum sold under this name is a spirit flavoured with the essential oil of Chamomile. It is very obvious that it cannot possess the bitter tonic of the flowers.

† **THE EVERLASTING PILL** of the ancients consisted of *metallic* Antimony, which being slightly soluble in the gastric juice was supposed to exert the property of purging as often as it was swallowed. This was economy in right earnest, for a single pill would serve a whole family during their lives, and might be transmitted as an heirloom to their posterity. We have heard of a Lady who having swallowed one of

cipally employed for the preparation of the other antimonial combinations, for which purpose it is more eligible than the metal itself, as being less contaminated with metallic impurities. Its medicinal energies depend altogether upon the state of the stomach, and must therefore be extremely uncertain; when it meets with any acid in the stomach, it acts with extreme violence, a circumstance which requires precaution. It was formerly much more employed as an Alterative than at present. Stoll recommends its use in chronic rheumatism, and advises its union with Myrrh. In the treatment of affections of the skin it has been long used, both singly, and in union with other substances, such as *Conium*, *Dulcamara*, *Guaiacum*, &c. In Scrofulous diseases, connected with cutaneous eruptions, or ulcerations, it has been a favourite remedy with many practitioners, and it forms the basis of several foreign *Nostrums*. In times of remote antiquity it was used by females as a black pigment for staining the eyelashes, a custom which continues to this day in the east.* It is at present given to horses mixed with their food, to make their coats smooth, and very large doses may be given to these animals without producing any deleterious effects. OFFICINAL PREPARATIONS. Dr. Black constructed a table representing a view of all the preparations whose basis was antimony; many of these however have fallen into disuse, and the nomenclature of all is changed. The following arrangement of the medicines prepared from the sulphuret of antimony,† is presented to us by Mr. Thomson, in his London Dispensatory. 1. BY TRITURATION, *Sulphuretum Antimonii Præparatum*. E. D. 2. BY THE ACTION OF HEAT WITH PHOSPHATE OF LIME, (oxidized) *Pulvis Antimonialis*, L. D. *Oxidum Antimonii cum Phosphate Calcis*. E. 3. BY THE ACTION OF ALKALIES, (oxidized,) *Antimonii Sulphuretum Præcipitatum*. L. E. *Sulphur Antimoniatum Fuscum*. D. 4. BY THE ACTION OF ACIDS, (oxidized,) *Antimonii Oxydum*, L. *Oxydum Antimonii Nitro-Muriaticum*. D. *Antimonium Tartarizatum*. L. *Tartris Antimonii*, olim *Tartarus Emeticus*. E. *Tartarum Antimoniatum*, sive *Emeticum*, D. *Vinum Antimonii Tartarizati*. L. *Vinum Tartaritis Antimonii*. E.

ADULTERATIONS. The importance of employing this article in a state of great purity for the preparation of so many active and valuable medicines, is obvious. It ought to be entirely volatilized by a red heat; Lead is discovered by its imparting to the antimony a foliated instead of a bladed texture, and from not being vaporizable; Arsenic, by the garlic odour emitted when thrown upon live coals or by the numerous tests mentioned under the history of that article; Manganese and Iron, from not being vaporizable, and from other tests: the most usual adulteration is black oxide of iron, or the scoræ of that metal, "*Smithy dust*."

these pills, became seriously alarmed at its not passing; upon sending however for her physician, he consoled her with the assurance that it had already passed through a hundred patients with the best effect.

* The manner of doing it among the Turks, is described by Shaw and Russel. Chateaubriand also remarks, "the women of Athens appear to me smaller and less handsome than those of the Morea, their practice of painting the orbits of the eyes blue, and the ends of the fingers red, is disagreeable to the stranger." Dr. Badham has also given us an interesting note upon this subject in his learned translation of Juvenal. Sat. II. l. 141. See also the present work, p. 49.

† The Sulphuret of Antimony is an ingredient in SPILSBURY'S DROPS. See Hydrargyri Oxyurias. Dr. Duncan also observes that it seems to constitute a quack remedy which has acquired some reputation in Ireland for the cure of cancer, where it is used as an external application to the sore.

ANTIMONII SULPHURETUM PRÆCIPITATUM. L.E.

Sulphur Antimoniatum Fuscum. D.

Precipitated Sulphuret of Antimony.

QUALITIES. *Form*, a brilliant orange coloured powder; *Taste*, slightly styptic, but inodorous. **CHYMICAL COMPOSITION.** Very complicated attractions are exerted during the preparation of this substance; the result of which is an hydro-sulphuret of Oxide of Antimony, with excess of sulphur. **SOLUBILITY.** It is quite insoluble in water. **USES.** According to the dose, it is diaphoretic, cathartic, or aromatic; it is, however, less certain than many other preparations, and, unless in combination with mercury, for cutaneous affections, is not very often employed. **INCOMPATIBLE SUBSTANCES.** All acids and acidulous salts increase its emetic properties; when therefore acid is suspected to prevail in the primæ viæ, it should be combined with soap, magnesia, (*Form* : 128,) or aromatic confection; on the contrary, the confection of roses, and vehicles containing acids, should be carefully avoided. **FORM OF EXHIBITION.** **Pills.** *Dose*, grs. 1 to v. **OFFICIAL PREPARATIONS,** *Pilulæ Hydrargyri Sub-Muriatis* (H) L. **ADULTERATIONS.** It is often sophisticated with chalk and other extraneous matter; it ought not to effervesce with acids; it should be entirely vaporizable by heat, and its colour should be that of bright orange. A spurious article is vended which consists of sulphur and sulphuret of antimony coloured with Venetian red.

ANTIMONIUM TARTARIZATUM. L.

Tartris Antimonii. E. Tartarum Antimoniatum. D.

*Tartar Emetic.**

QUALITIES. *Form*, crystals whose primitive form is the regular tetrahedron, although it assumes a variety of secondary forms. *Colour*, white. *Odour*, none. *Taste*, slightly styptic and metallic; on exposure to the air, the crystals slightly effloresce and become opaque; thrown upon burning coals, they become black and afford metallic antimony. **CHYMICAL COMPOSITION.** This is involved in much doubt and obscurity; it is stated in the various dispensatories to be a triple salt, consisting of tartaric acid, oxide of antimony,† and potass, and which therefore, says

* This saline body was first made known by Adrian de Mynsicht in his *Thesaurus Medico-chymicus*, published in 1631; although it appears probable that the preparation was suggested by a treatise, entitled "*Methodus in Pulverem*," published in Italy in 1620. This book, written by Dr. Cornachinus, gives an account of a method of preparing a powder which had been invented by Dudley, Earl of Warwick, and which had acquired considerable celebrity in Italy; this powder was composed of Scammony, Sulphuret of Antimony, and Tartar, triturated together.

† There is a tartrate of Antimony, but it can scarcely be made to crystallize; it easily assumes a gelatinous form; and it may be here observed that Antimony is one of those metals whose oxides seem to combine with difficulty, and to form compounds of little permanency, with acids, unless there be present at the same time an alkali or earth; and their solutions, in most cases, yield, on dilution, a white precipitate.

Mr. Thompson, on the principles of the reformed nomenclature, ought to be termed a *tartrate of antimony and potass*. The truth of these views however, is extremely questionable. I am inclined to believe with Gay Lussac, that in the various metalline compounds, of which super-tartrate of potass is an ingredient, this latter substance acts the part of a simple acid; an opinion which receives much support from the great solvent property of cream of tartar, and from the striking fact that it is even capable of dissolving various oxides which are insoluble in tartaric acid, of which the protoxide of antimony is an example. According then to this view, tartar emetic is a salt composed of bi-tartrate (*super-tartrate*) of potass, which acts the part of an acid, and protoxide of antimony: from the experiments of Mr. Phillips, it would appear that 100 parts of the bi-tartrate will dissolve 70 of the protoxide. In this state of doubt it must be admitted that no name can be more appropriate than *Antimonium Tartarizatum*, and the London College have therefore properly disregarded the suggestions which have been offered for changing its name.

SOLUBILITY. Much discrepancy of opinion exists upon this subject, owing probably to the variations and incidental impurities to which the salt is liable. Dr. Duncan, who selected very pure specimens for examination, states that it is soluble in three times its weight of water at 212° , and in fifteen at 60° . This solution, when the salt is pure, is perfectly clear and transparent, but if long kept, unless a portion of spirit be added, it undergoes decomposition; a precipitate indeed sometimes takes place very rapidly, but this is generally tartrate of lime, an incidental impurity, derived from the super-tartrate of potass.

INCOMPATIBLE SUBSTANCES. *Mineral Acids, Alkalies, and their Carbonates, most of the Metals, Soaps, Hydro-Sulphurets, and many infusions and decoctions of bitter and astringent Vegetables*, e. g. f3j. of the decoction of yellow bark is capable of completely decomposing 3j of this salt, and of rendering it inert.* Berthollet has accordingly recommended the immediate exhibition of this decoction when an overdose of the salt has been taken; and Orfila has given a very satisfactory case in which this antidote succeeded. Infusion and tincture of galls throw down curdled and inert precipitates of a dirty white colour, inclining to yellow. Rhubarb is equally incompatible: the extract of this substance therefore never ought to be employed in forming pills of tartar emetic: but it deserves notice that this salt is not decomposed by the infusions of gentian or wormwood. The *Alkaline Sulphates*, provided they be perfectly neutral, produce no disturbance in solutions of *tartar emetic*, and therefore cannot be considered incompatible with in them; if there be any excess of acid, as in *alum*, *bi-sulphate of potass*, &c., then its decomposition is effected, and a white insoluble sulphate of antimony is precipitated. It appears therefore that the famous "Emeto-purgative" of the French school, consisting of sulphate of soda and tartarized antimony in solution, is by no means the unchymical mixture which some have considered it to be, and that it really produces its effects from the operation of its original ingredients, and not from that of the compounds (*Sulphate of Antimony, Tartrate of Soda, and Sulphate of Potass*), which have been erroneously supposed to result.

FORMS OF EXHIBITION. Solution is its best form, see *Liquor Antimonii Tartarizati*.

* The compound of Tartarized Antimony and Bark, is said to purge, and to constitute the "Bolus ad Quartanas" of the French physicians.

DOSE. It either vomits, purges, or sweats, according to the quantity exhibited; thus gr. $\frac{1}{4}$ will, if the skin be kept warm, promote a diaphoresis; gr. $\frac{1}{2}$ will procure some stools first, and sweating afterwards; and gr. j will generally vomit and then purge, and lastly sweat the patient; in very minute doses, as gr. $\frac{1}{10}$ or $\frac{1}{12}$ combined with squill and ammoniacum, it acts as an expectorant, see *Formulae* 1, 2, 3, 8, 60. It is decidedly the most manageable, and the least uncertain of all the antimonial preparations, and the practitioner would probably have but little to regret, were all the other combinations of this metal discarded from our pharmacopœias. Some authors have considered this substance as possessing sedative powers, independent of its nauseating and diaphoretic effects. It undoubtedly acts upon the heart, and controls the force of the circulation in fevers, without occasioning any other sensible effect. Mr. Brodie, after having given large doses of this salt to animals, found that the heart beat very feebly, and although artificial respiration was kept up, it soon ceased to act altogether. Lenthois of Montpellier advises small doses of it in incipient phthisis, and it would on some occasions appear to diminish the febrile excitement. The following is the form in which Dr. Lenthois recommends it to be exhibited upon such occasions. He directs a grain of Tartarized Antimony to be dissolved in eight table spoonsful of distilled water, which are to be added to six or eight pints of water, and to be taken as common drink. Tartar emetic, when triturated with lard in the proportion of ʒiiss or ʒij to ʒj of the latter, forms a very powerful rubefacient, occasioning a pustular eruption on the skin, and proving very serviceable in deep-seated inflammation; or the application may be made by dusting a piece of adhesive plaster with tartarized antimony, taking care to leave a margin untouched that it may more firmly adhere. Dr. Jenner, in a late Essay on the influence of artificial eruptions on certain diseases, recommends the following formula for such a purpose.—*Rx. Antimonii Tartarizati (in pulverem subtilem trit.) ʒij—Unguenti Cetacei ʒix;—Sacchari albi* ʒj; Hydrargyri Sulphureti Rubri gr. v. M. ut fiat Unguentum.* The Pustules which are produced by the inunction have been generally compared to variolous pustules, they are, however, in general much smaller, not so red at the base, nor so tense and white when fully suppurated. They are very painful. In Hooping-cough, frictions with this ointment upon the region of the stomach have been greatly extolled. By this application, says Dr. Jenner, we cannot only create vesicles, but we can do more,—we have at our command an application which will at the same time both vesicate and produce diseased action on the skin itself, by deeply deranging its structure beneath the surface. This is probably one cause why the sympathetic affection excited by the use of Cantharides, and those changes produced by Tartar Emetic are very different. The eruption should be kept up for some time, either by the reapplication of small portions of the diluted tartar-etic ointment to the affected part, or by other gently stimulating ointments. Should they become much irritated and very painful, a soft bread and milk poultice will in general afford relief, without interfering with the progress of the eruption. **OFFICIAL PREPARATIONS.** gr. j. is contained in f ʒss of *Liquor Antimonii Tart*: L. and *Vinum Tartratis An-*

* The Sugar is added with a view to prevent the ointment from becoming rancid.

timonii. E.* ADULTERATIONS. It should be always purchased in its crystalline form; and a solution of it in distilled water ought to furnish a copious gold coloured precipitate with sulphuret of ammonia; a precipitate soluble in nitric acid, with acetate of lead; and a white and extremely thick precipitate, dissolving with facility in pure nitric acid, with lime water. If the crystals deliquesce, the presence of other salts may be inferred. M. Sexullas, in a memoir of which there is a copious extract in the *Journal de Pharmacie* for 1821, has shown that all the antimonial preparations used in medicines, except carefully crystallized *Tartar Emetic*, contain more or less arsenic, which metal was originally combined with the antimony in the ore, and has continued pertinaciously associated with it through all its modifications.

AQUA. Water.

Water, from its extensive powers as a solvent, never occurs in a state of absolute purity, although the nature and degree of its contamination must necessarily vary according to circumstances and situation. It is generally found holding earthy matter in a state of mechanical suspension, or saline and other bodies in chymical solution. The usual varieties of common water are classed and defined by Celsus; and modern chymists have not found any reason to reject the arrangement. "*Aqua levissima pluvialis est; deinde fontana, tum ex flumine, tum ex puteo; posthæc ex nive, aut glacie; gravior his ex lacu; gravissima ex palude.*"

1. RAIN WATER. *Aqua Pluvialis*, when collected in the open fields, is certainly the purest natural water, and consequently of the least specific gravity; the bodies which it holds in solution are, carbonic acid, a minute portion of carbonate of lime, with traces of muriate of lime. DEW is said to be water saturated with air. Rain water ought, however, to be boiled and strained, whenever it is collected near large towns; Hippocrates gives this advice, and M. Margraaf of Berlin has shown the wisdom of the precaution by a satisfactory series of experiments.

2. SPRING WATER. *Aqua Fontana*, in addition to the substances detected in Rain water, generally contains a small portion of muriate of soda, and frequently other salts; but the larger springs are purer than smaller ones, and those which occur in primitive countries, and in siliceous rocks, or beds of gravel, necessarily contain the least impregnation. An important practical distinction has been founded upon the fact, that the water of some springs dissolves soap, whilst that of others decomposes, and curdles it; the former has been termed *soft*, the latter *hard* water; soft water is a more powerful solvent of all vegetable matters, and is consequently to be preferred for domestic as well as medicinal purposes; the brewer knows well from experience how much more readily and copiously *soft* water will dissolve the extractive matter of his malt. Horses by an instinctive sagacity always prefer soft water, and when by necessity or inattention they are confined to that which is *hard*, their

* NORRIS'S DROPS. A solution of tartarized antimony in rectified spirit, and disguised by the addition of some vegetable colouring matter. I am credibly informed that the original recipe contained opium, but that which I have examined, and which was procured from a respectable agent, yielded no indications of its presence.

coats become rough and ill-conditioned, and they are frequently attacked with the gripes. Pigeons also refuse hard water when they have been accustomed to that which is soft.*

3. RIVER WATER. *Aqua ex Flumine*, being derived from the conflux of numerous springs and rain water, generally possesses considerable purity; that the proportion of its saline ingredients should be small, is easily explained by the precipitation which must necessarily take place from the union of different solutions; it is, however, liable to hold in suspension particles of earthy matter, which impair its transparency, and sometimes its salubrity: this is particularly observed of the Seine, the Ganges, and the Nile.†

4. WELL WATER. *Aqua ex Puteo*, is essentially the same as spring water, being derived from the same source; it is, however, more liable to impurity from its stagnation, or slow infiltration;‡ hence our old wells furnish much purer water than those which are more recent, as the soluble particles are gradually washed away. Mr. Dalton observes that the more any spring is drawn from, the softer the water becomes.

5. SNOW WATER, *Aqua ex Nive*, has been supposed § to be unwholesome, and in particular to produce bronchocele, from the prevalence of that disease in the Alps, but it does not appear upon what principle its insalubrity can depend; the prejudice however is a very ancient one, for Hippocrates observes that snow or ice water is unwholesome, in consequence of its finer particles being evaporated and lost during its solution: it appears to differ only from rain water in being destitute of air, to which water is certainly indebted for its briskness, and perhaps for many of its good effects upon animals and vegetables. The same observations apply to *Ice Water*.

6. LAKE WATER. *Aqua ex Lacu*, is a collection of rain, spring, and river waters, contaminated with various animal and vegetable bodies, which form its stagnant nature have undergone putrefaction in it.

7. MARSH WATER. *Aqua ex Palude* being the most stagnant is the most impure of all water, and is generally loaded with decomposing vegetable matter.

* Hard water has a tendency to produce diseases in the spleen of certain animals, especially sheep; this is the case in the eastern side of the island of Minorca, as we are informed by Cleghorn. The mischievous tendency of bad water, where it cannot be corrected by some chymical process, would seem to be best counteracted by bitter vegetables. Virey supposes that this circumstance first induced the Chinese to infuse the leaves of the tea plant.

† Alpini informs us that Elephantiasis is endemial in Egypt; Galen ascribes it to the impure waters of the Nile, and Lucretius adopted the same opinion.

“Est Elephas morbus, qui propter flumina Nili
Gignitur Ægypto in Medio.”

‡ Dr. Percival observes that bricks harden the softest water, and give it an aluminous impregnation; the common practice of lining wells with them is therefore very improper, unless they be covered with cement.

§ The same strumous affection occurs at Sumatra, where ice and snow are never seen; while on the contrary, the disease is quite unknown in Chili and Thibet, although the rivers of these countries are chiefly supplied by the melting of the snow with which the mountains are covered. The trials of Captain Cook, in his voyage round the world, prove the wholesomeness of *Ice water* beyond a doubt; in the high southern latitudes he found a salutary supply of fresh water in the ice of the sea; “this melted ice,” says Sir John Pringle, “was not only sweet but soft, and so wholesome as to show the fallacy of human reasoning unsupported by experiments.”

To what extent the impurities of water are capable of influencing its salubrity, has been a subject of interesting inquiry from the age of Hippocrates to the present day. To many of these natural contaminations, too much importance has been certainly attached; it is an affected refinement to suppose that the presence of minute portions of such earthy and calcareous salts, as generally occur in solution, can impart any noxious quality to water;* whilst on the contrary, animal and vegetable impurities, or earthy bodies in a state of mechanical suspension, cannot fail to prove injurious, and must be regarded as the true "*SCELERA AQUARUM*." Guided by false analogies many have supposed that they recognised the origin of all calcareous diseases in the earthy impurities of water; the researches however of chymistry have removed this delusion, by demonstrating that the substances found in water never enter into the composition of urinary calculi.† Metallic and other accidental contaminations are necessarily highly injurious, and the water in which their presence is suspected, should be submitted to the most careful examination.

For the purification and preservation of water numerous methods have been adopted; the mechanical impurities may be removed by filtration, which is performed through porous stones, or alternate layers of sand or charcoal: muddy water may be also cleared by adding a few grains of alum to each pint,‡ and in that proportion, the water is not rendered in the least disagreeable: when water has contracted a putrid smell, it may be rendered sweet by agitating it with a small portion of magnesia, or with black oxide of manganese, in the proportion of $1\frac{1}{2}$ parts to 250 parts of water. Dr. Black observes that nitrate of silver, which is one of the most antiseptic substances known, will preserve water from putrefaction for ever, and that it may at any time be separated therefrom in a few minutes by adding a small lump of common salt; this fact in itself is curious, but the experiment is too hazardous to be recommended. Dr. Alston prefers lime, as a preservative of the water, and proposes to remove it by the addition of a carbonate of magnesia; Dr. Henry has however found that it is more economically precipitated by the introduction of a current of carbonic acid into the cask. As that peculiar property of water which is termed *hardness*, generally depends upon the presence of *sulphate of lime*, the addition of an alkaline carbonate twenty-four hours previous to its being used, will be found to restore it, or if it should depend upon *super-carbonate of lime*, long ebullition without any addition will be found sufficient for its cure.

Water when kept for a long time in casks, especially on long voyages, is partially decomposed, and a volume of carburetted hydrogen is evol-

* I take this opportunity of observing that I have made analyses of several of those springs in Cornwall, which have from time immemorial enjoyed a reputation in the neighbourhood for curing diseases, amongst which were the waters of Holy-well, so named from its supposed virtues, and those of Permiscen Bay, equally extolled for their medicinal qualities. But I have only been able to detect minute quantities of carbonate of lime, derived from infiltration through banks of calcareous sand. See Transactions of the Royal Geological Society of Cornwall, Vol. I.

† See "Remarks on the Pump water of London," by W. Heberden, M. D. in the 1st vol. of the Medical Transactions; also, Acad. Royale des Scienc. 1700, Hist. pag. 58. Perrault Vitruve. L. VIII. c. 5.

‡ I am informed by a respectable chymist in this town, that he sells a large quantity of alum for this very purpose, as well as to publicans for the sake of clearing their spirituous liquors; for the same end, we are told, that the wine merchants in Paris put into each cask of wine as much as a pound of alum.

ed,* imparting to such water the peculiar smell and taste which characterise it; this decomposition may in a great degree be obviated by charring the interior of the water casks; it is, however, prevented in the Navy by substituting iron tanks for wooden vessels. In Pharmacy it ought to be remembered that whenever common water is employed it should not be *hard*; filtered rain water may be recommended as the most eligible on such occasions.

AQUA DESTILLATA. L.E.D. Distilled Water.

QUALITIES. *Taste*, vapid from the absence of air, and slightly empyreumatic in consequence probably of the presence of a small quantity of extractive matter which has undergone partial decomposition; a fluid-ounce weighs $454\frac{1}{2}$ grains. **MEDICINAL USE.** In extemporaneous prescriptions, distilled water should be always ordered whenever the formula contains any of the following substances:—*Acidum Sulphuricum*; *Acidum Citricum*; *Antimonium Tartarizatum*; *Argenti Nitras*; *Cuprum Ammoniatum*; *Ferrum Tartarizatum*; *Hydrargyri Oxy-murias*; *Liquor Ammoniae*; *Liquor Plumbi Sub-Acetatis*; *Liquor Potassae*; *Plumbi Acetas*; *Solutio Muriatis Barytae*; *Vinum Ferri*; *Zinci Sulphas*; *Ferri Sulphas*. Distilled water ought also to be employed in preparations where much water is evaporated, as in the formation of extracts, since the residual matter of common water will remain mixed with the product of the process, and uselessly add to its bulk, or even in some cases produce in it chymical changes; unless however under such circumstances, common water purified by filtration should be ordered, as the air which it contains imparts to it a pleasant and sprightly flavour. In making infusions or decoctions, it is very important that the water should be free from those impurities which impart to it *hardness*, and which render it a far less powerful solvent of vegetable matter, nor indeed can resinous substances be mixed with such water, even when assisted by a mucilaginous medium. On which account, in prescribing emulsions, it may perhaps be prudent to direct the employment of distilled water. **TESTS OF ITS PURITY.** Its transparency ought not to be disturbed by the addition of nitrate of silver, or muriate of baryta.

* This is particularly the case with respect to the water of the River Thames; for as it contains but a small proportion of saline matter, it is remarkably soft, although it holds suspended mud, and vegetable and animal debris, which occasion it to undergo a violent change on being kept: a large volume of carburetted and sulphuretted hydrogen gases is evolved, and it becomes black and insufferably offensive; upon racking it off however into large earthen vessels, and exposing it to the air, it gradually deposits a quantity of black slimy matter, and becomes as clear as crystal, and perfectly sweet and palatable, and is exceedingly well adapted for sea store. "THE NEW RIVER WATER" contains a small proportion of muriate of lime, carbonate of lime, and muriate of soda; it differs also in its gaseous contents: 100 cubic inches of New River Water contain 2.25 of carbonic acid, and 1.25 of common air, whereas the water of the Thames contains rather a larger quantity of common air, and a smaller proportion of carbonic acid.

AQUA MARINA. Sea Water.

Until the late able researches of Dr. Murray, we possessed but an imperfect knowledge of the composition of sea water; it is not therefore surprising that the analysis performed by different chymists should be found to be so materially at variance; the true cause of such discordance is now easily understood, for it appears, that in the examination of a mineral water or any compound saline solution, the substances obtained from it are not necessarily the original ingredients, but frequently the products of new combinations established by the operation of analysis, and that consequently the nature of the result obtained may vary according to the modes in which such analysis has been conducted, or even according to the degree of dilution in which the saline substances exist.*

* The law which determines such combinations has been investigated with singular ingenuity and success by Dr. Murray. (Transactions of the Royal Society of Edinburgh, 1816.) Berthollet had already established the important fact, that combinations are often determined by the force of cohesion, in such a manner, that in principles acting on each other, those on which this force operates most powerfully, in relation to the fluid which is the medium of action, are combined together; hence from a knowledge of the solubility of the compounds which substances form, we may predict what combinations will be established when they act on each other, those always combining which form the least soluble compounds. It is for the extension of these views, and for the useful application of them that we are indebted to Dr. Murray, who justly observes that if the force of cohesion can so far modify chymical attraction, as to establish among compound salts dissolved in any medium, those combinations whence the least soluble compounds are formed, we are entitled to conclude that the reverse of this force, i. e. the power of a solvent, may produce the opposite effects, or cause the very reverse of these combinations to be established, so that in a concentrated medium the least soluble will be formed, and in a dilute one, the more soluble compounds will be established. Hence follows the simple rule by which the actual state in which saline bodies exist in a solution may be determined, viz. that in any fluid containing the elements of compound salts, the binary compounds existing in it will be generally those which are most soluble in that fluid, and the reverse combinations will only be established by its concentration favouring the influence of cohesion. It appears that by simply evaporating a saline solution we may produce changes in its composition, and obtain products which never existed in its original state of dilution; thus, suppose muriate of magnesia and sulphate of soda to be dissolved in water, as is actually the case in the water of the ocean, and the solution to be concentrated by evaporation from heat; the combinations of sulphate of magnesia and muriate of soda, being on the whole less soluble in water, this circumstance of inferior solubility, or the force of cohesion thus operating, actually determines the formation of these compounds; and the production of sulphate of magnesia, from the bittern is to be explained upon this principle. Since it appears therefore that the influence of solubility is most important, temperature, to whose dominion it is under all circumstances subject, must necessarily be alike powerful; let us exemplify this fact by the action of the very salts under consideration; it has been just stated that muriate of magnesia and sulphate of soda decompose each other in a concentrated solution at a high temperature, producing muriate of soda and sulphate of magnesia, but at temperatures below 32° the reverse actually takes place, muriate of soda and sulphate of magnesia reacting, and being converted into sulphate of soda and muriate of magnesia; a fact evidently owing to the relation of the solubility of these salts to temperature. Muriate of soda has its solubility scarcely altered either by heat or cold; sulphate of soda is, in these respects, completely the reverse; hence at an elevated temperature, muriate of soda is the least, and sulphate of soda the most soluble salt, whilst at a low temperature, the reverse of this happens. All the circumstances of this investigation are most interesting; the medical practitioner will at once perceive its importance, as enabling him to appreciate the real nature of saline solutions, and even in many instances, to preserve their identity. See *Aquæ Minerales*.

The elements of the salts contained in a pint of sea water are *Lime* 2.9, *Magnesia* 14.8, *Soda* 96.3, *Sulphuric Acid* 14.4, *Muriatic Acid* 97.7, total 226.1 grains, and supposing these elements to be combined in the modes which Dr. Murray's views appear to establish, the saline contents of a pint of sea water may be expressed as follows, *Muriate of Soda* 259.3, *Muriate of Magnesia* 35.5, *Muriate of Lime* 5.7, *Sulphate of Soda* 25.6 grains, total 226.1 grains; besides such saline contents, it is contaminated with various animal and vegetable bodies, in consequence of which it becomes, when long kept, highly offensive; it ought also to be stated that Dr. Wollaston has discovered the presence of a minute proportion of potass in sea water; and Dr. Marcet has more lately detected ammonia in combination with muriatic acid. **MEDICINAL USE.** As a cathartic, a pint is the ordinary quantity, which should be taken in the morning, at two doses, with an interval of half an hour between each; this quantity contains half an ounce of purgative salt, of which about three fourths are muriate of soda, but it is much more active than a similar portion of any artificial combination. In procuring sea water for medicinal purposes, there is a precaution, the importance of which experience has suggested to me, that it be not hastily drank on the beach, before the particles of sand, with which under such circumstances it is generally mixed, are allowed to subside; from the neglect of this precaution I have witnessed serious consequences. The most important advantages of sea water are derived from its external use as a bath.

AQUÆ DESTILLATÆ. L.D.

AQUÆ STILLATITÆ. E. *Distilled Waters.*

These are waters impregnated with the essential oils of vegetables, and are principally designed as grateful vehicles for the exhibition of more active remedies; ample directions for preparing them are given in the several Pharmacopœias, and if they be rectified by redistillation they may be kept for several years; the usual mode of preserving them is by adding spirit, which has also the incidental advantage of preventing them from being frozen during the winter season. Some recommend a film of the essential oil to be diffused over the water's surface. They may be extemporaneously prepared by adding to water what have been called *Essences*, which consist of essential oil and alcohol, or by rubbing any essential oil with ten times its weight of sugar, or, what answers still better, of magnesia; when however they are so prepared they never retain their transparency. The college, in the present pharmacopœia, have directed the distillation off the essential oil, as well as off the recent herb; this alteration is one of practical convenience. The properties of each water may be learnt by referring to the vegetable from which it is distilled.

AQUÆ MINERALES. *Mineral Waters.*

Although all waters that flow from the earth, are, as they contain mineral bodies in solution, strictly speaking, *mineral waters*, yet this term is conventionally applied to such only as are distinguished from spring,

lake, river, or other water, by a peculiarity in colour, taste, smell, or any obvious properties, or by the medicinal effects which they produce, or are known to be capable of producing.

To the medical practitioner the history of these waters is most interesting and instructive, involving highly important subjects of chymical and physiological inquiry. These waters are without doubt indebted for their medicinal virtues to the operation of the substances which they hold dissolved, but this is so materially aided by the peculiar state of dilution in which they exist, as well as by the mere bulk and temperature of the water itself, as to render extremely doubtful the success of every attempt to concentrate their powers by evaporation. To what extent dilution may modify the chymical condition of saline solutions has been satisfactorily demonstrated by the researches of Dr. Murray (see *Aqua Marina*,) and to what degree an increase in the solubility of any remedy may influence its medicinal properties has been considered at some length, in a preceding part of this work, (page 143.) It is certain that, in general, soluble salts are capable of exerting a much more powerful effect upon the animal economy, than those which are insoluble; on which account, the earthy muriates, especially that of lime, are amongst the most active ingredients of mineral waters. Although chymical analysis has frequently from its own imperfection failed in ascertaining their presence, it seems probable that *muriate of lime* and *sulphate of soda* exist in all those springs that furnish, by the usual methods of examination, *sulphate of lime* and *muriate of soda*; for the same reasons it is equally probable that iron, which in certain waters has been supposed from the analysis to exist as a *carbonate*, is in its native solution a true *muriate*; this is undoubtedly the fact with respect to the Bath waters. Is it then surprising, that medical practitioners should hitherto have failed in their attempts to emulate, by artificial arrangements, the medicinal efficacy of active mineral springs? For the investigation of the true composition of mineral waters the researches of Dr. Murray furnish a simple and elegant formula. *Determine by precipitants the weight of the acids and bases, suppose them united in such a manner that they shall form the most soluble salts, and these salts will constitute the true saline constituents of the water under examination.*

Mineral Waters admit of being divided into four classes, viz.

1. ACIDULOUS; owing their properties chiefly to carbonic acid; they are tonic and diuretic, and in large doses produce a transient exhilaration; the most celebrated are *Pymont*, *Seltzer*, *Spa*, *Carlsbad*, and *Scarborough*.

2. CHALYBEATE; containing iron in the form of *sulphate*, *carbonate*, or *muriate*;* they have a styptic, inky taste; *Hartfell* near *Moffat*, *Peterhead*, *Tunbridge*, *Brighton*, *Cheltenham*, *Bath*, *Leamington Priors*, *Castle Horneck*, near *Penzance*, &c.

3. SULPHUREOUS WATERS derive their character from sulphuretted hydrogen, either uncombined, or united with lime, or an alkali: *Engien*, *Aix la Chapelle*, *Harrowgate*, *Moffat*.

* There is a precaution respecting the preservation of these waters for analysis with which the chymist ought to be acquainted; it will be fully explained by the relation of the following anecdote. M. Wurza, on examining some bottles of Chalybeate water, could detect no signs of iron in them, and on seeking for the cause of this circumstance he discovered it in the astringent nature of the corks which had combined with the metallic substance, and abstracted it from the water.

4. **SALINE**; mostly purgative, and are advantageously employed in those hypochondriacal and visceral diseases that require continued and moderate relaxation of the bowels; *Cheltenham*, *Leamington*, *Seidlitz*, and all brackish waters.

Some springs, as those of *Bath*, *Matlock*, and *Buxton*, owe their virtues rather to temperature than to any other cause, and others, as *Malvern*, to the diluent power of the water.

In the *Codex Medicamentarius* of Paris, formulæ are introduced for the preparation of several more distinguished mineral waters, under the head "*Aquæ Mineralis Arte Factæ*."*

* The Mineral Springs in the United States more especially deserving of notice, are those of *Saratoga* and *Ballston* in the state of New-York, and of *Schooley's Mountain*, in New Jersey. Of the two first various analyses have been published by different chymists, but with so little uniformity of result as to leave their true chymical character still in a state of uncertainty. An account of these discrepancies may be seen in the *New England Journal of Medicine and Surgery*, for 1817. As the analysis of Dr. Steel appears upon the whole to be the most satisfactory, we shall quote it. One gallon of the water was the quantity used in the Experiments.

BALLSTON.		2. <i>Columbian Spring</i> .—Temp. 50° Far.	
1. <i>Public Spring</i> .—Temperat. 50° Far.		Muriate of Soda	201.5
Muriate of Soda	159.	Carbonate of Soda	22.5
Carbonate of Soda	9.	Carbonate of Lime	121.
Carbonate of Lime	75.5	Carbonate of Magnesia	1.5
Carbonate of Magnesia	2.5	Carbonate of Iron	7.5
Carbonate of Iron	7.		
	253. grs.		354. grs.
Carbonic Acid 210 Cubic inches.		Carbonic Acid 236 Cubic inches.	
2. <i>Low's Spring</i> .—Temperat. 52°		3. <i>High rock Spring</i> .—Temp. 48°	
Muriate of Soda	142.	Muriate of Soda	210.
Carbonate of Soda	10.	Carbonate of Soda	18.
Carbonate of Lime	64.5	Carbonate of Lime	115.
Carbonate of Magnesia	1.5	Carbonate of Magnesia	.5
Carbonate of Iron	6.	Carbonate of Iron	4.5
	224. grs.		348. grs.
Carbonic Acid 220 Cubic inches.		Carbonic Acid 243 Cubic inches.	
3. <i>New Spring</i> .—Temperat. 50°		SCHOOLEY'S MOUNTAIN.	
Muriate of Soda	145.	According to the analysis of Dr. M' Nevin,	
Carbonate of Soda	12.	these waters consist of:	
Carbonate of Lime	61.5	Extractive	0.92
Carbonate of Magnesia	9.	Muriate of Soda	0.43
Carbonate of Iron	7.5	Muriate of Lime	2.40
	235. grs.	Muriate of Magnesia	0.50
Carbonic Acid 159.5 Cubic inches.		Carbonate of Lime	7.99
SARATOGA.		Sulphate of Lime	0.65
1. <i>Congress Spring</i> .—Temperat. 50°		Carbonate of Magnesia	0.40
Muriate of Soda	471.5	Silex	0.80
Carbonate of Lime	178.476	Carbonated Oxyd of Iron	2.00
Carbonate of Soda	16.5	Loss	0.41
Carbonate of Magnesia	3.356		
Carbonate of Iron	6.168		16.50
	676. grs.		
Carbonic Acid 343 Cubic inches.			

The diseases in which the *Ballston* and *Saratoga* waters have been recommended are dyspepsia, hypochondriasis, hysteria, dropsy, paralysis, chronic gout, and rheu-

ARGENTI NITRAS. L. Nitras Argenti. E.D.

Fused Nitrate of Silver, olim, Lunar Caustic.

QUALITIES. Fused nitrate of silver is in small cylinders of a dark gray colour, and presenting, when broken across, a crystalline structure. *Odour*, none; *Taste*, intensely bitter, austere and metallic; it tinges the skin indelibly black; when perfectly free from copper, it is not deliquescent. **CHYMICAL COMPOSITION;** oxide of silver 70, nitric acid 30, or one atom of oxide and one atom of acid. **SOLUBILITY.** In an equal weight of water, at 60°; it is also soluble in alcohol. The solution readily yields transparent colourless crystals, the primary form of which is a *right rhombic prism*. **INCOMPATIBLE SUBSTANCES.** *Fixed alkalies* and *alkaline earths*, the *muriatic*, *sulphuric*, and *tartaric* acids, and all the salts which contain them; *Soaps*, *arsenic*, *hydro-sulphurets*, *astringent vegetable infusions*, *undistilled waters*. The solutions of nitrate of silver are not disturbed by ammonia, the *ammoniuret* being very soluble; the carbonate of ammonia, however, produces a precipitation. Nitrate of silver tinges the skin and hair black, and has been frequently employed for the latter purpose;* it likewise forms the basis of permanent ink.† **MEDICINAL USES.** Tonic, antispasmodic, and escharotic; it is said to prove efficacious in epilepsy, but during a trial for several years in the Westminster hospital, I never could discover its virtues; many of the cases in which it has been supposed to have been successful, probably derived advantage from the purgative medicines which were simultaneously administered. It possesses a bitter taste, and it has been said to act like vegetable bitters upon the digestive organs, and to offer a resource in dyspeptic complaints. It is principally useful as an external application, and may be considered as the strongest and most manageable caustic that we possess; whilst in solution it acts as a useful stimulant in indolent ulcers; and being possessed of the power of coagulating animal matter, it does not spread to any extent, and is therefore extremely convenient where a large eschar is to be avoided. A weak solution of this metallic salt has lately been strongly recommended by a French surgeon, as a remedy for piles of long standing; it also forms an excellent lotion to excite the weak granulations of fungous ulcers. It is, moreover, said to be highly useful as an injection in cases of puriform discharges from the ear; before we direct, however, such an application, it is highly necessary that we should ascertain the tympanum to be entire, or the liquid may escape into the internal ear, and occasion very alarming irritation;

matism, chlorosis, suppression of the menses, and diseases of the bladder and kidneys.

The waters of Schooley's Mountain besides their general utility in diseases of the digestive organs, have proved eminently successful in calculous affections. *Ed.*

* For the same purpose the French employ a pomatum prepared with the oxide of bismuth, and it is said to answer the intention.

† **PERMANENT INK FOR MARKING LINEN.** This preparation is a solution of nitrate of silver, thickened with sap green, or cochineal. The preparing liquid, or Pounce liquid, as it is technically called, with which the linen to be marked is previously wetted, is a solution of soda, boiled with gum, or some animal mucilage. It is a curious circumstance that if potass be used for this purpose, the marking ink will run.

an event which unhappily occurred, not long since, in the case of a noble duke of high military renown. **FORMS OF EXHIBITION.** For internal use, in pills made with crumb of bread, with the addition of some sugar, to prevent the mass from being too hard. **Dose**, gr. $\frac{1}{8}$, gradually increased to gr. j. **ADULTERATIONS.** *Copper* may be always suspected when it deliquesces, and is to be immediately detected by its solution assuming a blue colour, when supersaturated with ammonia. The sticks should be preserved in closely stopped phials, and covered with soft and dry paper. **ANTIDOTE.** When this substance has been taken in excess, muriate of soda is its true antidote; indeed so completely does it decompose, and separate it from water, that if a saturated solution of nitrate of silver be filtered through common salt, it may be afterwards drunk with impunity. This circumstance alone would of necessity render nitrate of silver a very uncertain remedy; and yet it is evident that the basis of this salt is occasionally absorbed, for there are several cases upon record, in which the oxyd of silver has been deposited in the rete mucosum, and given a purple hue of a very singular appearance to the patient; I have lately witnessed an instance of this kind in a lady who had taken large doses of the nitrate, for the purpose of curing a dyspeptic complaint; and several other similar cases stand recorded in different works.

ARMORACIÆ RADIX. L.E. (*Cochlearia*)
(*Armoracia*)

Raphanus Rusticanus, D. *Horse* Radish Root.*

QUALITIES. *Taste*, hot and acrid; *Odour*, pungent. **CHYMICAL COMPOSITION.** All its virtues depend upon an essential oil. **SOLUBILITY.** Both water and alcohol extract its active principles, but they are dissipated by decoction. **MEDICINAL USES.** As a stimulant in paralysis it is often useful; Sydenham found it successful in dropsies which were consequent on intermittent fevers; Cullen recommends a syrup made with the infusion of horse radish, to remove that species of hoarseness which depends upon local relaxation; Dr. Withering extols an infusion of this root in milk as a cosmetic both safe and effectual. **INCOMPATIBLE SUBSTANCES.** *Alkaline Carbonates*; *Oxy-muriate of Mercury*; *Nitrate of Silver*; the *Infusion of Galls*, and of *Yellow Cinchona Bark*, produce precipitates with the infusion of this root. **FORMS OF EXHIBITION.** In substance, scraped or swallowed whole, or in infusion.† **Dose** of the substance ʒj, of an infusion fʒij. See *Infus Armoraciæ comp.* **OFFICIAL PREPARATIONS.** *Infusum Armoraciæ comp*: **L.** *Spiritus Armoraciæ comp*: **L.D.**

* Horse-radish; horse-mint; bull-rush; &c. These epithets are Grecisms; *ἵππος* and *βους*, i. e. horse and bull, when prefixed to any word, signified no more than great; thus the great Dock, Hippo-lapathum, and the horse of Alexander from the size of his head was named Bucephalus.

† An infusion of horse-radish is a very ancient remedy in disorders of the stomach. In Paulus Ægineta we shall find a letter written by Carytius Antigonus, in which it is highly recommended for such a purpose.

ARSENICUM ALBUM (*Acidum Arseniosum.*)Oxydum Arsenici. E. Arsenicum. D. *White Arsenic.**Arsenious Acid.* vulgo *Arsenic.*

QUALITIES. *Form*, shining semivitreous lumps, breaking with a conchoidal fracture, and when reduced to powder, bearing some resemblance to white sugar; *Taste* acrid and corrosive, but not in any degree corresponding with its virulence, leaving an impression of sweetness. *Specific gravity*, 3.7; it is volatilized at the temperature of 383° *Fah*: and by a strong heat is vitrified into a transparent glass capable of crystallizing in tetrahedra with truncated angles, or rather in octohedra. In the state of vapour it is quite inodorous, although it is asserted in many chymical works of authority to yield a smell like that of garlic; the fact is that the alliaceous or garlic-like smell is wholly confined to *metallic arsenic* in a state of vapour, and whenever the arsenious acid seems to yield this odour, we may infer that its decomposition has taken place; this happens when it is projected upon ignited charcoal, or when heated in contact with those metallic bodies which readily unite with oxygen, as *Antimony* and *Tin*. It is stated by Orfila and other chymists, that if it be projected upon heated copper the alliaceous odour is evolved. This assertion is undoubtedly true, but the fact requires to be explained with more precision, or we may fall into an important error respecting it. The phenomenon takes place only when the copper is in a state of ignition, at which temperature its affinity for oxygen enables it to reduce the arsenious acid; for I find by experiment that if a few grains of this substance be heated on a plate of copper, by means of a spirit lamp or blow-pipe, no odour is perceptible, for the whole of the acid is dissipated before the copper can acquire a sufficiently exalted temperature to deoxidize it. If the arsenious acid be heated on a plate of zinc, the smell is not evolved until the metal is in the state of fusion; if instead of these metals we employ in our experiments those of gold, silver, or platinum, no alliaceous smell whatever is produced, at any temperature. It however deserves particular notice, that the flame of the spirit lamp is itself capable of decomposing the oxyd, in consequence of the operation of its hydrogen: a fact which is very likely to betray the chymist into the fallacious belief that the oxyd does yield the odour in question.* It is probable that arsenical vapours which yield this peculiar odour are less noxious than those which are inodorous, but I am not aware that the knowledge of this fact can be applied to any purpose of practical importance.†

* The chymist may satisfy himself of this fact by heating some arsenious acid on a piece of platinum foil, and alternately raising and depressing it into the blue flame of the spirit, when corresponding changes in odour will take place.

† It will probably afford a satisfactory explanation of the circumstance mentioned by Dr. Percival, that the workmen who solder silver filligree with an arsenical alloy, are never affected by the fumes. Dr. Percival does not appear to have been in the least aware of the probable reason of this fact; he says, "This solder is melted by the flame of a lamp directed by a blow-pipe: the greatest part of the arsenic is evaporated by the blast and flame, and some part also of the rest of the solder, and yet the men appear to enjoy as good health, and to live as long as other artists! Amongst other examples of the truth of this observation, I lately saw in the manufactory at the Soho at

CHYMICAL COMPOSITION. This substance possesses many of the essential habitudes of an acid, as for instance, that of combining with the pure alkalies to saturation; it is therefore very properly denominated *Arsenious Acid*. It may be farther acidified by distilling it with nitrous *Arsenic Acid*; from experiments on the quantity of oxygen absorbed by metallic arsenic, during its conversion into these two compounds, instituted by Proust and Davy, it appears that the *arsenious acid* consists of about 25 of oxygen and 75 of metal, and the *arsenic acid* of 33 of oxygen and 67 of metal; or the quantity of metal being the same, that the oxygen in the latter compound is to that in the former nearly as three to two.

SOLUBILITY. We have but lately been set right upon this point; Klaproth has shown that it requires for its solution 400 parts of water at 60°, and only 13 at 212°, and moreover, that if 100 parts of water be boiled on the arsenious acid, and suffered to cool, it will retain three grains in solution, and deposit the remainder in tetrahedral crystals; this fact shows the importance of employing boiling water in every chymical examination of substances supposed to contain arsenic. It is soluble in alcohol and oils, the former taking up two per cent.; with lime water it produces a white precipitate of *arsenite of lime*, which is soluble in an excess of arsenious acid; with magnesia it forms a soluble *arsenite*, which proves very virulent. The poisonous effects of arsenious acid are so amply detailed in medical works,* that it would be superfluous to dwell upon them in this place; it may however be interesting and useful to record an account of the pernicious influence of arsenical fumes upon organized beings, as I have been enabled to ascertain in the copper smelting works, and tin burning-houses of Cornwall. This influence is very apparent in the condition both of the animals and vegetables in the vicinity; horses and cows commonly lose their hoofs, and the latter are often to be seen in the neighbouring pastures crawling on their knees and not unfrequently suffering from a cancerous affection in their rumps, whilst the milch cows, in addition to those miseries, are soon deprived of their milk; the men employed in the works are more healthy than we could *a priori* have supposed possible: the antidote upon which they all rely with confidence, whenever they are infested with more than an ordinary portion of arsenical vapour, is *sweet oil*, and an annual sum is allowed by the proprietors in order that it may be constantly supplied; this opinion is not solitary, for Tachenius relates that the poisonous effects, such as convulsions, gripes, and bloody stools, with which he was seized from exposure to the fumes of arsenic, were relieved by milk and oil.

Birmingham, a man of more than fifty years of age, who had soldered silver filligree for thirty-five years, and had regularly, during that period, passed from eight to ten hours daily in his occupation, and yet he was fat, strong, active, cheerful, and of a complexion by no means sickly; neither he nor his brother artists use any means to counteract the effect of their trade." Dr. Rotheram, in a letter to Dr. Percival comments upon this fact, and says, "how far the fluxes used in soldering the filligree may fix the parts of the arsenic, or from what cause these workmen might escape, I dare not say, but I should notwithstanding strongly suspect the fumes of this very volatile and caustic mineral to be very prejudicial."—I have shown in the preceding page that arsenious acid is readily decomposed when heated in contact with an oxidable metal, and I apprehend that this fact will explain the reason why the fumes of the alloy in question are disarmed of their virulence.

* In my work on Medical Jurisprudence, (Vol. ii. p. 216) the reader will find a very full account of the symptoms produced by this poison.

It deserves notice that the smelters are occasionally affected with a cancerous disease in the scrotum, similar to that which infests chimney-sweepers, and it is singular that Stahl in describing the putrescent tendency in the bodies of those who die from this poison, mentions in particular the gangrenous appearance of these parts. It is a very extraordinary fact that previous to the establishment of the copper works in Cornwall, the marshes in that vicinity were continually exciting intermittent fever, whereas since that period a case of ague has not occurred in the neighbourhood; I have heard it remarked by the men in the works, that the smoke *kills* all fevers. The fact is here stated without any other comment than that the agricultural improvements which have taken place in the district, are not sufficient to afford any clue to the explanation of the circumstance. **MEDICINAL USES.** Much has been said upon this subject, and the propriety and safety of its exhibition has been often questioned; there can be no doubt but that the greatest circumspection is required in the practitioner who administers it, and it ought not, in my opinion, to be employed until other remedies have failed; that it is capable of accumulating in the system is very evident, and this, in certain habits, may predispose the patient to serious diseases; the form in which it is most manageable and least dangerous, is that of solution. See *Liquor Arsenicalis*. Some practitioners have exhibited it in substance, made into pills, by rubbing one grain with ten of sugar, and then beating the mixture with a sufficient quantity of crumb of bread to form ten pills, one of which is a dose. The Chinese and other oriental nations form the sulphuret of arsenic (*realgar*) into medical cups, and use lemon juice, after it has stood some hours in them, by way of cathartic. As an external application, arsenic has long been extolled in the cure of cancers; the caustic so extensively used under the sanction of the late Mr. Justamond in cases of open cancer, consisted of two parts of Antimony, and one of Arsenious acid, fluxed together in a crucible, and afterwards levigated, and reduced to the requisite degree of mildness by the addition of powdered Opium.* But it deserves notice in this place, that repeated experiments have proved that arsenic kills† more rapidly when applied

* **PLUNKETT'S OINTMENT**, consists of arsenious acid, sulphur, and the powdered flowers of the *Ranunculus Flammula*, and *Cotula Foetida*, levigated and made into a paste with the white of an egg, and applied, on a piece of pig's bladder, to the surface of the cancer.

PATE ARSENICALE. This favourite remedy of the French surgeons consists of 70 parts of cinnabar, 22 of sanguis draconis, and 8 of arsenious acid, made into paste with saliva, at the time of applying it. This combination, observes a periodical writer, is similar, with the exception of the ashes of the soles of old shoes, to that recommended by Father Cosmo under the name of "*Pulvis Anti-carcinomatosa*."

DAVIDSON'S REMEDY FOR CANCER, arsenious acid, and powdered hemlock.

† In the *Journal de Medicine*, the following case of a woman is related who was killed by her husband having insinuated powdered arsenic into the vagina, at the moment of enjoying the conjugal rites. "A woman at Leneux, department de l'Ourthe, aged 40, having died after a short illness, attended with considerable tumefaction of the genital parts, uterine hemorrhage, vomiting, and purging, the body was inspected by order of the mayor, when the surgeons reported that they found the vulva in a state of gangrene, the abdomen much distended with air, and the intestines inflamed and gangrenous. The culprit was arrested, convicted, and executed." In the Acts of the Society of Medicine of Copenhagen, a similar crime is recorded, committed also by a peasant; in this latter case, although some small pieces of arsenic were found within the vagina, yet, some doubting the possibility of this species of poisoning, the magistrates consulted the College of Medicine of Copenhagen, who

externally to an abraded part, than when internally administered. See p. 135. *Lionardo di Capoa* relates the case of a child killed by the violent vomiting and purging arising from a slight wound made in the head by a comb, wet with oil, in which Arsenic had been diffused for the purpose of killing vermin; and we have numerous instances on record, where the application of arsenical cerates and ointments has been followed by violent and dangerous symptoms. We also learn from the different historians of the Plague of London, that the arsenical amulets which were worn, as preservatives, on that occasion, were sometimes attended with deleterious consequences; *Crato* (Epist. 168.) observed an ulcer of the breast produced by them. *Vernascha*, violent pains and syncope. Amongst the foreign authors who have related cases of poisoning by the external application of Arsenic we may mention *Desgranges* (*Recueil Period: de la Societ  de Med: de Paris*, T. vi. p. 22.) who records the history of a chambermaid, poisoned by having rubbed her head with an arsenical ointment for the purpose of destroying vermin; and *Roux* (*Nouveaux Elements de Med: Operat. par J. P. Roux*,) who professed to have killed a girl of eighteen by an application of the "*Pate Arsenicale*" to a cancerous breast. To the Empirics of our own times we are indebted for many fatal illustrations of the subject. Since the last edition of this work, a lady applied to a well known Quack, distinguished for his impudent pretensions in the treatment of cancer, and submitted to a caustic application to the breast. In a short time paralysis ensued, and the application was discovered to contain a large proportion of Arsenic, and that the disease, for the cure of which it had been applied, was *not* cancer. A somewhat analogous case occurred under the care of a bold empiric in the neighbourhood of St. George's Fields, who undertook to remove the deformity of bow legs in a dandy drawing-master! by *rasping the shin bones*, and applying arsenic to the surface of the wound; in consequence of which, in addition to extensive local mischief, the unhappy dupe became paralytic.* It is also necessary to inform the practitioner that Arsenious acid has been known to produce poisonous effects when applied to the *unbroken* skin: a case of this nature is related by *Desgranges*, in the sixth volume of the *Receuil Periodique de la Soc: de*

decided the question in the affirmative, by instituting a series of experiments upon horses.

SINGLETON'S EYE SALVE, or GOLDEN OINTMENT. Under this name is sold a preparation which consists of sulphuret of arsenic (orpiment) with lard, or spermaceti ointment. The Unguentum Hydrargyri Nitrico Oxydi of the London College is also sold under the same title.

DELCROIX'S POUDRE SUBTIL, "for removing superfluous hair in less than ten minutes!" This fashionable depilatory appears upon examination to consist of Quicklime and Sulphuret of Arsenic, with some vegetable powder. It is however, so unequally mixed, that in submitting it to analysis, no two portions afforded the same results. It can scarcely be necessary to state, that such a composition is incapable of fulfilling the intention for which it so confidently vended.

In Paris, arsenic forms the basis of several blistering cerates. Such applications cannot be safe.

* More than one case has come within the knowledge of the writer, in which paralysis has resulted from the incautious application of arsenical ointment. In one instance in which it was used to a cancer it speedily produced paralysis, which eventually destroyed the patient. In two other cases in which he has seen it applied to venereal sores, it has been succeeded by paralysis of the lower extremities. Too much caution cannot be exercised in the use of this powerful article. *Ed.*

Med: another may be found in the 22d volume of the *Acta Germanica* (1730;) and Renault obtained similar results in his experiments on animals. When the system is under the influence of arsenic, the following symptoms will appear, viz. thickness, redness, and stiffness of the palpebræ, soreness of the gums, ptyalism, itching over the surface of the body, restlessness, cough, pain in the stomach and bowels, headach, and I have also occasionally noticed paucity of urine, and even stranguary, a fact of which I find no mention in other authors. Strange as it may appear, *Arsenic* has been inhaled, together with the vapours of frankincense, myrrh, and those of other gums, during a paroxysm of asthma! This extraordinary practice arose from the practitioner mistaking the gum juniper, or *Vernix* of the Arabians, which by their medical authors was prescribed in fumigations under the name of *Sanderach*, for the *Σανδαράχη* of Aristotle, which was a sulphuret of arsenic.

ADULTERATIONS. It is frequently sophisticated with chalk, gypsum, or sulphate of barytes; the fraud is instantly detected by its not being entirely volatilized by heat, or by any insoluble residuum occurring in preparing the *Liquor Arsenicalis*, according to the directions of the pharmacopœia. To many the adulteration of so active a substance may seem unimportant, but in consequence of its being thus rendered a medicine of variable activity, it is one of the most dangerous frauds which can be committed; a very unpleasant circumstance lately occurred from such a cause in one of our public institutions: arsenic had been obtained from the shop of a respectable chymist, who had not usually supplied the establishment, for the purpose of preparing the arsenical solution: the article happened to be less adulterated than that which had been previously employed; the solution, however, was prepared in the usual way, and the usual dose was continued, when the patients were soon seized with violent pains in the bowels, and the cause was not detected until by an examination of the bottle the usual sediment was not discovered.

ANTIDOTES. Late researches have shown that *sulphuret of potass*, on which physicians have placed so much reliance, merits no confidence. The great indication to be fulfilled in all cases of poisoning is to excite vomiting, and to administer liquids, which are the least liable to act as solvents of the acrid matter, on which account lime water presents itself as a very appropriate fluid. The subject, however, is very fully considered in a preceding part of this work, to which I am very desirous of directing the attention of the medical practitioner; see *Antidotes*.

Methods of detecting the presence of Arsenious Acid.

1. *By its reduction to a metallic state.* Mix a portion of the suspected powder with three times its weight of *black flux*;* put the mixture into a thin glass tube, hermetically closed† at one end, about eight inches in

* This substance may be considered as consisting of charcoal, in a state of extremely minute division, and the sub-carbonate of potass. It is prepared by deflagrating, in a crucible, two parts of Super-tartrate of Potass with one part of Nitrate of Potass.

† In order to close the end of the tube, where a blow-pipe is not to be procured, the end is to be placed in a common fire, until it is completely softened, and a pair of small

length and one fourth of an inch in diameter ; should any of the powder adhere to the sides of the tube, it must be carefully brushed off with a feather, so that the inner surface of its upper part may be perfectly clean and dry ; the closed end of the tube, by way of security, may be thinly coated with a mixture of pipe-clay and sand,* but this operation is not absolutely necessary ; the open extremity is to be loosely plugged with a piece of paper ; the coated end must be now heated on a chaffing dish of red hot coals, when the arsenic, if present, will sublime and be found lining with a brilliant metallic crust the upper part of the tube : a portion of this reduced metal, if it be arsenic, will, when laid on heated iron, exhale in dense fumes, which are characterised by a strong smell of garlic. Mr. Phillips has lately stated that the tube may be sufficiently heated, for the purpose of metallization, by means of a spirit lamp.†

It merits particular notice, that in reducing by the above process the arsenious acid to the state of metal, the presence of potass in the flux is very essential, since it forms immediately an *arsenite of potass*, and thereby fixes the arsenious acid, and prevents it from being volatilized before the temperature is sufficiently high to enable the charcoal to decompose it ; an ignorance of this fact has not unfrequently proved a source of disappointment and fallacy.

Another method of identifying *white arsenic* by metallization, is to form at the moment of its reduction, an alloy with copper, which is easily effected in the following manner,—Mix the suspected powder with black flux, as in the former experiment, and place the mixture between two polished plates of copper, bind them tight together by iron wire, and expose them to a low red heat ; if the included substance contained arsenic, a silvery white stain will be left on the surface of the copper, which is an alloy of the two metals. If in this, as in the former experiment, charcoal be employed without the addition of a fixed alkali, the result may, for the same reason, prove unsatisfactory. But, with whatever care this experiment is conducted, it is, to say the least, a clumsy and unsatisfactory test, and ought never to be relied upon.

tongs being at the same time made red hot, the tube is to be withdrawn from the fire, and then heated and pinched by the tongs, and at the same time bent up at an acute angle, so as to be brought parallel to the body of the tube. The tube is then to be heated a second time, and being again firmly pinched by the hot tongs, the end will be found to be completely impervious. Where a glass is not at hand Mr. R. Phillips says a common draught phial may be made to answer the purpose, especially a *ten drachm* phial, for it is long in proportion to its diameter. In using it, however, care must be taken that the suspected powder and black flux do not reach the bottom, for, on account of its thickness, it will readily break on the application of heat. The phial must therefore be heated laterally by means of a spirit lamp.

* Dr. Bostock has informed us that the best proportions for this coating are one part of common pipe-clay, to three parts of fine sand ; which are to be well kneaded together, and reduced to such a state of tenacity, that the lute will readily adhere to the tube, and its different parts unite, without forming a visible seam. (Edinb. Med. & Surg. Journ. April, 1809.)

† Should the operator be unable to procure a spirit lamp, a very convenient substitute may be provided in the following manner. Let a piece of tin plate, about an inch long, be coiled up into a cylinder of about 3-8ths of an inch in diameter, and, if the edges be well hammered, it is not necessary to use solder. Perforate a cork, previously fitted to a phial, and put a cotton wick through the short tin tube, and the tube through the cork. The lamp is now complete, and will afford a strong flame, taking care of course not to prevent the rise of the spirit by fitting the cork too closely.

2. *By the application of certain Reagents, or Tests, to its Solutions.*

A great and important question has arisen in medicinal jurisprudence, whether any chymical proof of the presence of *white arsenic*, short of its actual reduction to the state of metal, can be depended upon, or ought to be received as evidence in the courts of criminal law. After a full experimental investigation of the subject, and an impartial review of all the facts which bear upon the question, I feel no hesitation in declaring it to be my conviction, that *white arsenic may be detected without any fear of fallacy, by a proper application of certain tests*, and that the contrary opinion is entirely founded in error, and unsupported by experiment, as will more fully appear in the sequel.*

(A.) *Fused Nitrate of Silver, or Lunar Caustic*—For this test we are indebted to Mr. Hume of London, who first gave it to the public in the *Philosophical Magazine* for May 1809, vol. xxxiii. His method of applying it is as follows: into a clean Florence flask introduce two or three grains of the suspected powder, to which add about eight ounces of rain or distilled water, and heat the solution until it begins to boil, then while it boils frequently shake the flask, and add to the hot solution a grain or two of sub-carbonate of potass, agitating the whole to make the mixture uniform. Pour into a wine glass about two table spoons-full of the solution, and touch the surface of the fluid with a stick of lunar caustic. If arsenic be present, a beautiful yellow precipitate will instantly proceed from the point of contact, and settle towards the bottom of the glass as a flocculent and copious precipitate.

By this test the 60th part of a grain may be satisfactorily recognized in two ounces of water. The presence of some alkali is essential to the success of the experiment, since arsenious acid is unable, by the opera-

* In the celebrated case of Kesler, who was tried in the state of New-York, some few years ago, for having poisoned his wife by Arsenic, this very question was agitated and gave rise to much learned controversy. The physicians originally called to examine the body of the deceased, found on dissection, the stomach and intestines highly inflamed, and on the inner surface of the stomach, particles of a vitreous appearance. These particles were subjected to various chymical tests, all of which very strikingly concurred in confirming the suspicion that they were arsenic. Upon this, in connexion with the other testimony adduced in the case, the prisoner was found guilty and condemned to death. The minutes of the trial were transmitted by the presiding judge (Yates) to Governor Clinton, who, very inconsiderately, we must believe, submitted the professional part of it to Dr. M'Nevin, of New-York, for his opinion in relation to it. Thus called upon, Dr. M. seems to have considered that his only business was to find fault. Objections were accordingly raised against every test hitherto employed by the best chymists for the detection of arsenic. They were all pronounced to be uncertain, and "*the only thing to be relied on,*" according to Dr. M. was "*the exhibition of the metal itself in its metallic lustre and state.*" After having instructed us how to perform the reduction of the metal, Dr. M. very amusingly tells us that in order to identify the metal, we may lay it upon hot coals and place it between copper plates, exposed to heat, two of the very tests against the uncertainty of which he had just been wasting so many words! Upon such reasoning as this was the execution of Kesler suspended by the Governor, who referred the whole case to the Legislature. That distinguished body appointed a committee to investigate the business—the result of whose labours was but little complimentary to the microscopic criticism of the New-York Professor of chymistry. The Legislature confirmed the verdict of the jury, and the criminal was executed.

It must furnish a source of the purest gratification to the medical witnesses concerned in this case, to find their opinions so unequivocally confirmed by a chymist so accomplished and versed as Dr. Paris. For a detailed account of this trial we refer to Beck's Medical Jurisprudence, Vol. 2. p. 239. *Ed.*

tion of simple affinity, to decompose the nitrate of silver.* The validity of this test has been questioned on the following grounds, which shall be fairly examined in order.

OBJECTION 1. *The alkaline phosphates are found to produce precipitates with silver, analogous in colour and appearance to the arsenite of silver.* This is undoubtedly the case when the experiment is performed in the manner just stated, but there are other reagents which will immediately distinguish these bodies, as will be seen under the history of the *Ammoniuret of silver*; I have also shown that there is a mode of so modifying the application of the silver test itself, that no error or doubt can arise in the use of it from the presence of phosphoric salts.† My method consists in conducting the trial on writing paper, instead of in glasses, thus—drop the suspected fluid on a piece of white paper, making with it a broad line; along this line a stick of lunar caustic is to be slowly drawn several times successively, when a streak is produced of a colour resembling that known by the name of *Indian Yellow*; and this is equally produced by the presence of arsenic and that of an alkaline phosphate, but the one from arsenic is rough, curdy, and flocculent, as if effected by a crayon, that from a phosphate homogeneous and uniform, resembling a water-colour laid smoothly on with a brush; but a most important and distinctive peculiarity soon succeeds, for in less than two minutes the phosphoric yellow fades into a *sad green*, and becomes gradually darker, and ultimately quite black; while on the other hand, the arsenical yellow remains permanent, or nearly so, for some time, when it becomes brown. In performing this experiment the sunshine should be avoided, or the transitions of the colour will take place too rapidly. It would be prudent also for the inexperienced operator to perform a similar experiment on a fluid known to contain arsenic, and on another with a phosphoric salt, as a standard of comparison. In this way the nitrate of silver, without the intervention of any other test, is fully capable of removing every ambiguity, and of furnishing a distinguishing mark of difference between the chymical action of arsenic and that of the phosphates. Mr. Hume states that he has repeated this experiment to his entire satisfaction,‡ and that, in a late unfortunate case of poisoning, he derived considerable information by its application. The laborious author of the *London Dispensatory* accepts it as an excellent test, but observes that it is rendered more luminous by brushing the streak lightly over with liquid ammonia immediately after the application of the caustic, when, if the arsenic be present, a bright queen's-yellow is produced which remains permanent for nearly an hour; but that when the lunar caustic produces a white-yellow before the ammonia is applied, we may infer the presence of some alkaline phosphate, rather than that of arsenic. One of the great advantages of this test is the very small quantity that is required for examination; it would be well therefore for the operator to perform the experiment in both ways on a separate paper.

* If any trifling opacity occur in a simple solution of arsenic, when assayed by the nitrate of silver, it may be considered as the effects of some casual impurities; this is further demonstrated by bringing over the surface of the arsenical liquid, a piece of blotting paper, or a stopper, moistened with a solution of ammonia, when there will instantly form a copious yellow precipitate of arsenic of silver. If this experiment be performed on a surface of glass, laid over white paper, the result is very striking and beautiful.

† *Annals of Philosophy*, vol. x, p. 60.

‡ *London Medical and Physical Journal*, January, 1818.

OBJECTION 2. *The Muricates produce precipitates with silver so copious and flocculent as to overcome every indication which the presence of arsenic would otherwise afford.* Dr. Marcet proposes to obviate this difficulty, by adding to the fluid to be examined dilute nitric acid, and then cautiously applying the nitrate of silver until the precipitation ceases; in this way the muriatic acid will be entirely removed, whilst the arsenic, if it be present, will remain in solution, and may be rendered evident by the affusion of ammonia, which will instantly produce the yellow precipitate in its characteristic form. This mode however it must be confessed appears complicated, and requires some chymical address for its accomplishment; it should be also known that the yellow precipitate thus produced is not always permanent, for it is soluble in the nitrate of ammonia formed during the process. Under these circumstances, it is surely preferable to precipitate at once from the suspected fluid all the substances which nitrate of silver can effect, and then to expose the mixed and ambiguous precipitate so obtained, to a low heat in a glass tube, when the arsenious acid will be immediately separated by sublimation. In this way the presence of muricates may even in certain cases be serviceable, especially if the quantity of arsenic be minute; for by increasing the bulk of the precipitate we shall decrease the difficulty of its examination. By this process, also, I should propose to meet the embarrassments which arise from the influence of various animal and vegetable substances, as milk, broth, wine, &c., so frequently present in the suspected liquid, and which are known to alter the character of the arsenical indications. In this case, however, we must not rely upon any single precipitant; after having thrown down all that is precipitable by the silver test, the super-natant liquid should be decanted, slightly acidified by acetic acid, and submitted to the action of Sulphuretted Hydrogen; when should any precipitate occur it must be separated and added to the former. Dr. Christison has demonstrated the importance of this proceeding by showing that the precipitates, occasioned by the Ammoniuirets of silver and copper, are soluble in certain vegetable infusions.* M. Orfila proposes to remove the difficulties and embarrassments, occasioned by the colouring matter of different media, by the application of *Chlorine*, so as to change the colour to a shade that will not offer any optical impediment to the characteristic indications of the different tests. I am ready to admit that such a mode of proceeding may, on certain occasions, assist the accomplished chymist in his analysis, but in the hands of a person less accustomed to chymical manipulation, I hesitate not to declare that it is subject to fatal fallacies;† whereas, by precipitating the

* In Wine and Porter, the solvent is probably Tartaric acid, for the arsenite of Silver is soluble in this as well as in the acetic and nitric acids. In Tea the solvent would appear to be Tannin. The Arsenite of Silver is likewise dissolved by the Tartaric acid, and also, but not so readily, by the Citric and Acetic acids.

† This opinion has lately received ample confirmation from the experiments of D. Christison, (Edinb. Med. and Surg. Journal, July, 1824) who has shown that the process of Orfila is objectionable on the three following grounds, viz.

1st. The colour is very seldom so entirely destroyed but that the precipitates produced by some of the tests still deviate to a certain degree from their characteristic tints; and although the colour of the fluid be even destroyed entirely, it often reappears in the precipitates.

2d. Although the Chlorine destroys the colour, it does not also take from the fluid its solvent action on the arsenical precipitates.

3d. In fluids decolorized by Chlorine, and containing no Arsenic, some of the tests

whole, and submitting the precipitate to the process of sublimation, we shall avoid every source of error. Why then should we attempt to pursue our game through the windings of a labyrinth, when a direct road lies before us, by which we may at once drive it into the open plain? Mr. Phillips has recently proposed the addition of animal charcoal (*Ivory Black*) for the purpose of destroying the colouring matter. He found that by mixing this substance with the *Liquor Arsenicalis*, that the colouring matter was so completely destroyed in a few minutes, that the test of nitrate of silver, or any other might be readily applied. This experiment was repeated with Port wine, gravy soup, and a strong infusion of onions, and he succeeded in these cases in procuring a solution sufficiently colourless for the application of the most delicate reagents. It might be supposed, adds Mr. Phillips, that the Phosphoric acid which the animal charcoal contains, might have some share in the production of the yellow precipitate with silver; he found, however, that water, or wine, which was merely digested on the animal charcoal, produced no effect with the nitrate of silver, except a slight precipitate of chloride; and this even, was prevented by lixiviation. I have, however, a serious objection to offer to this proposal. Animal charcoal, by some mode of operation not understood, possesses the property of removing certain substances from their solution in water; I have already noticed this effect with respect to Lime water, (see p. 249, *note*,) and I have lately found that it takes place with very dilute solutions of Arsenic.* Hence charcoal, as we shall presently find, may be employed for the purpose of detecting minute portions of arsenic.

OBJECTION 3. *Chromate of potass produces, with Nitrate of silver, a yellow precipitate which, when placed side by side with one produced by Arsenious acid, cannot be distinguished by colour or appearance from it.* This fact has lately been announced by Dr. Porter of the University of South Carolina. (Silliman's Journal, iii. 355.) But as the presence of chromate of potass can never be suspected in any research after arsenic, in cases of forensic interest, the fact is of no importance to the physician.

Where the Arsenious acid is mixed with vegetable matter, and it becomes difficult to separate it by filtration, the whole may be evaporated to dryness, taking great care that the heat applied for such a purpose never exceeds 250° *Fah*: or we shall lose the arsenic by volatilization. The residue thus obtained may then be submitted to a higher temperature, in a subliming vessel, in order to procure the arsenious acid in its pure state. Should the arsenious acid have, in the first instance, been

produce precipitates, not only precisely the same with those which they cause in the decolourized solutions of Arsenic, but likewise very similar in appearance to those caused in a pure aqueous solution of Arsenic.

* The experiments by which I ascertained this fact were made soon after the publication of Mr. Philip's paper, and long before I saw Dr. Christison's communication in the Edinburgh Journal. I merely mention this circumstance to add greater weight to the experimental evidence, for when different persons arrive at the same conclusion without any communication with each other, the strongest possible testimony is afforded. I may also add that my suspicions were raised to the probability of the fact by a knowledge of the action of charcoal upon lime water. In a philosophical point of view the fact is one of great interest; it seems to connect the phenomena of mechanical and chymical attraction. We have evidently a body removed from the state of solution by mechanical means.

dissolved in oil, Dr. Ure proposes to boil the solution in distilled water, and to separate the oil afterwards by the capillary action of wick threads. If the arsenious acid be mixed with resinous bodies, oil of turpentine may be employed as their solvent, which will leave the arsenic untouched. Dr. Black directed the application of alcohol for this purpose, but this is obviously improper, since arsenious acid is soluble in that fluid.

It has been stated that, in consequence of the inability of arsenious acid to decompose nitrate of silver by simple elective attraction, the presence of an alkali becomes indispensable in the examination, for which purpose Dr. Marcet has suggested the superior advantages which will attend the use of ammonia, in cases where the arsenic has not been previously combined with a fixed alkali, since it does not, when added singly, decompose nitrate of silver; a circumstance which in using the fixed alkalies is very liable to occasion fallacy. This led Mr. Hume to improve his original plan, by forming at once a compound, which he calls the *Ammoniaco-nitrate of silver*, but which may with more propriety be designated as an *Ammoniuret*.^{*} This is a triumph in the art of analysis; for whilst it obviates the necessity of ascertaining the exact proportion of alkali required in each experiment,[†] it possesses the valuable property of not in the least disturbing the phosphate of soda.

(B.) *Sulphate of Copper*. Like the preceding test, this also requires, for its success, that the arsenious acid should be combined with some alkali, in which case, by the operation of double elective attraction, an arsenite of copper is thrown down of a very striking and characteristic colour, being that of the well known pigment called *Scheele's green*; if arsenic be not present in the liquid so assayed, and a fixed alkali has been employed, the result will be a delicate *sky-blue*, instead of the *grass-green* precipitate.

Mr. Hume avails himself also of the peculiar property of ammonia to form a metallic salt, and has employed it with copper; he takes the sulphate or acetate of that metal, and by the same process as that described for the preparation of an ammoniuret of silver, forms another test. In using this, however, care must be taken that it be not too highly concentrated, for in that state it will not produce precipitation. Much controversy has taken place on the subject of sulphate of copper as a test for arsenic, and it has been stated, with more confidence than truth, that a *decoction of onions* has the property of imparting to the copper precipitate, which is produced by a fixed alkali, a colour and appearance analogous to that which is occasioned by arsenic. This opinion was boldly advanced and supported on a most important trial[‡] at the Lent

* The following is the formula for its preparation. Dissolve ten grains of lunar caustic in ten times its weight of distilled water, to this add, *guttatim*, liquid ammonia, until a precipitate is formed: continue cautiously to add the ammonia, repeatedly agitating the mixture until a precipitate is nearly redissolved. The object of allowing a small portion to remain undissolved is to guard against an excess of ammonia. Wherever the test is used, the liquid to which it is added ought to be quite cold.

† This is very important, for an excess of ammonia redissolves the yellow precipitate, and therefore defeats the object of the test. The fixed alkalies, in excess, have not such a property.

‡ The great impression made upon the public mind in Cornwall, by the above trial, produced a disposition to regard the cause of every sudden death with more than usual jealousy. See a Report of this trial in the Appendix of our work on Medical Jurisprudence.

assizes for Cornwall in 1817. Since this event an opportunity* has occurred which has enabled me to examine this alleged fact, by a fair and appropriate series of experiments, the result of which satisfactorily proved that the opinion was grounded on an optical fallacy, arising from the *blue* precipitate assuming a *green* colour, in consequence of having been viewed through a yellow medium.† The phosphoric salts may also, under similar circumstances, be mistaken for arsenic, for the intense blue colour of the phosphate of copper will thus necessarily appear green. This instance of optical fallacy is not solitary, for *corrosive sublimate* has been said to possess the character of an alkali, because it turns the syrup of violets green, whereas this change is to be attributed solely to the combination of the yellow hue of the sublimate with the blue colour of the violet.

Whenever therefore such a source of fallacy can be suspected, the operator would do well to repeat his experiment on white paper, in the manner I have before proposed, and the results which are obtained in glasses should always be examined by day-light, and viewed by reflected and not by transmitted light. The presence of Peroxide of Iron in the Cupreous salt will also impart a green colour to the precipitate produced by an alkali. To obviate any fallacy which might arise from this circumstance, Mr. Phillips proposes to add some pure Potass to the sulphate of copper ;

* In consequence of a report having arisen that a young woman had died after an illness of forty-eight hours, and been hastily buried at Madron, the magistrates of that district issued their warrant for the disinterment of the body, and requested my attendance at the examination. It appeared upon dissection that the immediate cause of death had been inflammation of the intestines; the stomach was found to contain a considerable portion of liquid, which was carefully collected and examined : no solid matter could be discovered in it. It appeared to consist principally of the remains of a quantity of penny-royal tea, which had been the last thing administered to the deceased. This was divided into several portions, and placed in separate wine glasses, and submitted, in the presence of the sheriff and other gentlemen, to a series of experiments, amongst which the following may be particularized, as bearing upon the question at issue.

1st. A few drops of a solution of sub-carbonate of potass were added to the liquid, in one of the glasses, when its colour, which was before of a light hazel, was instantly deepened into a reddish yellow; the sulphate of copper was then applied, when a precipitate fell down, which every one present immediately pronounced to be of a *vivid green* hue, but in pouring off the super-natant liquid, and transferring the precipitate upon white paper, it assumed a blue colour, without the least tinge of green; the explanation of the phenomenon, and the fallacy to which it gave rise, was obvious; the yellow colour, imparted to the liquid by the alkali, was the effect of that body upon vegetable extract, and will generally take place on adding it to the infusions of vegetable substances.

2d. To another portion of the liquid, the ammoniaco-nitrate of silver was added; a slight turbidness arose, but no yellow precipitate occurred.

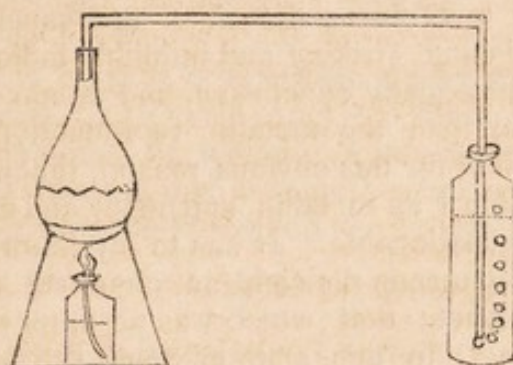
3rd. After adding a fixed alkali, the surface of the liquid was touched with a stick of lunar caustic, but no yellow precipitate was produced.

4th. The liquid was next assayed in a watch-glass, for a phosphate of soda, by endeavouring to form a triple salt with magnesia and ammonia, as suggested by Dr. Wollaston; the result proved that phosphate of soda was not present. It is unnecessary to pursue the relation of the experiments; I conceive that sufficient evidence has been adduced to establish the truth of the explanation. I have frequently repeated the first experiment, substituting for the gastric infusion, a decoction of onions, and with similar results.

† This explanation applies equally to the objection lately advanced by Dr. Porter, of the University of South Carolina, who, in observing on the tests for arsenic, remarks, that an appearance similar to Scheele's Green, is produced by the carbonate of potass when added to a solution of copper containing coffee, but without arsenic, more striking than if a weak solution of arsenic be used. Silliman's Journal, iii. 365.

if pure, a fine blue precipitate will be thus obtained ; to this may be then added the suspected solution, and if arsenious acid be present, it will then convert this blue precipitate to a green one.

(C.) *Sulphuretted Hydrogen*. This is a very delicate test for arsenic, producing with its solution a beautiful golden coloured liquor, which after a short time lets fall a precipitate. Mr. Phillips,* in reviewing the third edition of the present work, has stated, that no such precipitate occurs, but I find that in close, as well as in vessels exposed to the air, it takes place by repose. By this reagent, so small a quantity as $\frac{1}{1000000}$ may be detected in solution ; and it may be also stated in farther proof of the utility of this test, that it is less affected than any other by the presence of animal or vegetable matter. The method of preparing a solution of sulphuretted hydrogen gas is extremely simple. Put into an oil flask about two ounces of undiluted muriatic acid and an ounce and a half of powdered Sulphuret of Antimony ; fit a cork to the flask and pass through it the short leg of a small glass tube twice bent at right angles ; pass the longer leg of the tube into a phial containing distilled water, and then by the heat of a spirit lamp applied to the flask, sulphuretted hydrogen gas will be abundantly liberated, and though much of it will escape, yet a sufficient quantity will be dissolved by the water. The annexed sketch represents the apparatus proposed by Mr. Phillips, and which will require but little practical skill, either for its construction or use.



But it is not always necessary to prepare a watery solution of Sulphuretted Hydrogen, a stream of the gas, introduced into the suspected liquor by means of the above apparatus, will act with equal delicacy, and possesses as Dr. Christison has observed, the advantage of not diluting it. Before applying this test, it is necessary to add an acid, if any alkali should exist along with Arsenic, otherwise no precipitate will take place.

(D.) *Alkaline Hydro-sulphurets*. These bodies do not affect the arsenious solution, unless a few drops of acetic acid be added. To the *Hydro-sulphuret*, or perhaps more properly, *Hydroguretted Sulphuret*, of Ammonia, there is an insuperable objection, since this fluid, when diluted, possesses the colour which we expect to produce by the action of Sulphuretted Hydrogen upon Arsenious Acid.

(E.) *Charcoal Powder*. This test was proposed by Mr. A. Thomson, (London Dispensatory, 2nd edition, p. 53.) Into the suspected solution stir a moderate quantity of charcoal powder, allow it to settle, then pour off the super-natant liquor, and when the powder which remains is dry, sprinkle some of it on a red hot poker, when, if the solution should contain Arsenic, the odour of Garlic will be rendered sensible. I have al-

* Annals of Philosophy, New Series, No. III. for March, 1821.

ready offered some remarks upon the cause of this phenomenon (page 306-7.)

There are several other tests by which arsenic may be identified. The process described in the Dublin Pharmacopœia for the preparation of *Arsenias Kali*, the arseniate, or rather super-arseniate of potass, which has been long known under the name of "the arsenical salt of Macquer," has been strongly advised as a collateral proof; it consists in decomposing the nitrate of potass * by the arsenious acid, but since this problem requires that the suspected poison should be in a solid and palpable form, it is impossible to examine its pretensions to our confidence, without being reminded of the story so often told to us in our infancy, of catching a bird by laying salt upon its tail.

It is necessary to observe in this place, that the *arseniate*, like the *arsenite of potass*, or that of *ammonia*, is obedient to the silver test, but that instead of the yellow precipitate, which is produced by the latter salt, we obtain, by the former, a red or brick-coloured one.

If arsenious acid and quick-lime be heated together in a glass tube, a sudden ignition is occasioned at a certain temperature, when metallic arsenic will sublime, and an arseniate of lime be formed. In this case one portion of the arsenious acid is robbed of its oxygen to complete the acidification of the remainder.

In taking an impartial review of all the evidence which the investigation of this subject can furnish, it must appear to the most fastidious, that the silver and copper test above described are capable, under proper management, of furnishing striking and infallible indications, and that in most cases they will be equally conclusive, and in some even more satisfactory in their results, than the metallic reproduction upon which such stress has been laid, and for this obvious reason, that unless the quantity of metal be considerable,† its metallic splendour and appearance is often very ambiguous and questionable. It has to my knowledge happened to a medical person, by no means deficient in chymical address, to ascribe to the presence of arsenic that which was no other than a film of very finely divided charcoal: in this state of doubt the last resource was to

* The habitudes of arsenious acid with the nitrates were first observed by Kunkel; nitrous vapour is disengaged, part of the oxygen being absorbed by the arsenious acid, by which an arsenite of potass is formed.

† Dr. Bostock confesses that where less than three fourths of a grain were used, he could not say that the metallic crust was clearly perceptible; and Dr. Black considered that one grain was the smallest quantity which could be distinctly recognized by such a process. Dr. Jaeger (*Dissertatio Inauguralis*, Stuttgart, 1808) also observes that he has been enabled to recognize the tenth of a grain of arsenious acid, although mixed with sugar, by its odour, when thrown upon burning coals! I must be allowed to question this fact; Dr. Jaeger, no doubt, believed that he recognised the alliaceous odour, but it must have been the effect of imagination. Dr. Bostock observes that, if Arsenic be mixed with either an animal or vegetable substance, the smoke and smell arising from those bodies, when heated, will altogether prevent our recognizing its odour. He found that when a quantity of Arsenic was mixed with an equal weight of flour, and placed upon iron at a low red heat, so as not to cause the flour to inflame, the suffocating smoke that arose from the latter could be alone perceived; nor was it possible to discover that any thing had been mixed with it (*Edinb. Med. Journal.*) This objection of Dr. Bostock is true in fact, although it admits of a different explanation, for at a low temperature the Arsenious acid would be volatilized without decomposition; in which case no alliaceous odour can be developed. Dr. Traill has lately asserted (*Annals of Philosophy*, Feb. 1824) that he has recognized the alliaceous odour during the volatilization of 1/78th of a grain of the metal. I do not question the truth of this assertion, but there must have been an address in the manipulation which we cannot expect to find in ordinary experimenters.

ascertain whether it yielded, or not, upon being heated, an alliaceous odour. Surely an unprejudiced judge would prefer the evidence of sight, as furnished by the arsenical tests, to that of smell, as afforded in the last experiment. No one will attempt to deny that it is the duty of the medical practitioner who is called upon to decide so important a question as the presence of arsenic, to prosecute by experiment every point which admits the least doubt; he should also remember that in a criminal case, he has not only to satisfy his own conscience, but that he is bound, as far as he is able, to convince the public mind of the accuracy and truth of his researches; and he fails in his duty if he omits, through any false principle of humanity, to express the strong conviction which the success of his experiments must necessarily have produced in his mind. Let it however be remembered, that the application of chemical reagents on solutions suspected to contain arsenic, so far from throwing any obstacle in the way of the metallic reduction of that body, are the very steps which should be adopted as preparatory to the "*experimentum crucis*," since the precipitates which are thus produced may be collected, and easily decomposed, as before stated. Those who for judicial purposes may require farther information upon these subjects are referred to the second volume of our work on "*Medical Jurisprudence*." *Tit: Poisons.*

ARSENICI OXYDUM SUBLIMATUM. L.

Prepared Oxide of Arsenic.

The object of this process is to ensure a pure and uniform oxide; it has been already stated that a more dangerous fraud, can scarcely be committed than the adulteration of arsenic; I am therefore not inclined to coincide with Mr. Thomson, and to regard "the present process as superfluous," and the committee of the college entertained a similar opinion.

ASARI FOLIA. L.E.D. *Asarum Europæum.*

Asarabacca Leaves.

QUALITIES. The leaves, when recent, are nauseous, bitter, and acrimonious, and prove violently purgative and emetic, properties which are impaired by keeping. **CHEMICAL COMPOSITION,** a peculiar acrid principle not well understood. **SOLUBILITY,** water by infusion extracts their sensible properties, but they are lost by decoction. **Uses.** As an errhine, Dr. Cullen has remarked that they form the most useful species of this genus of local stimulants. **DOSE,** gr. iij to v. repeated every night until the full effect is produced. **OFFICINAL PREP.** *Pulvis Asari compositus.* E.D.

ASCLEPIAS TUBEROSA.

Pleurisy root. Radix.

[The root of this plant, which is very abundant in every part of the United States, is the part used in medicine. It has a bitter taste, and its most soluble portions are fecula and a bitter extractive matter. Its best menstruum is boiling water. Its medicinal properties are expectorant and diaphoretic. The diseases in which it has been found useful are catarrh, bronchitis, the passive stage of pneumonia, and in rheumatism. In sub-

stance it may be taken in doses from \mathfrak{Dj} to $3ss.$ Of the decoction, made by boiling half an ounce of the root in water, a tea cup full may be taken frequently during the day.]

ASSAFŒTIDA.* L.E.D.

Ferula Assafoetida. Gummi Resina.

QUALITIES. *Form*, small irregular masses, adhering together, of a variegated texture, and containing many little shining tears of a whitish, reddish, or violet hue. *Taste*, bitter and sub-acrid. *Odour*, fœtid and alliaceous, but this latter property is very much impaired by age. **CHEMICAL COMPOSITION.** Gum (or according to Brugnetelli, *extractive*) 60, resin 30, and essential oil 10 parts. **SOLUBILITY.** It yields all its virtues to alcohol and æther; if triturated with water it forms a milky mixture, but which is not permanent, unless some intermede be employed for the suspension of the gum resin; for this purpose egg may be added, in the proportion of one yelk to a drachm of assafoetida, or a permanent mixture may be effected by carefully triturating the gum resin with double its weight of mucilage. If $3vj$ of assafoetida be triturated with $3ss$ of camphor, a mass results of a proper consistence for a plaster; if triturated with carbonate of ammonia, it is easily reduced to powder, but undergoes no other change. **FORMS OF EXHIBITION;** in mixture or in pills.

The Indian physicians have an idea that on account of its stimulating powers, it will, if administered to a pregnant woman, produce abortion. *Dose*, gr. v. to \mathfrak{Dj} . *Form.* 23, 29. **MEDICINAL USES**, stimulant, antispasmodic, expectorant, and anthelmintic; in coughs, attended with pulmonary weakness, and a tendency to spasm, it is very beneficial; in cases of flatulent cholic, it has in the form of enema, acted like a charm; in habitual costiveness it often proves an invigorating aperient, and may be advantageously combined with resinous purgatives in torpor of the bowels connected with nervous symptoms. **OFFICINAL PREP.** *Mist: Assafoetid: L.D.* *Tinct: Assafoetid: L.E.D.* *Spir: Ammonia fœtid: (B) L.E.D.* *Tinct: Castori, comp: (B) E.* *Pil: Aloes cum Assafoetid: (G) E.* *Pil: Galbani: comp: (B) L.* *Enema fœtid: D.* **IMPURITIES.** Its characteristic odour should be powerful, and when broken, its fracture ought to exhibit a bluish-red appearance. It ought not to be brittle.

AURUM.

(Auri Murias.) *Muriate of Gold.*

[Gold was early used as a medicine. It fell however into total disrepute until its use was a few years since revived in France. Although it has attracted some attention lately, it can hardly be said, to have reclaimed a permanent place in the materia medica. The most striking effects

* Assafoetida was used by the ancients as a condiment, under the name of *σικφίδιον*, *Laserpitium*, (Pliny;) and according to Kempfer, the Persians use it for the same purpose. The Arabian writers on the materia medica class this article among their *Mobehyat (Aphrodisiaca)*. The term Assafoetida is derived from the monks of the Salernian school; some of the writers of the middle ages call it *Opium Cyrenaicum*, i. e. the Juice from Cyrene.

which it produces on the system, are an increase of urine and perspiration. It has been recommended in glandular swellings, gleet, schirrus of the uterus, scrofula, and dropsy. It is however as an antisiphilitic remedy that it has been principally celebrated. According to Dr. Chrestien of Montpellier, it would appear that gold was not merely adequate to the cure of syphilis in all its forms, but that it possesses very great advantages over mercury—It does not affect the gums, nor does it in any way disturb the general health of the patient. Notwithstanding this warm recommendation of Dr. Chrestien, it is still doubtful whether gold is adequate to the cure of syphilis. The best form in which the gold can be given is that of the muriate, prepared according to the directions of the Pharmacopœia of the United States; of this the dose is one fifteenth to one fourth of a grain, in pills, given every six, eight, or twelve hours.]

BALSAMUM PERUVIANUM. L.E.D.

(Myroxylon Pruiferum.) *Peruvian Balsam.*

QUALITIES. *Form*, a viscid liquid of a reddish brown colour. *Odour*, fragrant and aromatic. *Taste*, hot and bitter. **CHEMICAL COMPOSITION.** Resin, volatile oil, and benzoic acid; it is therefore a true *balsam*: this term was formerly applied to every vegetable resin having a strong scent and the fluidity of treacle, and which was supposed to possess many medicinal virtues; it is now restricted to those resins which contain the benzoic acid in their composition, of which there are only three, viz. the Balsams of *Peru*, *Tolu*, and *Benzoin*. **SOLUBILITY.** Water when boiled upon it dissolves only a portion of benzoic acid; æther is its most complete solvent; alcohol dissolves it completely, but the quantity of this menstruum must be considerable. **PROPERTIES**, stimulant, and tonic, on which account in certain chronic affections of the lungs, it has been found a serviceable expectorant; Sydenham gave it in Phthisis, but wherever any inflammatory action is to be apprehended Dr. Fothergill wisely cautions us against its use. **FORMS OF EXHIBITION.** Diffused in water by means of mucilage, or made into pills with any vegetable powder. **DOSE**, gr. v to 3j. **ADULTERATIONS.** A mixture of resin and some volatile oil with benzoin, is often sold for Peruvian Balsam, and the fraud is not easily detected, and is probably of but little importance.

BALSAMUM TOLUTANUM. L.E.D.

(Toluisera Balsamum.) *Balsam of Tolu.*

QUALITIES. *Form*, a thick tenacious liquid, becoming concrete by age, in which state it is usually found in the shops. *Taste*, warm and sweetish. *Odour*, extremely fragrant, resembling that of lemons. **CHEMICAL COMPOSITION.** Volatile oil, resin, and benzoic acid. **SOLUBILITY.** It is soluble in alcohol, forming a tincture which is rendered milky by water, but no precipitate falls. When dissolved in the smallest quantity of a solution of potass, its odour is changed into one that resembles clove pink. **MEDICINAL USES.** It has been regarded as expectorant. In turning to the classification of expectorants, p. 105, it will be found to occupy a place in the second division of our first class, for it may be considered as capable of stimulating the pulmonary exhalants; whence its use in chronic coughs. **FORMS OF EXHIBITION.** It may be suspended in water by means of mucilage, or yolk of egg, but it is rarely em-

ployed except on account of its agreeable flavour;* its virtues are similar to those of the Balsam of Peru. OFFICIAL PREP. *Tinct: Benzoin: comp: L.E.D. Tinct: Toluiferi Balsam: E.D. Syrup: Tolut: L.*

BELLADONNÆ† FOLIA. L.E.D.

(*Atropa Belladonna.*) *Deadly Nightshade.*

QUALITIES. The leaves are inodorous. *Taste*, slightly nauseous, sweetish, and subacid; their peculiar properties are not lost by drying. **CHEMICAL COMPOSITION.** Vauquelin found that the leaves contained a substance analogous to albumen, salts with a base of potass, and a bitter principle on which its narcotic properties depended, and more lately the presence of an alkaline element has been detected, which has received the appellation of *Atropia*, the sulphate of which crystallizes very beautifully. **SOLUBILITY.** Water is the most powerful solvent of its active matter. **USES.** It is a powerful sedative and narcotic, both as an internal medicine and as an external application; in this latter form, it alleviates local pains very effectually, but is liable to affect the nervous system. The recent leaves powdered, and made into an ointment with an equal weight of lard will be found an efficient form for many purposes; rubbed over the penis it prevents priapism and relieves chordee more effectually than any application which has been proposed. **FORMS OF EXHIBITION.** Every part of the plant is poisonous, and the berries from their beautiful appearance have often tempted the unwary; the leaves however furnish the most convenient and powerful form of exhibition; externally, they may be used as a poultice, internally, one grain of the dry leaves powdered, and gradually increased to 10 or 12 grains, or the leaves may be infused in boiling water in the proportion of four grains to two fluid-ounces, which may be given as a dose. A little of this infusion dropped into the eye permanently dilates the pupil, for which intention it has been successively applied previous to an operation for the cataract. The extract of this plant, since its active principle is fixed, ought to possess activity, but as it occurs in commerce it is found to be very uncertain and variable, a circumstance which entirely depends upon the manner in which it has been prepared.‡ See *Extractum Belladonnæ*.

* **TOLU LOZENGES.** Sugar 8 oz. Cream of Tartar 1 oz. Starch 2 drachms. *Tinct. Toluiferæ Balsami E.* one fluid-drachm, mucilage of Gum Tragacanth q. s.

† *Belladonna*, so called from the juice of its berries being used as a cosmetic by the Italian women, to make their faces pale.

‡ The root of this plant seems to partake of the same qualities as the leaves, but is perhaps less virulent:

“Or have we eaten of the insane root,
That takes the reason prisoner.”

Macbeth.

The Belladonna is supposed by Sauvage to be the plant that produced such extraordinary effects upon the Roman soldiers during their retreat, under the command of Anthony, from the Parthians, when they are said to have “suffered great distress for want of provisions, and were urged to eat unknown plants: among others they met with a herb that was mortal: he that had eaten of it lost his memory and his senses, and employed himself wholly in turning about all the stones he could find, and after vomiting up bile, fell down dead.” (Plutarch’s Life of Anthony.) The Scotch historian Buchanann relates, “that the Scots mixed a quantity of the juice of the Belladonna (*Solanum Somniferum*) with the bread and drink which by their truce they were to supply the Danes with, which so intoxicated them that the Scots killed the greater part of Sweno’s army.

An overdose of belladonna produces the most distressing and alarming symptoms, and so paralyzing is its influence, that vomiting can be hardly excited by the strongest doses of tartarized antimony; in such cases vinegar will be found the best antidote, or the affusion of cold water over the surface of the body, after the application of which emetics are more likely to perform their duty, for physiological reasons explained in p. 87. **OFFICINAL PREPARATIONS.** *Extract: Belladonnæ L. Succus spissatus Atropæ Belladonnæ. E.*

BENZOINUM. L.E. Benzoe. D. (Styrax. Benzoin) vulgo *Benjamin*

QUALITIES. *Form*, brittle masses, composed of white and brownish, or yellowish fragments; *Odour*, fragrant; *Taste*, scarcely perceptible. When heated, it exhales benzoic acid in the form of crystals. **CHEMICAL COMPOSITION.** Resin, and a large proportion of benzoic acid. **SOLUBILITY.** It is readily dissolved by alcohol and æther, and is again separated from them by water; solutions of lime, and the fixed alkalies separate the benzoic acid from it, which can afterwards be recovered from such solutions by the addition of an acid. **USES.** It is considered expectorant, and was formerly used in asthma, and other pulmonary affections; it has however fallen into disuse, and is now principally employed in perfumery, and odoriferous fumigations.* **OFFICINAL PREPARATIONS.** *Acidum Benzoicum. L.E.D. Tinct: Benzoini comp:† L.E.D. IMPURITIES.* It is found in the market in various degrees of purity, the best is yellowish, studded with white spots; the worst is full of dross, and very dark or black.

BISMUTHI SUB-NITRAS. L.

QUALITIES. *Form*, a white, inodorous, tasteless powder. **CHEMICAL COMPOSITION.** Oxide of Bismuth in combination with some water and a little nitric acid. **SOLUBILITY.** It is insoluble in water and dilute acids, but is dissolved by the concentrated acids, and is again precipitated by water. The alkalies, Potass and Soda, also dissolve it, but sparingly; it is more soluble in ammonia. **USES.** It was formerly employed as a cosmetic, under the name of *Magistery of Bismuth*, or that of *Pearl White*;‡ since, however, it becomes black from the operation of Sulphuretted Hydrogen and its compounds, § much inconvenience attends its applica-

* **FUMIGATING PASTILLES.** Benzoin generally constitutes the chief ingredient in these compositions, to which may be added any variety of odoriferous substances; the following formula may be offered as a specimen: \mathcal{R} Benzoin 3j, Cascarillæ 3ss, Myrrh ʒj. Olei nuc. moschat. ol. Caryophyll. aa gr. x. potassæ nitratis 3ss, carb. ligni 3vj. mucilag. gum. Trag. q. s.

† **VIRGIN'S MILK.** A spirituous solution of Benzoin mixed with about twenty parts of rose water; forms a cosmetic long known by this name. Under the same title also a very different preparation is sold, vid. *Liquor Plumbi sub-acetatis*.

FRIAR'S BALSAM, WADE'S DROPS, JESUIT'S DROPS.—These preparations are nothing more than the *Tinctura Benzoini composita*.

PECTORAL BALSAM OF HONEY.—Is merely the tincture of Benzoin or that of Tolu.

ESSENCE OF COLTSFOOT.—This preparation consists of equal parts of the Balsam of Tolu, and the Compound Tincture of Benzoin, to which is added double the quantity of rectified Spirit of Wine; and this forsooth is a Pectoral for Coughs! If a patient with a pulmonary affection should recover during the use of such a remedy, I should certainly designate it as a lucky Escape, rather than as a skilful Cure.

‡ The Pearl Powder of Perfumers is obtained from the nitric solution of Bismuth, by adding a proportion of muriatic acid, and then precipitating by a small quantity of water. In this way it is obtained in the form of minute scales of a pearly lustre.

§ The gas which arises from the combustion of mineral coal will produce the same

tion. Its medicinal powers appear to have been first noticed by Jacobi,* but the remedy attracted little or no attention until the publication of a paper upon the subject by Odier† of Geneva. The diseases in which its powers as a tonic have been more particularly displayed, are Gastrodynia, Pyrosis, and Dyspepsia attended with cholic. Dr. Marcet in a paper read in 1801 before the Medico-chirurgical Society of London, says, "I have had frequent opportunities of trying the oxide of Bismuth in spasmodic affections of the stomach in Guy's Hospital, and those trials have fully confirmed the opinion which I formerly gave of the utility of this medicine. The practitioner will receive a further confirmation of its value by referring to Dr. Bradsley's Medical Reports: and Dr. Yeats has published in the Royal Institution Journal‡ a striking case illustrative of its efficacy.§ Dose, gr. v to xv, in the form of pills.

BISTORTÆ RADIX. L.E.D.

(*Polygonum Bistorta.*) *Bistort Root.*

QUALITIES. This root has no odour, but is highly astringent. **CHEMICAL COMPOSITION.** Its active principles are tannin and gallic acid. **MED. USES.** It acts as an astringent, and is accordingly used in hemorrhages and fluxes. Dose of the root ʒj—3j; of a decoction f3j—f3ij. Combined with *Calamus* it has been successfully administered for the cure of intermittent fevers. See p. 172.

effect. It is related of a lady of fashion who had incautiously seated herself too near the fire, at a quadrille party, that her countenance changed on a sudden from a delicate white to a dark tawny, as though by magic. The surprise and confusion of the whole party had such an effect upon the disfigured *fair one*, that she was actually dying from apprehension, when the physician dispelled their fears by informing his patient that nothing more was necessary than for her to abstain from the use of mineral cosmetics, and to trust in future to those charms which Nature had bestowed upon her.

* L. F. Jacobi de Bismutho. Erford, 1697.

† Journal de Medicine, 1786, T. 68, p. 49.

‡ Vol. iv. p. 156.

§ In this country Bismuth has enjoyed for some years a reputation exceedingly high. Dr. Samuel W. Moore, of New-York, was the first to call the attention of the American medical public to it, in a very interesting dissertation which was published in the year 1810. In this essay are recorded a number of cases illustrative of the salutary effects of this medicine in spasmodic pain and other troublesome affections of the stomach. See Eclectic Repertory, Vol. 1, p. 234. By the Editors of the New-England Journal of Medicine and Surgery, we are furnished with the following unqualified statement in relation to the virtues of this medicine. "The action of this substance on the stomach is that of a mild and effectual tonic; and from our own experience of its virtues, we do not hesitate to affirm with Odier, Marcet, Bradsley, and Moore, that in pyrosis, cardialgia, and more particularly gastrodynia, it operates more speedily and with more certainty, than any other article of the *Materia Medica*. In the course of the last five years, we have frequently prescribed it in these forms of dyspepsia with almost uniform success; and although a medicine possessing such active properties might be supposed occasionally to produce unpleasant effects on the system, we have never known any injurious consequences to result from its exhibition. A substance which discovers such qualities ought to be more generally known and more frequently administered; for even on the supposition that it is capable of producing no greater effects than those of the medicines usually prescribed in these complaints, its use will be attended with the advantage of discarding, in some measure, from practice, the long continued employment of alcohol and bitters, which ultimately lessen the activity of the digestive organs, and either prolong or perpetuate the disease they were intended to relieve." New-England Journal of Med. and Surg. Vol. 1. p. 286—7. In addition to its use in gastric disorders, it is stated by Dr. Chapman, that Dr. Carmichael, of Virginia, has administered Bismuth with much success in the treatment of Intermittents. Ed.

CALAMI RADIX. L. Acori Calami Radix. E.

Acorus. D. (Acorus Calamus). *Sweet Flag Root.*

QUALITIES. This root is full of joints, crooked, and flattened on the sides, internally of a white colour, and loose spongy texture. *Odour*, fragrant and aromatic. *Taste*, bitter and pungent, qualities which are improved by exsiccation. **CHEMICAL COMPOSITION.** The principles in which its qualities reside appear to be essential oil, and bitter extractive; the root likewise contains fecula, which is copiously precipitated from its infusion by sub-acetate and acetate of lead. Watery infusion extracts all its virtues, but decoction impairs them. Spirit is also an appropriate solvent, and a resinous extract may be produced accordingly. **USES.** It is not employed so frequently as it deserves;* it would be a useful addition to many of the compound infusions of vegetable stomachics. **DOSE.** A cupful of the infusion made by adding 3vj of the dried root to f3xij of boiling water. It is so favourite a remedy with the native practitioners of India, in the bowel complaints of children, that there is a penalty incurred by any druggist who will not, in the middle of the night, open his door and sell it, if demanded.

CALUMBÆ RADIX. L. (Cocculus Palmatus.)

Colomba, Radix. E.D. *Calumba Root.*

QUALITIES. *Form*, the dried root imported into this country is in transverse sections; the bark is thick, and easily detached; the wood is spongy and yellowish; the pieces are frequently perforated, evidently by worms. *Odour*, slightly aromatic. *Taste*, bitter and somewhat acrid. **CHEMICAL COMPOSITION.** Cinchona, bitter resin, volatile oil, and starch, in addition to which M. Planche has found a peculiar animal-like substance; it appears also to contain Malate and Sulphate of Lime. **SOLUBILITY.** Boiling water takes up about one third of its weight, but proof spirit appears to be its most perfect menstruum. **INCOMPATIBLE SUBSTANCES.** No change is occasioned in the infusion by the solutions of nitrate of silver, sulphate of iron, muriate of mercury, or tartarized antimony; but precipitates are produced by the infusion of galls, and yellow Cinchona bark, by sub-acetate and acetate of lead, oxy-muriate of mercury, and lime water. The infusion very soon spoils. **DOSE** of the powdered root gr. xv to 3ss; of the infusion f3iss to f3ij. **USES.** It is one of the most valuable tonics and stomachics which we possess. It seems to be superior to many others, from not possessing astringent, and stimulant powers, on which account it is singularly eligible in certain pulmo-

* Very lately our attention has been particularly called to this plant by Dr. E. G. Ludlow, of New-York, who speaks of it in terms of high commendation. He says "the diseases in which I have used it are exclusively those of the Chylopoietic viscera, as dyspepsia, diarrhœa, and cholera. For the removal of pain and flatulence in the bowels, which may be enumerated among the most frequent and distressing symptoms of the first stage of indigestion, calamus is superior to any other carminative; by virtue of its aroma it creates a strong sensation of warmth in the stomach, increasing its action without sensibly augmenting the force of the circulation, while its powerful bitter principle gives permanent tone to the relaxed state of the fibres." New-York Med. and Phys. Journal, No. 11, p. 321. The tincture is the preferable form of administering the Calamus. The dose is from 3ss to 3j. *Ed.*

nary and mesenteric affections: it may be given in combination with chalybeates, aromatics, saline purgatives, or with rhubarb, as circumstances may require. (*Form.* 34, 155.) OFFICIAL PREPARATIONS. *Infus: Calumbæ. L. Tinct: Calumbæ. L.E.D.* It becomes worm-eaten by age, and, in that condition, should be rejected. Those pieces which have the brightest colour, and the greatest specific gravity, are the best. The root of *white briony*, tinged yellow with the tincture of Calumba, has been fraudulently substituted for this root.

CAMBOGIA. L. (*Stalagmitis*) Gambogia. E.D.
Gamboge, (Cambogioides.)

QUALITIES. *Form*, lumps of a solid consistence, breaking with a vitreous fracture; *Odour*, none; *Colour*, deep yellow, bordering on red, and becoming, when moistened, a brilliant light yellow. *Sp. Grav*: 1.221. *Taste*, slightly acrid, but which is not experienced unless it be allowed to remain long in the mouth. CHEMICAL COMPOSITION. One part of gum, (*Cerasin*,) and four parts of a brittle resin; but this knowledge throws no light on the nature of its cathartic property. SOLUBILITY. When triturated with water two thirds of its substance are speedily dissolved, and a turbid solution results; alcohol dissolves nine tenths, and forms a yellow transparent tincture, which is rendered turbid by the addition of water; sulphuric ether dissolves six tenths of the substance; it is also soluble in alkaline solutions, and the resulting compound is not rendered turbid by water, but is instantly decomposed by acids, and the precipitate so produced is of an extremely brilliant yellow colour, and soluble in an excess of acid. INCOMPATIBLE SUBSTANCES. No bodies appear to produce in gamboge such a chemical change as to destroy the chemical properties which distinguish it, but by a mechanical admixture, its solubility, and consequently its operation may be materially modified. Dr. Cullen found that the inconvenience arising from its too rapid solubility, and sudden impression upon the stomach, might be obviated by diminishing the dose, and repeating it at short intervals as directed in *Form*: 89. FORMS OF EXHIBITION. No form is more judicious than that of pill. Its alkaline solution has been sometimes exhibited in dropsy, when it is said to operate both on the bowels and kidneys. Dose, gr. 2 to gr. 6. USES. It is a powerful drastic cathartic, and hydragogue, very liable to excite vomiting, and from this peculiar action upon the stomach it has been frequently employed with success in the expulsion of teniæ (*Form*: 161.) and it accordingly enters as an ingredient into many of the empirical compositions which are sold for the cure of tape worms.* OFFICIAL PREPARATIONS. *Pil: Cambogiæ comp: L.* There is considerable difference in the degree of purity in which this substance occurs in the market; it should be estimated by its clearness and brilliancy.

* THE SPECIFIC OF HERRENSCHWAND, which formerly excited so much interest in Germany, consisted of 10 grains of Camboge with 20 of sub-carbonate of Potass; although it is said that on its being analyzed by order of Elizabeth of Russia, there were also found in it both Mercury and Arsenic.

Camboge is also the basis of the SPECIFIC OF CLOSSIUS.

GOLDEN SPIRIT OF SCURVY GRASS. This is merely a solution of Camboge in the Spir. Armoraciæ. comp:

CAMPHORA. L.E.D. (*Laurus Camphora*.*)

Camphor.

QUALITIES. *Form*, a white brittle substance, unctuous to the touch, but possessing at the same time a degree of ductility which prevents its being easily pulverised, unless a few drops of spirit be previously added. It is capable of affecting a crystalline form.† *Odour*, peculiar, fragrant, and penetrating. *Taste*, bitter, pungent, and aromatic. *Specific gravity*, .9887, it therefore swims on water; it is so volatile that during warm weather a considerable proportion will evaporate, especially if at the same time the atmosphere be rather moist, for the reason stated in page 180. It is readily ignited, and burns with a brilliant flame and much smoke; it melts at 288° , and boils at 400° . **CHEMICAL COMPOSITION.** It is a proximate vegetable principle, resembling the essential oils in many of its habitudes, and probably differs from them in composition only in containing a larger proportion of carbon. **SOLUBILITY.** Water may be said to dissolve about a nine hundredth part of its weight, or f3j rather more than gr. $\frac{1}{2}$, but its solvent power is considerably increased by the addition of carbonic acid gas; camphor is also rendered more soluble by trituration with magnesia; it is soluble in an equal weight of alcohol, but it is again separated by the addition of water; it is also dissolved by oils, both fixed and volatile,‡ especially if their temperature be a little raised, and by sulphuric and other æthers, but strong acetic acid may be said to be its most powerful solvent. By repeatedly distilling it with nitric acid it is converted into *Camphoric acid*, an acid distinguished by peculiar properties, and composing, with alkalies and earths, a class of salts called *Camphorates*, but which do not possess any medicinal value. The alkalies do not produce any effect upon camphor. **INCOMPATIBLE SUBSTANCES.** It is not affected by any substance with which we can combine it. **FORMS OF EXHIBITION.** It is preferable in the form of mixture, since it is very liable in the solid state to excite nausea, and, from swimming on the contents of the stomach, to occasion pain at its

* Although the Camphor of commerce is generally furnished by the *Laurus Camphora*, yet it is abundantly yielded by many other plants. It is said that what is imported from Sumatra is the product of the *Dryobobans Camphora*. It is also contained in the roots of the Cinnamon, Cassia, and Sassafras laurels, and in those of Galangale, Zedoary, and Ginger; in Cardamom seeds and Long Pepper. The essential oils of Lavender, Sage, Thyme, Peppermint, Rosemary, and those of many other labiate plants yield camphor by distillation. Camphor may be also artificially formed by driving a stream of muriatic gas through oil of turpentine; this factitious product however, is to be distinguished from native camphor in not being soluble in weak nitric acid, and also in not being precipitated by water from its solution in strong nitric acid.

† The collection of the *Materia Medica* at the College of Physicians, contains a beautiful specimen of native Camphor in the wood: having selected from it as perfect a crystal as I could find, I requested my friend and publisher Mr. W. Phillips, well known for his researches in crystallography, to undertake its examination: and he observes that "The crystal of native camphor (in the wood) appears as a flat octohedron; but the primary form is a right rhombic prism of $51^{\circ}. 36'$. and $128^{\circ}. 24'$. by measurement with the reflective goniometer on cleavage planes: the octohedral appearance arises from the deep replacement of four of the solid angles of the prism, by as many planes."

‡ AN ODONTALGIC REMEDY in great repute consists of a solution of camphor in oil of turpentine; a fluidounce of which will dissolve two drachms.

upper orifice. If a larger dose be required than that which water can dissolve, an additional proportion may be suspended by means of sugar, almonds, yolk of egg, or mucilage, for which purpose three times its weight of gum arabic is required. If Camphor be first dissolved by trituration in a very small portion of oil, it readily mixes with mucilage of gum arabic, and may then be conveniently blended with liquids. It has also the property of uniting with gum-resins, and of converting them into permanently soft, and uniform masses; hence they may sometimes be conveniently applied for diffusing it in water. It may be formed into pill-masses by stiff mucilage, foetid gums, or by a confection. **MEDICINAL USES.** In moderate doses it exhilarates, without raising the pulse, and gives a tendency to diaphoresis; and under certain conditions of the body, when opium fails, it will frequently promote sleep. As its effects are transient, its dose should be repeated at short intervals. *Illustrative Formulæ* 1, 6, 21, 125, 134, 164. Camphor is said to correct the bad effects of opium, mezereon, cantharides, and the drastic purgatives, and diuretics. Dose gr. ij to ʒj. In excessive doses it occasions anxiety, vomiting, syncope, and delirium; these violent effects are best counteracted by opium. **OFFICINAL PREPARATIONS.** *Mistura Camphoræ.* L.D. *Emulsio Camphorata.* E. *Spiritus Camphoræ,* L.E.D. *Tinctura Camphoræ comp:* L.E.D. *Acidum Acetosum Camphoratum.* E.D. *Linimentum Camphoræ.* L.E.D. *Liniment: Camphoræ comp:* L. *Liniment: Saponis.* (G) L.E.D. **ADULTERATIONS.** It has been stated that pure camphor may be known by placing it upon hot bread, when it will turn moist, whereas an adulterated specimen becomes dry—but with what can it be adulterated?

CANELLÆ CORTEX. L.E.D. (*Canella Alba Cortex.*)
Canella Bark.

Wild Cinnamon.

QUALITIES. *Form;* it occurs in quilled and flat pieces; the former are of a whitish yellow colour, considerably thicker than cinnamon; the latter, which are probably the bark of the larger branches, or of the stem of the tree, are yellow on the outside, and pale brown within. *Odour,* resembling that of cloves. *Taste,* warm, pungent, and slightly bitter. **CHEMICAL COMPOSITION.** Its virtues depend upon an essential oil, and a bitter resin. **SOLUBILITY.** Water extracts only the bitterness, but proof spirits both the bitterness and aroma. **MEDICINAL USES.** As a warm stimulant to the stomach, and as a corrigent to other medicines. In America it is considered as a powerful antiscorbutic. Dose of the powdered bark gr. x to ʒss. **OFFICINAL PREPARATIONS.** *Tinct. Gentian. comp.* (B.G.) E. *Vinum Aloes,* (G) L.D. *Pulv. Aloes cum canella.* (G) D.

CANTHARIDES.* (*Cantharis Vesicatoria.*)

Blistering, or Spanish Flies.

This beautiful insect of the beetle tribe is exceedingly abundant in the southern parts of Europe, and particularly in Spain. They are collect-

* Although the London College, for reasons sufficiently weighty, were induced on a former occasion to transfer the Blistering fly from the genus *Cantharis* to that of

ed from the leaves of the different trees on which they delight to dwell, in June and July, and are afterwards destroyed, as recommended by Dioscorides, by the fumes of strong vinegar, and dried in the sun. The chemical history of Cantharides is still involved in some obscurity; the blistering principle has been obtained by Robiquet in a separate state, when it assumes the form of small crystalline plates, having a micaceous lustre, not unlike spermaceti; Dr. Thompson has given to it the name of *Cantharidin*;* when pure, it is insoluble in water and in cold alcohol; boiling alcohol, however, dissolves it, but precipitates it again on being cooled. Æther and the oils dissolve it readily. Although not soluble in water it is rendered so by the presence of a yellow matter which exists in native combination with it. A very minute portion of this substance dissolved in sweet oil, and applied to the skin with a piece of paper, produces vesication in five or six hours. In addition to this active principle, Cantharides contain a green concrete oil; a yellow fluid oil; a peculiar black substance soluble in water and proof spirit, but not in pure alcohol; a saponaceous or yellow substance, soluble both in water and alcohol; Uric acid; Acetic acid; Phosphate of Magnesia, and a parenchymatous substance.† MEDICINAL USES. Cantharides, when administered internally are powerfully stimulant and diuretic;‡ and whether applied as a vesicatory to the skin, or taken into the stomach, they have a peculiar tendency to act upon the urinary organs, and especially to irritate and inflame the neck of the bladder, and occasion strangury. On this account they have been very successfully employed both for the cure of incontinence of urine, and suppression of this discharge, from torpor or paralysis of the bladder; they have been used in gleet and leucorrhœa, and in cases of seminal weakness and impotence. In consulting the works of Dioscorides, Galen, and Pliny, we shall find they entertained a notion, that the *virus* existed only in the body of the fly, and that the head, feet, and wings, contained its antidote! Hippocrates prescribed them internally in Dropsy, Jaundice, and Amenorrhœa; and yet in the end of the sixteenth century, Dr. Groenvelt was charged and sued§ for giving

Lytta; the Committee for revising the late Pharmacopœia determined, on the authority of Latreille, to restore it to its former genus. The work of Latreille, "*Genera Crustaceorum et Insectorum*" holds the highest rank in Etymology of any hitherto published.

* Cantharidin may be obtained by the following process: Boil the cantharides in water until all the soluble parts are extracted; filter the decoction, and evaporate to the consistence of an extract. Digest this extract in concentrated alcohol, then pour off the alcohol and evaporate it; if sulphuric acid be then added to this extract, it will take up the Cantharidin, which may be obtained in a tolerably pure state by evaporation. The crystalline plates may be afterwards freed from the adhering colouring matter by alcohol.

† Annales de Chimie, tom. lxxvi.

‡ It forms the basis of the once celebrated diuretic of Tulpus, called Lithontrypicum Tulpii, from its supposed efficacy in stone. The other ingredients were Cardamoms, made into a Tincture with Rectified Spirit, and Spirit of Nitric Æther.

§ He was cited before the censors of the College of Physicians in 1693, and committed to Newgate by a warrant from the President; but he was acquitted upon the plea that—bad practice must be accompanied with a bad intention to render it criminal. He published his vindication in a small tract, entitled, "*De tuto Cantharidum usu interno*." The issue, says Dr. Quincey (Pharm: p. 152) ruined the unhappy Doctor, but taught his prosecutors the safety and value of his practice. The following was his formula. Of egg-shells calcined ʒss; Camphor ʒj; Spanish flies ʒss; and Venice turpentine q, s, to make nine pills; three of which were to be swallowed every three hours.

them inwardly, in substance, for the cure of the stone. Dose, in substance, not exceeding gr. i, combined with opium or hyoscyamus. See *Tinctura : Cantharid.* A strong decoction of the Cantharides in Oil of Turpentine furnishes a most powerful Epispastic, and may be easily applied by means of dossils of lint. As the general belief, which exists with respect to the aphrodisiac powers of this substance, may induce persons to try its efficacy in large doses, either for goading the exertions of exhausted nature, or for incensing the passions of females whose seduction is meditated, it behoves the medical practitioner to become acquainted with the symptoms which it may produce, and of which the following may be considered as the most prominent;—violent retching; copious alvine evacuations, frequently bloody; very severe colics; active inflammation of the stomach and intestines; sometimes universal convulsions, attended with a horror of liquids, resembling that which occurs in hydrophobia; furious delirium, &c. But the affections of the urinary passages, and organs of generation, may be regarded *κατεξοχην*, as the peculiar symptoms of poisoning by Cantharides; such as heat in the bladder, horrible strangury, painful and obstinate priapism, *satyriasis*, &c. The method of treatment to be pursued on such occasions will consist in copious bleeding, warm bath, local fomentations, mild and mucilaginous drinks; and opium, especially in the form of clyster or suppository.

OFFICINAL PREP. *Tinct: Cantharid: L. Emplast: Cantharid: L. Ceratum Cantharid: L. Unguent: Infusi Cantharid: Vesicat: E. Unguent: Cantharid: D.* The flies do not lose their virtues by being kept; it is, however, curious that even those acrid insects are soon reduced to dust by others feeding upon them; but since the inert parenchymatous portion is alone selected by them, the residue is extremely active.*

CAPSICI BACCÆ. L.E.D. (*Capsicum annum.*)

Berries of the Capsicum.

QUALITIES. *Form*; pods, long, pointed, and pendulous; *Colour*, when ripe, a bright orange red. *Odour*, aromatic and pungent. *Taste*, extremely acrimonious and fiery. SOLUBILITY. Its qualities are partially extracted by water, but more completely by æther and spirit. CHEMICAL COMPOSITION. Cinchonia, resin, mucilage, and an acrid principle said to be alkaline.† INCOMPATIBLE SUBSTANCES. The Infusions of capsicum are disturbed by *Infusion of Galls*; *Nitrate of Silver*; *Oxymuriate of Mercury*; *Acetate of Lead*; the *Sulphates of Iron, Copper, and Zinc*; *Ammonia*, *Carbonate of Potass*, and *Alum*, but not by sulphuric, nitric, or muriatic acid. MEDICINAL USES. It is a most powerful stimulant to the stomach, and is unaccompanied with any narcotic effect; as a gargle in cynanche maligna, and in relaxed states of the throat, it fur-

* Not less than sixteen species of the genus *Cantharis* have already been discovered in this country, by the industry of our Entomologists; most, if not all, of which possess vesicating powers. Of these the most common is the *Lytta Vittata*, or potatoe fly. The medicinal virtues of this insect were first discovered in 1797, by Dr. Isaac Chapman, of Pennsylvania, and found to be fully equal to those of the Spanish fly. Dr. Barton says "from frequent employment of the two articles, I cannot hesitate to prefer the American to the foreign fly. Long keeping, provided it be carefully kept, does not materially impair the blistering property of the *Lytta Vittata*. At the end of three or four years after being collected, I have found it equal in power to the shop *Cantharides*."

Ed.

† *Journal de Physique*, p. 173. 1820.

nishes a valuable remedy; combined with purgatives, it proves serviceable in dyspepsia, (*Form*: 78,) it has lately been given with success in the advanced stages of acute rheumatism; in various diseases attended with cold feet, it has been recommended to wear socks dusted with Cayenne Pepper. **FORMS OF EXHIBITION.** It may be given, made into pills with crumb of bread, or in the form of tincture, diluted with water; for the purpose of a gargle, a simple infusion in the proportion of gr. j to f3j of boiling water, or f3vi of the tincture to f3viij of the *Infusum Rosæ*, may be directed. **DOSE**, of the substance, gr. vj to x, of the tincture f3j to f3ij in an aqueous vehicle. **OFFICIAL PREPARATIONS.** *Tinct: Capsici*: L.D.*

Cayenne Pepper is an indiscriminate mixture of the powder of the dried pods of several species of capsicum, but especially of the *Capsicum baccatum*, (Bird pepper.)

ADULTERATIONS. Cayenne pepper is generally mixed with *muriate of soda*, which disposes it to deliquesce. *Red Lead* may be detected by digesting it in acetic acid, and adding to the solution sulphuret of ammonia, which will produce, if any lead be present, a dark coloured precipitate; or the fraud may be discovered by boiling some of the suspected pepper in vinegar, and after filtering the solution adding to it sulphate of soda, when a white precipitate will be formed, which, after being dried and exposed to the heat, and mixed with a little charcoal, will yield a metallic globule of lead.

CARBO LIGNI. L.E.D. Charcoal.

QUALITIES. It is a black, inodorous, insipid, brittle substance; when newly prepared it possesses the property of absorbing very considerable quantities of the different gases; it is also capable of destroying the smell and taste of a variety of vegetable and animal substances, especially of mucilages, oils, and of matter in which *extractive* abounds; and some medicines are said to be even deprived of their characteristic odour by remaining in contact with it, as Valerian, Galbanum, Balsam of Peru, and Musk. The use of charring the interior of water casks, and of wrapping charcoal in cloths that have acquired a bad smell, depends upon this property; for the same reason it furnishes a very excellent tooth powder,† for which purpose, that which is obtained from the shell of the cocoa nut is to be preferred. None of the fluid menstrua with which we are acquainted have any action whatever as solvents upon carbon.‡
MEDICINAL USES. It is antiseptic, and has been administered internally, to correct the putrid eructations which sometimes attend dyspepsia, but in order to produce this effect it should be newly prepared, or such as has been preserved from the access of air, for it operates by absorbing the putrid gas, as well as by checking the decomposition of the undigest-

* **RYMER'S CARDIAC TINCTURE.** In the earlier editions of this work an erroneous account of this medicine has been given, in consequence of a spurious specimen having been examined: the following analysis is now confidently presented to the profession. It is an infusion of Capsicum, Camphor, Cardamom seeds, Rhubarb, Aloes, and Castor in Proof Spirit, with a very small quantity of Sulphuric acid.

† **LARDNER'S PREPARED CHARCOAL** consists of cretaceous powder, or chalk finely powdered, rendered grey by the addition of charcoal, or Ivory black.

‡ **CONCENTRATED SOLUTION OF CHARCOAL.** A preparation is sold under this absurd name for cleaning the teeth, and is nothing more than a tincture of Catechu. The name was probably suggested by the experiments of Mr. Hatchett, who succeeded in producing artificial tannin by the action of Nitric acid upon Charcoal.

ed element.* **DOSE**, grs. x to 3j. It has been lately asserted to possess powers as an antidote to arsenic; if this be true, its action can only be mechanical by absorbing like a sponge the arsenical solution, and thereby defending the coats of the stomach from its virulence.† Charcoal, when mixed with boiled bread, forms a very valuable poultice for foul and gangrenous sores. In a state of impalpable powder, it is said to be effectual as a styptic; Dr. Odier informs us that the celebrated *powder of Faynard*, for stopping hemorrhage, was nothing more than the charcoal of beech-wood finely powdered.

Charcoal is prepared for the purposes of medicine and the arts, from a variety of substances, viz.

BURNT SPONGE. *Spongia Usta*. L. Consists of charcoal with portions of phosphate and carbonate of lime, and sub-carbonate of soda; it has been highly commended in bronchocele and scrophulous complaints, in the form of an electuary, or in that of a lozenge, and it has been lately asserted that it owes its power to the presence of Iodine.

VEGETABLE ÆTHIOPS. *Pulvis Quercus marinæ*. From the *fucus vesiculosus*, or bladder-wrack, used as the preceding.

IVORY BLACK. *Ebur Ustum*. From ivory shavings burned; used as a dentifrice and a pigment, under the name of "*blue-black*," for its hue is bluish; but bone-black is usually sold for it.

LAMP BLACK. *Fuligo Lampadum*. By burning resinous bodies, as the refuse of pitch, in furnaces of a peculiar construction.

WOOD SOOT. *Fuligo ligni*, collected from chimnies under which wood is burnt. It contains sulphate of ammonia, which imparts to it its characteristic bitterness. It has been considered antispasmodic, and a tincture was formerly prepared of it.

CARDAMOMI SEMINA. L.D. (*Matonia*† *Cardamomum*.)

Amomum Repens. E. *Cardamom Seeds*.

QUALITIES. *Odour*, aromatic and agreeable; *Taste*, warm and pungent, but unlike the peppers, they do not immoderately heat the stomach.

* In cases of obstinate constipation of the bowels, charcoal is one of the most efficient remedies in the whole *Materia Medica*. Many cases have yielded to it which had resisted every other cathartic medicine previously used. Dr. Daniell, of Savannah, to whom we are indebted for an interesting paper on this subject, states as the result of his experience, "that the most speedy, as well as the most certain relief, is to be obtained from the free use of Charcoal. If it does not wholly relieve, it always very much mitigates the pain in six or eight hours from the period of its first administration; and within my observation," he adds "the patient has always been entirely composed before the operation of the medicine upon the bowels." "In relation to the dose of this medicine," he states that "the rule which I have pursued is to give it as freely and as frequently as the stomach will allow. The quantity required is considerable. It has a happy influence in lulling the irritability of the stomach, when nothing else which I have used, would control the nausea and vomiting of the patient: thus fulfilling the double intention of first alleviating a very distressing symptom, and then removing the disease itself. I usually give from one to three table-spoonful of Charcoal every half hour or hour: whenever the stomach becomes overcharged with the medicine, the excess is thrown off, and the stomach is again quiet. I give it in lime water, milk, or water alone—the vehicle having appeared to me unimportant." *Philadel. Journal of Med. and Phys. Sciences*, Vol. 5. p. 120. ED.

† See an account of Charcoal, as a test for Arsenic, and remarks thereon.

‡ Dr. Maton in a learned critical and botanical note to a paper on the Cardamom, by Mr. White, Surgeon of Bombay, (*Trans: Lin: Soc: v. x, 229*.) called the genus, of which it consists, *Elettaria*, a nomenclature which was accordingly adopted by the

SOLUBILITY. Water, alcohol, and æther extract their virtues; the two latter most completely, and the result is transparent, whereas the watery infusion is turbid and mucilaginous. **CHEMICAL COMPOSITION.** Fecula, mucilage, and essential oil. **MEDICINAL USES.** They are carminative and stomachic, and prove grateful adjuncts to bitter infusions; they are principally employed to give warmth to other remedies. **DOSE** of the powder, gr. vj. to ʒj. **OFFICINAL PREPARATIONS.** *Extract: Colocynth: comp: (E) L.D. Tinct. Cardamomi, L.E.D. Tinct. Cardamom: comp: L.D. Tinct: Cinnamomi, co. (B) L.E. Tinct. Gentian. co. (G) L. Tinct. Rhei (E) L.E.D. Tinct. Rhei cum Aloe, (G) E. Tinct. Sennæ, (E) L. D. Spir. Ether. Aromat. B L. Vinum Aloes Socot (G) E. Confect. Aromat. B L. Pulv. Cinnamom. co. (B) L.E.D. Pil. Scilliticæ, (E) E. Infus. Sennæ. D. (E.)*

Cardamom seeds should be kept within their husks, or their virtues will soon be considerably impaired; they are frequently mixed with *grains of paradise*, which are much hotter and more spicy, but less aromatic in their flavour.

CARICÆ FRUCTUS, L.D. Fici Caricæ Fructus, E.

The preserved Fruit of the Fig.

QUALITIES of the dried fig are too well known to require description. The fig consists almost entirely of mucilage and sugar. **USES.** It has been already stated that the most ancient cataplasm on record was made of figs, (2 kings, chap. xx. 7.) they are employed medicinally in many demulcent decoctions, as *Decoctum Hordei comp: L.D.* They are gently aperient; it is curious to learn that they constituted the chief part of the food of the ancient Athletæ.

CARYOPHYLLI. L.

(*Eugenia Caryophyllata. The unopened flowers dried.*)

Caryophilli Aromatici Germen, E.

Caryophilli aromat. Calyx, D. Cloves.

Cloves are the unexpanded flowers or flower-buds, of the clove tree, which are first obtained when the tree is six years old; they are gathered in October and November before they open, and when they are still green: and are dried in the sun, after having been exposed to smoke at a heat of 120°, till they assume a brown hue. It is a curious fact that the flowers when fully developed are quite inodorous, and that the real fruit is not in the least aromatic. **QUALITIES.** *Form*, that of a nail, consisting of a globular head, formed of the four petals of the corolla, and four leaves of the calyx not yet expanded; and a germen situated

College in their late Pharmacopœia; but says Sir James Smith, as this name is of a barbarous origin, (viz. from Elettaria, the Malabar name of the plant, (we should greatly prefer that of Matonia; a suggestion which has been since adopted by Mr. Roscoe of Liverpool, in his description of the Scitamineæ. The College has therefore the gratifying task of erasing the term Elettaria from their Materia Medica, and of substituting for it a name, no less known than respected by the Medical profession.

below nearly cylindrical, and scarcely an inch in length. *Odour*, strong fragrant, and aromatic. *Taste*, acrid, aromatic, and permanent. Benzoic acid has lately been discovered in them.

SOLUBILITY. Water extracts their odour, but little of their taste; alcohol and ether take up both completely. **MEDICINAL USES.** They are more stimulant than any of the other aromatics; they are sometimes given alone, but more generally as a corrigent to other medicines. **OFFICIAL PREPARATIONS.** *Infusum Caryophyllorum*. L. *Spir. Lavand. co.* D. (**B**) **FRAUDS.** The Dutch frequently mix the best cloves with those from which the oil has been drawn.

CARYOPHYLLORUM OLEUM. This essential oil, in consequence of the resinous matter which it holds in solution, has a specific gravity of 1.020, and consequently sinks in water. When the oil has a hot fiery taste, and a great depth of colour, it is adulterated. It is imported from the spice islands. On account of its stimulant properties, it is added to griping extracts, or used as a local application in the tooth-ache. Vauquelin obtained from the leaves of the *Agathophyllum ravsara* an essential oil, in every respect similar to that of cloves; and I am informed by Dr. Davy that an oil exactly resembling in smell the oil of Cloves is procured in Ceylon from the leaf of the Cinnamon tree; but very little, if any, has ever been exported.

CASCARILLÆ CORTEX. L.D. (Croton
Croton Eleutheria. E. (Cascarilla.)

Cascarilla Bark.

QUALITIES. *Form*, curled pieces, or rolled up into short quills; its fracture is smooth and close, of a dark brown colour; *Odour*, light and agreeable; when burning, it emits a smell resembling that of musk, which at once distinguishes it from all other barks. *Taste*, moderately bitter, with some aromatic warmth. **CHEMICAL COMPOSITION.** Mucilage, bitter extractive, resin, volatile oil, and a large proportion of woody fibre; neither *Cinchonia* nor *Quina* has hitherto been discovered in it. **SOLUBILITY.** Its active constituents are partially extracted by alcohol and water, and completely by proof spirit. **MEDICINAL USES.** Carminative and tonic; it is an excellent adjunct to cinchona, rendering it by its aromatic qualities more agreeable to the stomach, and increasing its powers. It is valuable in dyspepsia and flatulent cholic, in dysentery and diarrhoea, and in the gangrenous thrush peculiar to children. **FORMS OF EXHIBITION.** It is most efficacious in substance; it may however be given in form of infusion, or tincture. Decoction dissipates its aromatic principle: the extract therefore merely acts as a simple bitter, See *Infus. Cascarillæ*. **DOSE** of the powder, grs. xij to 3ss. **OFFICIAL PREPARATIONS.** *Infus. Cascarill.* L. *Tinct. Cascarill.* L.D. *Extract. Cascarill.* D.

CASSIÆ PULPA. L.E.D. (Cassia Fistula. *Lomentorum Pulpa*).

Cassia Pulp.

The fruit is a cylindrical pod scarcely an inch in diameter, but a foot or more in length: the exterior is a hard brown bark; the interior is divided into numerous transverse cells, each of which con-

tains an oval seed imbedded in a soft black pulp. **QUALITIES.** *Odour*, faint and rather sickly. *Taste*, sweet and mucilaginous. **SOLUBILITY.** Nearly the whole of the pulp is dissolved by water, partially by alcohol and sulphuric ether. **CHEMICAL COMPOSITION.** Sugar, gelatine, glutine, gum, and a small portion of resin, extractive, and some colouring matter. **USES.** It is gently laxative, and is adapted for children and very delicate women, but it should be always given in combination with manna or some other laxative, or it is apt to induce nausea, flatulence, and griping. **OFFICIAL PREPARATIONS.** *Confectio Cassiæ.* L.E.D. *Confectio Sennæ* (B.O.) L.E.D.* There are two kinds of this drug in the market; that from the West Indies, the pods of which are generally large, rough, thick rinded, and contain a nauseous pulp; and that from the East Indies, which is to be preferred, and which is distinguished by smaller and smoother pods, and by their containing a much blacker pulp. The pulp ought not to have a harsh flavour, which arises from the fruit having been gathered before it was ripe, nor ought it to be sour, which it is very apt to become by keeping. The heaviest pods, and those in which the seeds do not rattle, are to be preferred.

CASTOREUM, L.E.D. (Castor Fiber, (*Rossicus.*) *Concretum sui generis.*)
Castor.

This substance is secreted by the beaver, in bags near the rectum.† **QUALITIES.** *Odour*, strong and aromatic. *Taste*, bitter, sub-acrid, and nauseous. *Colour*, reddish brown. **CHEMICAL COMPOSITION.** Volatile oil, resin, mucilage, extractive, iron, and small portions of the carbonates of potass, lime and ammonia. It contains also, according to the analysis of Laugier, a small quantity of benzoic acid. The Canadian variety is also stated by Laugier to contain benzoic acid both free and combined. **SOLUBILITY.** Its active matter is dissolved by alcohol, proof spirit, and partially by water; the tincture made with alcohol is the least nauseous, and the most efficacious; the spirit of ammonia is also an excellent menstruum, and in many cases improves its virtues. **FORMS OF EXHIBITION.** It may be given in substance, as a bolus, or in the form of tincture, but its exhibition in the form of extract or decoction is chemically incorrect. **Dose**, grs. x to ʒj, and, in clysters, to ʒj. **MEDICINAL USES.** It is antispasmodic, and seems to act more particularly on the uterine system. It certainly proves beneficial as an adjunct to antihysterical combinations; it was highly esteemed by Van Swieten, De Haen, and many other German practitioners. Baglivi states that it counteracts the narcotic powers of opium, but this is not the case. **OFFICIAL PREPARATIONS.** *Tinct. Castorei.*‡ L.E.D. **Adulter:** It is sometimes counterfeited by a mixture of dried blood, gum ammoniacum, and a little real castor, stuffed into the scrotum of a goat; the fraud is de-

* **ESSENCE OF COFFEE.** The Cassia pulp is said to form the basis of this article.

† The ancients erroneously considered them as the testicles of the beaver, and Æsop relates that the animal bit them off when pursued by the huntsman, whence some have derived its name, *a castrando*; the true origin however, of the word is from *γαστρον*, i. e. animal *ventriculosum*, from his swaggy and prominent belly.

‡ **BATEMAN'S PECTORAL DROPS** consisted principally of the Tincture of Castor, with portions of Camphor and opium, flavoured by anise seeds, and coloured by cochineal.

tested by comparing the smell and taste with those of real castor ; and by the deficiency of the subaceous follicles, which are always attached to genuine specimens. There are two kinds in the market, the Russian and Canadian, the former however, which is the best, has become extremely scarce ; it may be distinguished from the latter, by being larger, rounder, heavier, and less corrugated on the outside.

CATECHU EXTRACTUM, L.E.D.

(Acacia Catechu, *Extractum*.)

Catechu ; olim *Terra Japonica*.* *Japan Earth*.

QUALITIES. There are too varieties of catechu in the market, the one of a light yellowish, the other of a chocolate colour ; they differ only in the latter having a more austere and bitter taste. **CHEMICAL COMPOSITION.** Tannin, a peculiar extractive matter, mucilage, and earthy impurities. **SOLUBILITY.** It is almost totally dissolved both by water and spirit. **INCOMPATIBLE SUBSTANCES.** Its astringency is destroyed by alkaline salts ; and precipitates are produced by metallic salts, especially by those of iron ; and with gelatine it forms an insoluble compound. **MEDICINAL USES.** It is a most valuable astringent. **FORMS OF EXHIBITION.** In infusion, tincture, or powder. (*Form.* 51, 52, 58, 151.) In the form of a lozenge, from its gradual solution, it may be very advantageously applied in relaxed states of the uvula and fauces ; I have found this remedy successful in cases where the *sulphate of zinc* was inefficient. From its great astringency it also forms an excellent dentifrice, especially when the gums are spongy ; for this purpose I have employed equal parts of powdered catechu, and Peruvian bark, with one fourth the quantity of the powder of myrrh. **DOSE,** grs. x to ℥i. **OFFICIAL PREP.** *Infus. Catechu*, *Tinct. Catechu*, L.E.D. *Electuarium Mimosæ Catechu*, E. D.

CENTAURII CACUMINA. L.E.D.

(Chironia Centaurium† *Cacumina*.)

The flowering tops of the common Centaury.

QUALITIES. *Odour*, none ; *Taste*, intensely bitter. **CHEMICAL COMPOSITION.** Mucilage, resin, and bitter matter. **SOLUBILITY.** Alcohol and water dissolve all its active matter. **MEDICINAL USES.** All its value depends upon its bitterness. It entered into the composition of the once celebrated *Portland Powder* for the gout, for an account of which see page 32. **DOSE,** of an infusion, made in the proportion of ℥j to oʒ of boiling water, f℥ij ; of the dry powder ℥i.

CERA. L.E.D. *Wax*.

It is admitted into the list of the *Materia Medica* under two forms, viz.

1. **CERA FLAVA.** *Yellow or Unbleached Wax.*

* It was formerly supposed to be a mineral production ; and hence the term *Terra Japonica*. Hagedorn and Boulduc were among the first who opposed this error, and who established the fact of its vegetable origin (*Mem. de l' Acad ; des Sciences de Paris*, A. 1709, p. 228.)

† So called from Chiron the Centaur, who is said to have employed it to cure himself of a wound accidentally received by letting one of the arrows of Hercules fall upon his foot.

QUALITIES. *Odour*, faintly honey-like; It is brittle yet soft: when chewed, it does not, if pure, adhere to the teeth; it melts at 142° , and burns entirely away. **CHEMICAL COMPOSITION.** It is the honey-comb of the bee melted with boiling water, pressed through cloth bags, and ultimately cast into round cakes for the market. Whether it be an animal product, or a vegetable substance merely collected by the bees, has been a question of dispute; the former opinion is probably correct, although wax is certainly produced as a secretion by many plants. The yellow wax contains a portion of pollen which imparts its colour to it, and increases its fusibility. **SOLUBILITY.** It is insoluble in water, and in cold alcohol or ether, but it is soluble in boiling alcohol and ether, in fixed oils, and in alkalies. **USES.** It is chiefly employed in the composition of external applications. **ADULTERATIONS.** *Earth* or *peas-meal* may be suspected when the cake is very brittle, and the colour inclines to grey; *Resin* is detected by putting it in cold alcohol, which will dissolve the resinous part without acting on the wax. *Tallow* is discovered by the greater softness and unctuousity of the cake, and by its suffocating smell when melted; when this latter substance is employed, turmeric is added to disguise its paleness.

2. CERA ALBA. *White, Bleached, or Virgin's Wax.*

QUALITIES. This substance differs only from the former, in being colourless, harder, heavier, and less fusible. **USES.** It is said to be demulcent, and very useful in dysentery, but it is rarely used. **FORMS OF EXHIBITION.** It may be formed into a mixture by melting it with one third of its weight of soap, and then gradually adding to it any mucilaginous liquid. **ADULTERATIONS.** *White Lead* may be detected by melting the wax in water, when the oxide will fall to the bottom of the vessel; *tallow* may be suspected when the cake wants its usual translucency.

CERATA. L.E. Cerates.

These compositions are characterized by a degree of consistence, intermediate between that of plasters, and that of ointments. As this consistence is obtained from the wax which they contain, they very properly derive from that substance the generic appellation of *Cerates*.

CERATUM CALAMINÆ. L. (*Ceratum lapidis Calaminaris*. P.L. 1787. *Ceratum epuloticum*. P.L. 1745). Ceratum Carbonatis Zinci Impuri. E. Unguentum Calaminare. D.—These preparations have been long known under the name of *Turner's Cerate*; they form the basis of many extemporaneous cerates, in some of which nitric oxide of mercury, in the proportion of 3j of the oxide to 3j of cerate, and in others, the liquor of subacetate of lead, are introduced. By the former combination we obtain a very useful application to indolent and ill-conditioned ulcers, a valuable stimulant for inducing an action conducive to the regeneration of parts. By the latter combination we derive a remedy highly extolled by our most experienced surgeons, in the cure of burns and scalds.

CERATUM CANTHARIDIS. L. The basis of this preparation is spermaceti cerate *six parts*, to which is added, of powdered flies *one part*: as it is intended to promote a purulent discharge from a blistered surface, it may be reduced in strength according to circumstances.

CERATUM CETACEI. L. (*Ceratum Spermatidis ceti*. P.L. 1787. Ceratum Album, P.L. 1745). Ceratum Simplex, E. It furnishes a soft and cool-

ing dressing, and constitutes a convenient basis for more active combinations, as in the following instance.

CERATUM PLUMBI ACETATIS. L. (*Unguentum Cerussæ Acetatæ, P.L. 1787.*) This is cooling for burns, excoriations, and inflamed surfaces.

CERATUM PLUMBI COMPOSITUM. L. (*Cerat: Lithargyri acetati compositum, P.L. 1787.*) This is "Goulard's Cerate," and is applicable to the same cases as the former cerate; the camphor which enters into its composition imparts a gently stimulating power to it; it proves extremely serviceable in chronic ophthalmia of the tarsus, and for the increased secretion of tears, which so frequently affects the eyes of persons advanced in years.

CERATUM RESINÆ. L. *Ceratum resinæ flavæ, P.L. 1787. Ceratum citrinum. 1745. Yellow Basilicon.*) Unguent: Resinosum, E. Unguent: Resinæ albæ. D. It is stimulant, digestive, and cleansing, and affords a very excellent application for foul and indolent ulcers.

CERATUM SABINÆ. L. *Savine Cerate.* It is intended to keep up a purulent discharge from a blistered surface; in practice however it is often found to fail from the difficulty of obtaining it good, since the acrid principle of the plant is injured by long boiling, and by being previously dried; the ointment also loses its virtue by exposure to the air.

CERATUM SAPONIS. L. This preparation was much used and recommended by the late Mr. Pott; in preparing it the greatest possible caution is required; the fire should never be too rapidly applied, the stirring should be uniform and incessant, and the heat should only be sufficient to keep the two compositions liquid at the time when they are united. The original intention of the cerate was to afford, when spread upon linen, a mechanical support to fractured limbs, and to keep the points of the bone in due opposition, while in consequence of the *acetate of lead* which is formed in the first stage of the process for its preparation, it possesses the virtues of a saturnine dressing. As a mechanical agent it may prove at once effectual and dangerous, for if it be applied before all inflammation and swelling have entirely disappeared, the inflamed vessels may be completely strangulated by its unrelenting pressure, and high erysipelatous inflammation, and a rapid state of gangrene may be the result.

CERATUM SIMPLEX. A useful application to excoriations and sores.

Besides the above cerates, there are many magistral* preparations of great practical value, and I must refer the surgical student for an account of them to that very useful little manual, entitled "*Pharmacopœia Chirurgica.*"

* **KIRKLAND'S NEUTRAL CERATE.** Is formed by melting together ℥ viij of Lead Plaster with f℥iv of olive oil, into which are to be stirred ℥iv of prepared chalk; when the mixture is sufficiently cooled f℥iv of acetic acid, and ℥iij of pulverized Acetate of lead are to be added, and the whole is to be stirred until nearly cold.

MARSHALL'S CERATE. ℞. Palm. Oil ℥v, Calomel ℥i, Acetate of Lead ℥ss, Nitrate of Mercury ℥ij.

COLD CREAM (Ceratum Galeni.) Ol: Amygdal: lbj. Ceræ alb: ℥iv; melt, pour into a warm mortar, and add, gradually, Aq: Ros; oj. It should be very light and white. Gray's Supplement.

CETACEUM. L.

(Physeter Macrocephalus, *Concretum sui generis.*)

Spermaceti. E.D.

QUALITIES. *Form*, flakes, which are unctuous, friable, and white. *Odour* and *taste*, scarcely perceptible. *Sp. Grav.* 9.433. It melts at 112°. **CHEMICAL COMPOSITION.** It is a peculiar modification of fatty matter. **SOLUBILITY.** It is insoluble in water and cold alcohol, but soluble in hot alcohol, ether, and oil of turpentine, but it concretes again as the fluids cool; in the fixed oils it is completely soluble. The alkaline carbonates do not affect it, but it is partially dissolved in the pure alkalies, and with hot ammonia it forms an emulsion which is not decomposed on cooling. **USES.** It is demulcent and emollient, but it possesses no advantages over the bland oils. **FORMS OF EXHIBITION.** It may be suspended in water by means of mucilage or yolk of egg. (*Formulae* 76, 78, 79.) **OFFICINAL PREPARATIONS.** *Ceratum Simplex.* E. *Ceratum Cetacei.* L. *Unguent. Cetacei.* L.D. From exposure to hot air, it becomes rancid; but it may be again purified, by being washed in a warm solution of potass.

CINCHONA. L.E.D. *Bark. Peruvian Bark.**Jesuit's Bark.*

Notwithstanding the labours of the Spanish botanists, the history of this important genus is still involved in considerable perplexity, and owing to the mixture of the barks of several species,* and their importation into Europe under one common name, it is extremely difficult to reconcile the contradictory opinions which exist upon the subject, nor indeed would such an investigation be consistent with the plan and objects of this work. Under the trivial name *officinalis*, Linnæus confounded no less than four distinct species of cinchona, and under the same denomination the British Pharmacopœias, for a long period, placed as varieties the three barks known in the shops; this error indeed is still maintained in the Dublin Pharmacopœias, but the London and Edinburgh colleges have at length adopted the arrangement of Mutis, a celebrated botanist, who has resided in South America, and held the official situation of Director of the exportation of bark for nearly forty years.

CINCHONÆ CORDIFOLIÆ CORTEX. L.E. Cortex Peruvianus. D. Heart-leaved Cinchona Bark, commonly called *Yellow Bark*.

CINCHONÆ LANCIFOLIÆ CORTEX. L.E. Cortex Peruvianus. D. Lance-leaved Cinchona Bark, common *Quilled bark*—*Pale bark*.

CINCHONÆ OBLONGIFOLIÆ CORTEX. L.E. Cortex Peruvianus. D. Oblong-leaved Cinchona Bark, called *Red bark*.

QUALITIES. The *odour* and *taste* of these three species are essentially the same, although they differ in intensity. They are all bitter, sub-astringent and aromatic, but the flavour of the *Yellow bark* is incompar-

* There are no less than twenty-five distinct species of Cinchona, independent of any additions which we may owe to the zeal of Humboldt and Bonpland: and Mr. A. T. Thomson, in his London Dispensatory, states that in a large collection of dried specimens of the genus Cinchona, in his possession, collected in 1805, both near Loxa and Santa Fé, he finds many species which are not mentioned in the works of any Spanish botanist.

ably the most bitter, although less austere and astringent, whilst the red bark has a taste much less bitter, but more austere and nauseous than either of the other species. **CHEMICAL COMPOSITION.** Few vegetable substances have been more frequently, or more ably submitted to chemical analysis than the Peruvian bark, and yet but few results of any great practical utility had been obtained previous to the recent experiments of Pelletier and Caventou, communicated to the Academy of Sciences at Paris, since the publication of the fourth edition of the present work.

Dr. Maton* had several years ago observed, that an infusion of nut-galls produced a precipitate with the decoctions of Bark; a fact which necessarily produced considerable speculation. Seguin was induced to regard it as arising from the presence of *gelatine* (see page 57,) an opinion which Dr. Duncan proved to be erroneous, and shewed that it depended upon a new proximate principle, to which M. Gomez of Lisbon had previously assigned the name of *Cinchonine*. Besides which, bark was considered as containing resin, extractive, gluten, tannin, a small portion of volatile oil, and some salts, with a base of lime; one of which however had been only found in *Yellow* bark, and had been discovered to contain a peculiar vegetable acid, denominated by Vauquelin *Kinic*, a name which Dr. Duncan very judiciously superseded by that of *Cinchonic* acid.

In the *Red* bark, Fourcroy detected also a portion of citric acid, some muriate of ammonia, and muriate of lime. Upon which of these principles the tonic and febrifuge virtues of bark depends, has ever proved a fruitful source of controversy. Deschamps attributed them to *Cinchonate of Lime*, and asserted that two doses of thirty-six grains each, would cure any intermittent. Westering considered *Tannin* as the active constituent; while M. Seguin assigned all the virtues to the principle which precipitates gallic acid, and which, as it has been before stated, he mistook for *gelatine*. Fabroni concluded from his experiments, that the febrifuge power of the bark did not belong exclusively and essentially to the astringent, bitter, or to any other individual principle, since the quantity of these would necessarily be increased by long boiling, whereas the virtues of the bark are notoriously diminished by protracted ebullition. This argument however will not go far, when we consider the chemical changes which the liquid is known to suffer during that operation, and by which a considerable portion of its matter is rendered insoluble. Such was the state of our knowledge respecting the composition of the *Cinchona*, when Pelletier and Caventou, guided by analogy, were led to infer the presence of an alkaline element of activity in its composition. The merit belonging to the researches of these eminent chemists, does not so much consist in the discovery of new elements, as in the proofs which they have furnished of the well known principle, *Cinchonine*, being a salifiable base,† and in demonstrating the peculiar states of combination in which it exists in the different species of *Cinchona*.

Cinchona Lancifolia.

Their analysis of the *Pale Bark*, furnished the following principles.

* See London Medical and Physical Journal. Vol. v. p. 33.

† **ESSENTIAL SALT OF BARK.** It is highly necessary that the public should know that the preparation sold under this empirical title, has no relation whatever to the late discoveries of Pelletier. It is merely an extract prepared by macerating the bruised substance of bark in cold water, and submitting the infusion to a very slow evaporation.

1. *Acidulous Kinate of Cinchonia*.*
2. *A green fatty matter.*
3. *Red Colouring matter, slightly soluble.*
4. *Ditto soluble.* (Tannin.)
5. *Yellow colouring matter.*
6. *Kinate of Lime.*
7. *Gum.*
8. *Starch.*
9. *Lignin.*

Cinchonia, when obtained in an isolated form,† is distinguished by the following characters and habitudes.

It is white, transparent, and crystallizes in the form of needles; it has but little taste, a circumstance depending upon its comparative insolubility, as it requires no less than 7000 parts of cold water for its solution; in boiling water it is soluble in 2500 times in weight, but a considerable part separates, on cooling. In alcohol and the acids it is much more soluble, and imparts to such menstrua the characteristic bitter of the bark; it dissolves only in small quantities in the fixed and volatile oils, or in sulphuric ether. *Cinchonia* restores the colour of litmus which has been reddened by an acid. With acids it combines and forms neutral salts, of which the solubility and crystalline form vary with the acid employed.

Sulphate of Cinchonia, easily crystallizable and moderately soluble, has been found to consist of *Cinchonia* 100, *Sulphuric acid* 13.02.

Nitrate of Cinchonia, uncrystallizable, and sparingly soluble.

Muriate of Cinchonia, crystallizes in very beautiful needles, and is more soluble than the preceding salts.

Oxalate of Cinchonia, nearly insoluble; hence by pouring oxalic acid, or oxalate of ammonia into solutions of any of the soluble salts of cinchonia, we obtain a very white and abundant precipitate, which might be mistaken for oxalate of lime; it is, however, soluble in an excess of acid, and in alcohol.

Gallate of Cinchonia, equally as insoluble as the *Oxalate*, whence the precipitate occasioned by pouring an infusion of galls into the decoctions of genuine cinchona.

Cinchonia, when heated, does not fuse before decomposition. Its ultimate elements are *oxygen*, *hydrogen*, and *carbon*; the latter being predominant.

The *Kinic acid*, which exists in native combination with the *Cinchonia*, amongst several other peculiar properties, is convertible by means of

* The designation of *Cinchonia*, consistent with the principles of chemical nomenclature, must now have a termination in *a*, and the name *Cinchonia* appears preferable to that of *Cinchonina*.

† The following is the process by which *Cinchonia* may be prepared. Take a pound of Pale Bark, bruised small, and boil it for an hour in three pints of a very dilute solution of pure Potass. After the liquid has cooled, it must be strained through a fine cloth with pressure, and the residuum be repeatedly washed and pressed. The *cinchonia*, thus washed, is to be slightly heated in a sufficient quantity of water, adding muriatic acid gradually until litmus paper is slightly reddened. When the liquid is raised nearly to the boiling point, it is to be strained, and the *cinchona* again pressed. To the strained liquor, while hot, add an ounce of sulphate of magnesia, and after this add a solution of potass, till it ceases to occasion any precipitate. When the liquor is cold, collect the precipitate on a filtre, wash and dry it, and dissolve it in hot alcohol. On evaporation of the spirit, the *cinchona* will crystallize.

heat into a substance (*acide pyrokinique*,) which is crystallizable, and capable of producing with iron a most beautiful green colour.

2. *Cinchona Cordifolia*.

In the *Yellow Bark*, these chemists discovered also a salifiable base, quite distinct, however, in its character and habitudes from *Cinchonia*; they accordingly designated it by another name, viz. *Quinine*, but which we shall hereafter call *Quina*. In speaking of these two bases, the authors compare them, in point of dissimilarity, to the fixed alkalies, potass and soda. *Quina* is distinguished from *Cinchonia* by the following characters. It cannot, like this latter body, be crystallized by evaporation from its alcoholic solution, although it may be obtained in transparent plates. *It is very soluble in æther*; in water it is as insoluble as *cinchonia*, but its taste is much more bitter. The salts which it forms are different from those of *cinchonia*, both in the proportion of their elements, and in the properties which they possess, being generally much more bitter. In comparing their composition, *Quina* will appear to have less capacity of saturation* than *cinchonia*.

Sulphate of Quina. It forms crystals quite remarkable for their satin-like and pearly lustre. It is soluble in cold water, a property which is very considerably increased by an excess of acid.† It appears from the observations of M. Callaude, apothecary at Annecy, that *Sulphate of Quina* exposed to a gentle heat, becomes highly luminous; and M. Pelletier has since found that *Sulphate of Cinchonia*, when exposed in a capsule to the steam of boiling water, exhibits the same phenomenon, but that neither *Quina* nor *Cinchonia*, by themselves, nor their acetates, possess this

* Thus, as we have stated, 100 parts of *Cinchonia* unite with 13.021 of Sulphuric acid, while the same weight of *Quina* requires for saturation not more than 10.91 of the same acid.

† **SULPHATE OF QUINA.** As this preparation is considered the most active form of the salifiable principle of bark, I have subjoined the most approved formula for its preparation. Boil for half an hour two pounds of the appropriate bark in powder, in sixteen pints of distilled water, acidulated with two fluid-ounces of sulphuric acid; strain the decoction through a linen cloth, and submit the residue to a second ebullition in a similar quantity of acidulated water; mix the decoctions, and add by small portions at a time, powdered lime, constantly stirring it to facilitate its action on the acid decoction. (Half a pound is near the quantity requisite.) When the decoction has become slightly alkaline it assumes a dark brown colour, and deposits a reddish brown flocculent precipitate, which is to be separated by passing it through a linen cloth. The precipitate is to be washed with a little cold distilled water and dried. When dry it is to be digested in rectified spirit, with a moderate heat for some hours; the liquid is then to be decanted, and fresh portions of spirit added, till it no longer acquires a bitter taste. Unite the spirituous tinctures, and distil in a water-bath till three fourths of the spirit employed has distilled over. After this operation there remains in the vessel a brown viscid substance covered by a very bitter alkaline and milky fluid. The two products are to be separated and treated as follows. To the alkaline liquid add a sufficient quantity of sulphuric acid to saturate it; reduce it by evaporation to half the quantity; add a small portion of charcoal, and after some minutes' ebullition, filter it whilst hot, and crystals of Sulphate of Quina will form. The brown mass is to be boiled in a small quantity of water, slightly acidulated with sulphuric acid, which will convert a large portion of it into Sulphate of Quina. The crystals are to be dried by a bibulous paper. Two pounds of bark will, it is said, yield 5 to 6 drachms of the sulphate; of which eight grains are considered equivalent to an ounce of bark. It has been prepared in this country by several manufacturing chemists, especially by Mr. Pope of Oxford-Street, whose zeal and industry in Pharmaceutic experiments entitle him to great commendation. The superior price of the bark, however, from the duty in this country, as well as that of alcohol, must prevent us from entering into competition with the French in its manufacture, and it has accordingly been found more economical to import than to prepare it.

phosphorescent quality. This appears to be the most efficient of all the salts of Bark, and is the one from which I have frequently derived much advantage. In its exhibition we must be careful not to combine it with substances that form insoluble compounds with it. The *Infusum Rosæ compositum* is objectionable as a vehicle, on account of the astringent matter which it contains, and which therefore precipitates the *Quina* from its solution. I have lately seen a prescription in which the salt is directed to be rubbed with a few grains of *Cream of Tartar*, and then to be dissolved in mint water. This is obviously injudicious, since Tartaric acid decomposes the sulphate, and occasions an insoluble *Tartrate*, which is precipitated. The form in which I have usually prescribed it is in that of solution, with a small quantity of sulphuric acid, in the proportion of a minim to every grain of the salt. A *Wine of Quina* may be made by adding five grains of the sulphate to a pint of Sherry; a Tincture, by dissolving the same quantity in eight fluid-ounces of Rectified Spirit. The sulphate is to be preferred to the pure *Quina* in these cases, because, when the tincture is made by using the alkali, not saturated by an acid, a precipitate is formed on adding it to aqueous liquors. Dose of the Sulphate, gr. i.—v.

Acetate of Quina, very remarkable for the great facility with which it crystallizes, and for the pearly aspect and agreeable stellated grouping of the crystals; whereas the acetate of cinchonia crystallizes with difficulty, and simply in plates transparent, and devoid of lustre.

Quina forms with the oxalic, gallic, and tartaric acids, salts as insoluble as those which the same acids form with *Cinchonia*.

3. *Cinchonia Oblongifolia*.

The *Red Bark* upon analysis was found to contain a double basis, and to yield both *Cinchonia* and *Quina*, and what is still more extraordinary, the quantity of each exceeded that which is known to exist in the *grey* and *yellow barks*.

The latest experiments, however, made on very large quantities of the bark, have shewn that *Quina* and *Cinchonia* exist simultaneously in all the three species; but the *Cinchonia* is, relatively to the *Quina*, in greater quantity in the *grey* bark; whilst, in the *yellow* bark, the *Quina* so predominates, that the presence of the *Cinchonia* might well have escaped notice when small quantities were operated on.

Having thus furnished a sketch of this curious discovery, we have next to enquire whether the alkaline bases in question do actually concentrate all the virtues of the barks in which they reside? M. Majendie* informs us that Pelletier had very early after the discovery transmitted to him a portion of the new substances for trial, and that he has unequivocally determined that they do not possess any deleterious qualities,† and are therefore essentially different from the principles of *Nux vomica*, (*Strychnine*,) *Opium*, (*Morphia*,) &c. According to the testimony of Dr. Double, as related in the same journal, they would seem to possess the medicinal properties of the cinchona.

* Journal de Physiologie. No. 1. p. 90.

† Upon this point however a difference of opinion has existed; M. Halle entertained considerable fears on the subject, which were supported by M. M. Larrey, Emery, Duponchel, and others, who communicated to the Société Médicale d'Emulation, facts which excited their apprehensions. The question, however, has been set at rest both in this country and on the Continent. They are perfectly harmless.

In the third number of *Majendie's Journal* we receive a report from M. le docteur Renaudin, of an intermittent cured by the *Sulphate of Cinchonia*, in doses of six grains.

As the discovery of an alkaline element in Opium led the way to the detection of salifiable bases in other active vegetables,* it has seemed to me preferable that I should introduce those general observations which I wish to offer upon the subject of those bodies, under the history of that narcotic. It is only necessary in this place to caution the practitioner against the hasty generalizations of the too sanguine chemist; it has already been observed that those vegetable remedies, whose value has been established by the sober experience of ages consist of different principles of activity, or, at least, owe a modified power to the compound effect of their several ingredients. (See page 159, note.)

SOLUBILITY OF THE BARK. Cold water extracts its bitter taste, with some share of its odour; when assisted by a moderate heat, the infusion is stronger, but becomes turbid as it cools; the infusion cannot be kept, even for a short time, without undergoing decomposition, and being spoiled; wine also extracts the virtues of bark, and is prevented by this substance from becoming sour, a fact which probably depends upon the avidity with which some of the principles of bark combine with oxygen, and which may throw some light upon the cause of its antiseptic virtues. The colouring matter of wine is precipitated by bark, as it is by charcoal, in the course of a few days. By decoction the active matter of cinchona is in a great degree extracted, but if the process be protracted beyond eight or ten minutes, it undergoes a very important chemical change, the precise nature of which is not well understood; the balance of affinities, however, by which the different elements are united, is evidently overthrown, and a considerable precipitation ensues; oxygen would also appear to have been absorbed; whether the *Cinchonia* becomes insoluble has not yet been ascertained, but experience has shewn that the general loss of solubility produced by such a process, is accompanied with a corresponding loss of medicinal activity; on which account, the extract is necessarily a very inefficient preparation; if we attempt to redissolve it, not more than one half is soluble in water. Vinegar is a less powerful solvent than water; the active matter of bark is rendered more soluble by the addition of mineral acids, and by the earths and alkalies; these latter bodies deepen its colour, and precipitate the *Cinchonia*, for which reason, when they are employed, the decoction ought not to be filtered; see *Form.* 41, 42. and note thereon. *Lime water* has been recommended as a solvent, and it affords an excellent form for children and dyspeptic patients; for the same reason we obtain a stronger and perhaps a more efficient preparation, by triturating it with magnesia, previous to the process of infusion. Alcohol is a very powerful solvent, but the great activity of this menstruum so limits its dose that we are prevented from exhibiting a sufficient quantity of the bark in the form

* *Cinchonia* has been detected in other vegetables besides the Bark, as in the root of *Cusparia*, and in the berries of *Capsicum*, while in the bark of *Cascarilla*, a substance bearing a much nearer relation in medicinal effect to the Bark, its presence has not yet been discovered. It is said that experiments have been lately made by M. M. Robiquet and Petroz on the Bark of the *Carapa*, which has been successfully used in several parts of America in the cure of agues, and that they have found in that bark a salifiable basis analogous to Quina.

of tincture ; it furnishes however an excellent adjunct to other preparations.

INCOMPATIBLE SUBSTANCES. Precipitates are produced by the *salt of iron, sulphate of zinc, nitrate of silver, oxy muriate of mercury, tartarized antimony, solutions of arsenic, &c.* Any considerable portion of a tincture produces also a precipitation, which sometimes does not immediately take place, and the medicinal value of the bark is probably not impaired by it. As the infusions of *nut galls* and some other vegetable astringents precipitate the cinchonia from bark, it becomes a question how far such liquids are medicinally compatible ; saline additions, as *alum, muriate of ammonia, &c.* have been frequently proposed, but in many such mixtures decompositions arise which must deceive us with regard to the expected effects. **FORMS OF EXHIBITION.** No form is so efficient as that of powder, a fact which would seem to argue against the *exclusive* value of the *Cinchonia* ; even the ligneous fibre which the chemist pronounces to be inert and useless, may produce its share of benefit by modifying the solubility of the other ingredients, or by performing some mechanical duty which we are at present unable to understand or appreciate ; but where the stomach rejects it, it must be administered in *infusion* or *decoction*, with the addition of its *tincture*. In cases where it is necessary to join cordials, an infusion of bark in Port wine* is a popular and very useful form for its administration. **DOSE** of the powder, gr. v. to 3ij. or more, of the infusion or decoction 3ij. **MEDICINAL USES.** It is powerfully tonic and antiseptic ; it was introduced into practice for curing intermittent fevers, but since that period it has been generally used in diseases of debility, in fevers of the typhoid type, and in gangrene. It was first conjectured to be useful in gout by Sydenham, and Dr. Haygarth has strongly recommended its exhibition in acute rheumatism ; when however it is used in these diseases, the greatest attention ought to be paid to the state of the bowels, and purgatives should be occasionally interposed. In Dyspepsia, the use of the purer bitters is to be greatly preferred to that of the bark. **OFFICINAL PREPARATIONS.** *Infus. Cinchonæ, L.E.D. Decoct. Cinchon. L.E.D. Extractum Cinchon. L.E. Extract. Cinchonæ resinosum L.D. Tinct. Cinchonæ. L.E.D. Tinct. Cinchonæ comp. L.E.D. Tinct. Cinchon. Ammoniat. L.* **MAGISTRAL FORMULÆ, 31, 37, 40, 44, 127, ADULTERATIONS.** The frauds committed under this head are most extensive ; it is not only mixed with inferior barks, but frequently with genuine bark, the active constituents of which have been entirely extracted by decoction with water. In selecting cinchona bark, the following precautions may be useful ; it should be dense, heavy, and dry, not musty, nor spoiled by moisture ; a decoction made of it should have a reddish colour when warm ; but when cold it should become paler, and deposit a brownish red sediment. When the bark is of a dark colour, between red and yellow, it is either of a bad species, or it has not been well preserved. Its *taste* should be bitter, with a slight acidity, but not nauseous, nor very astringent ; when chewed, it should not appear in threads, nor of much length ; the *odour* is not very strong, but when bark

* It was under this form that the celebrated empiric Talbor used to administer it in the paroxysm of Intermittents, and so successful was his practice, that Louis XIV. was induced to purchase at a large price the secret of his specific ; and Charles the Second very unjustly protected him against the power of the College, and appointed him one of his physicians.

has been well cured, it is always perceptible, and the stronger it is, provided it be pleasant, the better may the bark be considered. In order to give bark the form of *quill*, the bark gatherers not unfrequently call in the aid of artificial heat, by which its virtues are deteriorated; the fraud is detected by the colour being much darker, and upon splitting the bark, by the inside exhibiting stripes of a whitish sickly hue. In the form of powder, cinchona is always found more or less adulterated. During a late official inspection of the shops of apothecaries and druggists, the Censors repeatedly met with powdered cinchona having a harsh metallic taste, quite foreign to that which characterizes good bark.* The best test of the goodness of bark is afforded by the quantity of *Cinchonia*, or *Quina* that may be extracted from it; and the manufacturer should always institute such a trial before he purchases any quantity, taking a certain number of pieces indiscriminately from the bulk. Much has been said of late concerning the probability of the genuine species of the cinchona tree becoming extinct; in consequence of which some succedaneum has been anxiously sought for; the bark of the broad-leaved willow, *Salix Caprea*, has been proposed for this purpose. Vogel recommends the root of *Geum urbanum avens*; others propose that of the *Dastisca canabina*.

The *Cinchona Caribæa* of the Edinburgh Pharmacopœia is said, by Dr. Wright, to whom we are indebted for our knowledge of it, to have satisfactorily answered in all cases where the Peruvian bark was indicated. The *Geoffræa Interwis* is often sold for it.

M. Ré, Professor of the Materia Medica at the Veterinary School at Turin, has announced that the *Lycopus Europæus* of Linnæus, called by the peasants of Piedmont the *Herb China*, is a complete succedaneum for Peruvian Bark.† The success with which bark has been imitated by medicinal combination has already been noticed in the first part of this work.

CINNAMOMI CORTEX. L.E.D. (Laurus Cinnamomum.)

Cinnamon.

The qualities of Cinnamon depend upon the presence of an *essential oil*. *Benzoic acid* has been found in it. It is principally employed to cover the taste of nauseous medicines, and to correct the griping quality of different purgatives. It is, however, in itself, astringent and tonic, whence it has been found efficacious in the relief of alvine fluxes. **ADULTERATIONS.** It is sometimes intermixed with cinnamon from which the oil has been drawn; the fraud is detected by the weakness of the odour and taste of the specimen; sometimes it is mixed with *cassia*, but this is soon discovered, for *cassia* is thick and clumsy, breaks short, and smooth, and has a remarkably slimy taste, whereas the fracture of cinnamon is shivery, and its flavour warm and clean. Cinnamon ought not to

* Mr. Thompson has suggested the probability of this circumstance having arisen from the admixture of a species of bark, lately introduced into Europe from Martinique, resembling the *Cinchona Floribunda*, and which, by an analysis of M. Cadet, was found to contain iron. (London Disp. Edit. 3. p. 247.)

† This plant is found in abundance in Piedmont, principally in the marshes, where of course it is most needed. Nature is very kind in this respect, for the particular situation which engenders endemic diseases, is generally congenial to the growth of the plants that operate as antidotes to them.

leave a mawkish taste in the mouth; this circumstance denotes an inferior quality. There is an inferior kind imported into Europe from China, through the hands of private merchants; this is distinguished by being darker coloured, rougher, denser, and by breaking shorter; the taste is also harsher, more pungent, and ligneous, without the sweetness of Ceylon cinnamon. Dose of the cinnamon in powder is from grs. x to ʒj. OFFICINAL PREP. *Aqua Cinnamomi*, L.E.D. *Spir. Cinnamomi*, L.E.D. *Tinct. Cinnamomi*, L.E.D. *Tinct. Cinnamom. co. L.* *Pulv. Cinnamom. comp.* L.E.

CINNAMOMI OLEUM. It is principally imported from Ceylon: it has a whitish yellow colour, a pungent burning taste, and the peculiar fine flavour of cinnamon in a very great degree.* It should sink in water, and be entirely soluble in alcohol. It is one of the most powerful stimulants which we possess. Dose, ℥i to iij, on a lump of sugar.

COCCUS. L.E. (*Coccus Cacti.*) *Coccinella. D.*

Cochineal.

It is an insect imported from Mexico and New Spain, and has the appearance of a wrinkled berry or seed of a deep mulberry colour, with a white powder between the wrinkles. **USES.** Its medicinal virtues are now entirely discredited, and it is only employed for the sake of its colouring matter, for the purpose of a dye; it was known to the Phœnicians, and was the *tolu* of the Jews. Its watery solution is of a violet crimson, its alcoholic of a deep crimson, and its alkaline of a purple hue; the colour of the watery infusion is brightened by acids, cream of tartar, and alum, and at the same time partly precipitated. Dr. John has given the name of *Cochenelin* to this colouring principle, which M. M. Pelletier and Caventou have lately obtained in a perfectly pure state, as a very brilliant purple red powder with a granular crystalline appearance: these chemists propose to call it *Carmine*, but as Mr. Children very justly observes, if we adopt the term, its termination should be altered, to avoid confounding the pure colouring matter with the pigment in common use. It may be called *Carmina*, a more harmonious name than *Cochenelin*, (*Ann: de Chimie*, vol. viii). **INCOMPATIBLE SUBSTANCES.** The colouring matter is decomposed by *sulphate of iron*, *sulphate of zinc*, and *acetate of lead*. **OFFICINAL PREPARATIONS.** *Tinct: Cardamom: comp: L. D.* *Tinct: Cinchon: comp: L. D.* *Tinct: Gentian, comp: E.* *Tinct: Cantharid D.* **ADULTERATIONS.** It is invariably adulterated with pieces of dough, formed in moulds, and coloured with cochineal. I understand that this fraud gives employment to a very considerable number of women and children in this metropolis. A cargo of the counterfeit article was some time since exported, in order to obtain the drawback; by throwing a suspected sample into water, we shall dissolve the spurious ones, and ascertain the extent of the adulteration.

* Dr. Davy, in a letter to me upon this subject, says, "there are two kinds of oil of cinnamon procured in Ceylon, one of greater, the other of less specific gravity than water. In distillation they come over together. On what the difference depends I do not know, nor am I aware that the subject has yet been investigated."

COLCHICI RADIX, ET SEMINA. L.E.D.

Colchicum Autumnale.

The *Bulb* of the Meadow Saffron.

QUALITIES. When recent it has scarcely any *odour*, but its *taste* is bitter, hot, and acrid. **CHEMICAL COMPOSITION.** Its properties reside in a milky juice, and depend upon an alkaline principle; it contains also gum, starch, inulin, and extractive matter, which, when in solution, undergoes a chemical change, analogous, I apprehend, to that which takes place in the infusion of Senna, and it would appear with similar inconvenience. Sir Everard Home ascertained that this deposit, in the vinous infusion, excites nausea and griping, but that it may be removed without destroying the efficacy of the medicine. The alkaline element, similar to that of the Hellebore (*Veratria*), lately found in it, appears to exist in combination with gallic acid. (*Annales de Chimie*, tom. xiv. Mai, 1820.) This alkaline body would seem to display its greatest energies by its action upon mucous surfaces; in small portions it excites violent sneezing, and when applied to the membrane of the stomach, immediate vomiting and purging are the result. See *Veratri radix*. The virtues of the bulb of *Colchicum* are very variable, according to the place of growth and season of the year. Since the third edition of this work, I have been favoured with some valuable observations upon this subject by Mr. Alexander Gordon: he says that it is in its greatest perfection from the beginning of June until the middle of August.* It is also necessary to extract the virtues of the bulb as soon as it is gathered, for although removed from the earth, the developing process of vegetation continues, and the substance undergoes a corresponding series of chemical changes, and finally becomes as inert as if it had remained in the ground. It is a problem of some importance to discover a method of destroying the vegetable life of the bulb, without at the same time injuring its virtues, for I apprehend that a want of attention to the above precaution frequently renders the vinous infusion inactive. The practitioner engaged in preparing this vegetable remedy will find some valuable directions in the third edition of Thomson's Dispensatory. The flower of the *meadow saffron* is very poisonous to cattle. **SOLUBILITY.** Vinegar and wine† are the

* With this opinion Mr. A. T. Thompson coincides, for in the 3d edition of his Dispensatory, he says, "the thick old bulb begins to decay after the flower is perfectly expanded, and the new bulbs, of which there are always two formed on each old bulb, are perfected in the following June; from which time until the middle of August, they may be taken up for medicinal use."

† EAU MEDICINALE DE HUSSON. After various attempts to discover the active ingredient of this Parisian remedy, it is at length determined to be the colchicum autumnale which several ancient authors, under the name of hermodactyllus, have recommended in the cure of gout, as stated in the historical preface to this work. The following is the receipt for preparing this medicine. Take two ounces of the root of colchicum, cut it into slices, macerate it in four fluid-ounces of Spanish white wine, and filter. See *Veratri Radix* (note).

Dr. WILSON'S TINCTURE FOR THE GOUT. This is merely an infusion of colchicum, as Dr. Williams of Ipswich has satisfactorily shewn. Since the discovery of colchicum being the active ingredient of the Eau Medicinale, numerous empirical remedies have started up, containing the principles of the plant in different forms.

The expressed juice of the colchicum is used in Alsace to destroy vermin in the hair; it is very acrid, and excoriates the parts to which it is applied.

best menstrua for extracting its active qualities; by decoction its essential oil is dissipated. **MEDICINAL USES.** It has been much extolled on the continent as a remedy in dropsy, especially in hydro-thorax, and in humoral asthma; its operation, however, as a diuretic, is less certain than squill, although its *modus operandi* is analogous to it, as will be seen by referring to our new arrangement of Diuretic remedies. As a *specific* in gout its efficacy has been fully ascertained; it allays pain, and cuts short the paroxysm. It has also a decided action upon the arterial system, which it would appear to control through the medium of the nerves. **INCOMPATIBLE SUBSTANCES.** In my opinion, acids, and all oxygenated substances render the vinous infusion drastic: on the contrary, alkalies render its principles more soluble, and its operation more mild, but not less efficacious. Magnesia may judiciously accompany its exhibition. **Dose** of the saturated vinous infusion, the only form in which its successful operation can be insured, f3ss to f3j, whenever the patient is in pain. See *Vinum Colchici*. **OFFICINAL PREPARATIONS.** *Acetum Colchici*, L. *Oxymel Colchici*, D. *Vinum Colchici*, L. *Spiritus Colchici Ammoniatus*, L. *Syrupus Colchici Autumnalis*, E.

COLCHICI SEMINA. Dr. Williams of Ipswich has lately published an account of the efficacy of the *Seeds* of *Colchicum* which he says possess all the virtues of the root, without its pernicious* qualities; the form in which he administers them, is in that of vinous infusion.† He also informs me that he has experienced considerable tonic effects from these seeds; and that unlike other narcotic remedies they do not appear to produce, or favour congestion in the head. The seeds ought not to be bruised, as their virtues reside chiefly in the husk, or cortical part.

COLOCYNTHIDIS PULPA. L.E.D.

(*Cucumis Colocynthis.*)

Colocynth. Coloquintida. Bitter Cucumber.

QUALITIES. The medullary part of this fruit, which is alone made use of, is a light, white, spongy body. *Taste*, intensely bitter and nauseous. *Odour*, when dry, none. **CHEMICAL COMPOSITION.** Mucilage, resin, a bitter principle, and some gallic acid. **SOLUBILITY.** Alcohol and water alike extract its virtues, but the active principle resides both in the portion soluble in water, and in that which is insoluble. **MEDICINAL USES.** It is a very powerful drastic cathartic, and was employed by the ancients in dropsical and lethargic diseases. Many attempts have been made to mitigate its violence, which is best effected by triturating it with gummy farinaceous substances, or the oily seeds; the watery decoction or infusion is much less severe, and has been recommended in worm cases, but it is rarely employed, except in combination with other purgatives. Thunberg informs us, (*see his Travels*, vol. ii. p. 171) that this article is rendered so perfectly mild at the Cape of Good Hope by being pickled,

* Dr. Davy, however, informs me that he is acquainted with a fatal instance from an excessive dose of these seeds, viz. 3j taken by a medical man for gout. On dissection, most of the viscera, more especially the brain and intestines, exhibited great sanguineous turgescence, and appearances of inflammation.

† This preparation, or the Seeds, may be procured for trial, from the house of Savory, Moore, and Davidson, of New Bond Street.

that it is absolutely used as food both by the natives and colonists. Mixed with paste or other cements, it is used to keep away insects, which it does by its extreme bitterness. DOSE, grs. iv. to x. INCOMPATIBLE SUBSTANCES. The infusion is disturbed by *sub-acetate*, and *acetate of lead*; *nitrate of silver*; *sulphate of iron*, and by the *fixed alkalies*. OFFICIAL PREPARATIONS. *Extract. Colocynth. L. Extract. Colocynth. comp. L.D. Pil. Aloes cum Colocynth. D.E. (B.)* When the fruit is larger than a St. Michael's orange, and has black acute pointed seeds, it is not good.

CONFECTIONES. L. *Confections.*

Under this title the London College comprehends the *conserves* and *electuaries* of its former Pharmacopœias; but in strict propriety, and for practical convenience, the distinction between *conserves* and *electuaries* ought to have been maintained. Saccharine matter enters into each of these compositions, but in different objects. In *conserves* it is intended to preserve the virtues of recent vegetables; in *electuaries*, to impart convenience of form. See *Electuaria*.

CONFECTIO AMYGDALARUM. L. This preparation affords an expeditious mode of preparing the almond emulsion; it should be used in the proportion of a drachm to each fluid-ounce of distilled water.

CONFECTIO AROMATICA. L. *Electuarium Aromaticum. E.D.* This is a very useful combination of various aromatics, to which the London and Dublin colleges have added a *carbonate of lime*; this circumstance makes the preparation a judicious constituent for the exhibition of active salts, liable to be invalidated by the presence of acid in the stomach, but, at the same time, rendering it incompatible with *acids*, *antimonial wine*, &c. These observations do not of course extend to the *aromatic electuary* of the Edinburgh pharmacopœia. See *Form*: 15, 42, 49, 125, 126. DOSE, ʒj to ʒj.

CONFECTIO CASSIÆ. L. The ingredients of this confection are manna, tamarind pulp, and syrup of roses. It is gently laxative, and from its agreeable flavour is well calculated for children. The pharmacist, in preparing it, must take care that he does not substitute the syrup of the *red*, for that of the *damask* rose: a substitution, as stated under the head of Syrupi, not very unusual. The confection does not ferment or become acescent. DOSE ʒj to ʒj.

CONFECTIO OPII. L. *Electuarium Opiatum. E.* This is a combination of aromatics with opium, intended as a substitute for the *Mithridate* and *Theriaca* of the old pharmacopœias. It is highly useful in flatulent choleric and diarrhœa, and in all cases where a stimulant narcotic is indicated. One grain of opium is contained in grs. 36 of the London, and in grs. 43 of the Edinburgh preparation. DOSE, grs. x to xxx.

CONFECTIO PIPERIS NIGRI. L. This preparation has been introduced into the Pharmacopœia, on the suggestion of several eminent practitioners, who have experienced its utility in certain cases of Piles. It is intended to resemble WARD'S* PASTE, whose composition has been given

* WARD was originally a footman, and during his attendance upon his master on the Continent, obtained from the Monks those receipts which afterwards became his nostrums. It may be observed that this Confection appears to be well adapted for the cure of that species of Piles which probably attended the sedentary, and luxurious habits of the monks.

in all the former editions of this work, and according to which Formula the committee have directed the present preparation. It is principally useful in those cases attended with considerable debility, in leucophlegmatic habits, and when piles arise from a deficient secretion in the rectum. On the other hand, the composition will as certainly prove injurious in those cases which are accompanied with erysipelatous inflammation, and which require cooling laxatives, and a total abstinence from all stimulants, for their cure.

CONFECTIO ROSÆ CANINÆ, olim *Conserva Cynosbati*. Its acidity depends upon uncombined citric acid, a circumstance which it is essential to remember when we direct its use in combination. The hip, or fruit of this plant, beat up with sugar, and mixed with wine, is a very acceptable treat in the north of Europe.

CONFECTIO ROSÆ GALLICÆ. *Confection of the Red Rose*. Principally used as a vehicle for more active medicines. It is sometimes brightened by the addition of a small proportion of sulphuric acid; this is a circumstance of great importance, where the confection is used for making the mercurial pill. See *Pilulæ Hydrarg.* It is a very common excipient for pills, see *Form.* 21, 59, 66, 73, 122, 160, 170.

CONFECTIO RUTÆ, *Confection of Rue*. The principal use of this preparation is as an ingredient in antispasmodic enemata.

CONFECTIO SCAMMONEÆ. **L.D.** Scammony, *two parts*, powdered cloves and ginger, of each, *one part*, to which are added a small portion of oil of caraway, and of syrup of roses, q. s. It is a stimulating cathartic, and may be given in the dose of 3ss to 3j.

CONFECTIO SENNÆ. **L.E.D.** olim *Electuarium Lenitivum*. The ingredients of this preparation are senna leaves, figs, tamarind pulp, cassia pulp, the pulp of prunes, coriander seeds, liquorice root, and refined sugar. It is gently laxative, and is an excellent vehicle for the exhibition of more powerful cathartics. (*Form.* 74, 93.) When properly made, it is an elegant preparation, not apt to ferment, nor to become acescent; the directions of the pharmacopœia are however rarely followed. Jalap blackened with walnut liquor, is frequently substituted for the more expensive article cassia; and the great bulk of it sold in London, is little else than prunes, figs, and jalap. I understand that a considerable quantity is also manufactured in Staffordshire, into which unsound and spoilt apples enter as a principal ingredient. The preparation sold at Apothecaries' Hall is certainly unique in excellence. Dose, 3ij or more.

The above are the principal confections which are employed in modern practice, for happily the shops are at length disencumbered of those nauseous insignificant conserves, unknown to the ancients, but which were ushered into use by the Arabian physicians, and which continued for so many years to disgrace our dispensatories and to embarrass our practice. The French, in their new *Codex Medicamentarius* have limited their electuaries to a number not exceeding nine; they have however made up in complexity for deficiency in number; the *Electuarium de croco*, which is intended to answer the same ends as our *confectio aromatica*, has no less than twelve ingredients, although the force of the combination depends entirely upon carbonate of lime, cinnamon, and saffron; and so it is with the rest.

CONII FOLIA. L.E. (Conium Maculatum.)

Cicuta. D. Hemlock.

QUALITIES. The leaves, when properly dried, have a strong and narcotic odour, and a slightly bitter and nauseous taste: the fresh leaves contain not only the narcotic, but also the acrid principle: by exsiccation, the latter is nearly lost, but the former undergoes no change: the medicinal properties of the leaves are therefore improved by the operation of drying. **CHEMICAL COMPOSITION.** The medicinal activity of the plant resides in a resinous element, which may be obtained in an insulated form, by evaporating an ethereal tincture made with the leaves, on the surface of water; it has a rich dark green colour, and contains the peculiar odour and taste of hemlock in perfection; a dose of half a grain will produce vertigo and head-ache. It may be distinguished by the name of *Conein*. The watery extract of this plant can therefore possess but little power, a fact which Orfila has fully established by experiment. No part of the plant is entirely destitute of efficacy, though the leaves possess the most activity. **SOLUBILITY.** Alcohol and æther extract its virtues. **INCOMPATIBLE SUBSTANCES.** Its energies are greatly diminished by vegetable acids; hence vinegar is its best antidote. **MEDICINAL USES.** It is a powerful sedative, and has been deservedly commended for its powers in allaying morbid irritability: according to my own experience, it is, in well directed doses, by far the most efficacious of all palliatives, for quieting pulmonary irritation. It has been extolled also in the cure of schirrus and cancer, and it will without doubt prove in such cases a valuable resource, from its sedative influence. Externally it will afford considerable relief in irritable ulcers, when applied in the form of fomentation or cataplasm, see *Form.* 17. 18. **FORMS OF EXHIBITION.** The dried leaves, powdered, and made into pills, (*Form.* 2, 17, 18.) The powder ought to have a fine lively green colour. **DOSE,** gr. iij. gradually increased, until some effect is produced. Several different plants have been mistaken for, and employed in the place of hemlock, such as *Cicuta Virosa*, (the water hemlock,) *Jethusa Cynapium*, *Caucalis anthriscus*, and several species of *Chærophylum*. **OFFICIAL PREPARATIONS.** *Extract. Conii.* L.E.D.

CONTRAJERVÆ RADIX. L. E.

(Dorstenia Contrajerva, Radix.) *Contrajerva Root.*

The qualities of this plant are alike extracted by spirit and water; the watery decoction, however, is very mucilaginous; as it contains no astringent matter, the salts of iron do not affect it. **DOSE** of the powdered root, gr. v to 3ss, but it is rarely used. It is considered cordial, and diaphoretic. Has it any virtues? The Spanish Indians have long used it as an antidote to poisons; the Spanish word *contrahiérba* signifies antidote. **OFFICIAL PREP.** *Pulv. Contrajervæ.* L.

COPAIBA. L.E. (Copaifera Officinalis.)

Balsamum Copaibæ. D.

Copaiba, Copaiva, or Capivi Balsam.

QUALITIES. *Consistence*, that of oil, or a little thicker. *Colour*, pale golden yellow. *Odour*, fragrant and peculiar. *Taste*, aromatic, bitter,

and sharp. *Sp. Grav.* 0.950. **CHEMICAL COMPOSITION.** It is improperly denominated a balsam, for it contains no benzoic acid, but consists of resin and essential oil. **SOLUBILITY.** It is insoluble in water, but soluble in ten parts of alcohol, and in expressed and essential oils; with the pure alkalies it forms white saponaceous compounds, which are soluble in water, forming opaque emulsions. **MEDICINAL USES.** Stimulant, diuretic, and laxative; it seems to act more powerfully on the urinary passages than any of the other resinous fluids; hence its use in gleet and in fluor albus. Its use gives the urine an intensely bitter taste, but not a violet smell, as the turpentine do. By referring to the Synoptical arrangement of Diuretic remedies, it will appear that *Copaiba* is referred to class I, 1. *b.* for there is reason to believe that its active principle undergoes absorption, and by coming in contact with the urinary organs, produces the medicinal effects for which it is so highly valued. **FORMS OF EXHIBITION.** Diffused in soft or distilled water by yolk of egg, or by twice its weight of mucilage, f3ss to every f3j of water, forms an elegant mixture, or it may be given dropped on sugar, and in this latter form it is certainly more disposed to act on the urinary organs, than when exhibited in that of an emulsion. (*Form.* 156.) Dr. Chapman has proposed a new mode of exhibiting this medicine; he advises us to pour the *Copaiba* on half a wine-glassful of water, and afterwards to add slowly a few drops of common bitter tincture, by which means the *Copaiba* will be collected in a small globule that may be easily swallowed, while its taste, so nauseous to most patients, will be entirely masked by the bitterness of the vehicle. In whatever form, however, this medicine is administered, it is extremely apt to derange the digestive organs, if long continued, and the unpleasant effects thus occasioned remain in some cases, for a very long period.* **ADULTERATIONS.** A considerable quantity sold in London is entirely *factitious*. A curious trial took place some time since, between the owner of certain premises that were burnt down, and the Governors of the Sun Fire Office, in consequence of the latter refusing to indemnify the proprietor for his loss, because the fire had been occasioned by his *making* Balsam of *Copaiba*. This article is also adulterated with mastiche and oil; M. Bucholz asserts that if it does not dissolve in a mixture of four parts of pure alcohol, and one of rectified æther, we may infer its adulteration; *rape oil* is also frequently mixed with it, in which case if dropped into water, the drops will not retain their spherical form, as they invariably will, if pure.

CORNUA. L.E D. Cervus Elaphus.

Stag's, or Hart's Horn.

The horns of the stag differ only from bone, in containing less of the phosphate of lime, and a larger proportion of gelatine; by boiling, they yield a clear, transparent, and flavourless jelly, in quantity about one fourth of the weight of the shavings employed; to obtain which we should

* Dr. Chapman recommends the liberal use of the *Copaiba* in the very commencement of Gonorrhœa, disregarding ardor ruinæ, chordee, and every other symptom of inflammation that may be present. Than this, we do not know a medical precept more erroneous in theory, or more mischievous in practice. We are convinced that a great majority of gleet may be traced to the premature use of balsam *Copaiba*, and other stimulating articles in the inflammatory stage of the disease.—*Ed.*

boil ℥iv in f℥vij of water, until reduced to f℥vi . ADULTERATIONS. This article is often sophisticated with the shavings of mutton bone; the fraud is detected by their greater degree of brittleness. They were formerly so much used for the preparation of ammonia, that the alkali was commonly called *Salt*, or *Spirit*, of *Hartshorn*.

CORNUS FLORIDA.

(Common Dogwood.)

Cortex.

The dogwood is a common forest tree, abundant in almost every part of the United States. It flowers in the months of May and June. The bark, which is the part used in medicine, yields by analysis tannin, gallic acid, resin, gum resin, bitter extractive, and mucilage. The dogwood is a powerful tonic, and by many practitioners has been used as a substitute for the Peruvian bark. The diseases in which it has been found serviceable are intermitting and remitting fevers, dyspepsia, general debility, &c. It may be given in substance, in doses of ℥j to ℥ij —in extract, from 5 to 15 grs. or in infusion and decoction. ED.

CRETA PRÆPARATA. L.D.

Carbonas Calcis Preparatus. E. *Prepared Chalk.*

This is common chalk, the coarser particles of which have been removed by the mechanical operation of washing. It consists of carbonate of lime, with various earthy impurities. The Dublin Pharmacopœia directs a chemical process for obtaining a perfectly pure carbonate (*Creta Præcipitata*), but it appears to be an unnecessary refinement. MED. USES. It is antacid and absorbent, on which account it is useful in acidities of the primæ viæ, and in diarrhœas, after removing all irritating matters by previous evacuation. (*Form*, 52.) From its absorbent properties, it is a good external application to ulcers discharging a thin ichorous matter. DOSE, grs. x to ℥ij , or more. It is almost unnecessary to state that it must not be combined with acidulous salts; I have, however, seen a formula for a powder, intended as an astringent, in which chalk and alum entered as ingredients. OFFICINAL PREP. *Hydrargyrum cum creta*. L. *Pulvis cretæ comp.* L.E. *Pulv. Opiatus*. E. (F) *Mist. Cretæ*. L. E. *Trochisci Carbonatis Calcis*. E. *Confectio Aromatica*, L.E. (G)

CROCI STIGMATA. L.E.

(Crocus Sativus.)

Crocus. D. *Saffron.*

QUALITIES. *Form*, cakes, consisting of the stigmata of the flower, closely pressed together. *Odour*, sweet, penetrating, and diffusive. *Taste*, warm and bitterish. *Colour*, a rich and deep orange red. CHEMICAL COMPOSITION. One hundred parts consist of sixty-two of extractive, the remaining parts are chiefly ligneous fibre, with small portions of resin and essential oil. Bouillon Lagrange and Vogel have examined this extractive matter very accurately, and from the circumstance of its watery infusion assuming different colours when treated with different agents, they

have named it *polychroite*. Thus chlorine and light destroy its colour, sulphuric acid changes it to indigo, which gradually becomes lilac, and nitric acid gives it a green hue. **SOLUBILITY.** It yields its colour and active ingredients to water, alcohol, proof spirit, wine, vinegar, and in a less degree to æther: the watery infusion, and the vinous tincture soon grow sour, and lose their properties, and the solution in vinegar becomes quickly colourless. **MED. USES.** It is now never employed but for the sake of its colour or aromatic flavour, as an adjunct to other substances. It is much used in foreign cookery to colour rice, &c. **OFFICIAL PREP.** *Syrup. Croci.* L. *Tinct. Croci sativi.* E. *Confect. Aromat.* L.D. (○). *Pil. Aloes cum Myrrha.* L. (G). *Tinct. Aloes comp.* L.E.D. (○). *Tinct. Cinchonæ comp.* L.D. *Tinct. Rhei.* L. (○). *Tinct. Rhei comp.* L. (○). **ADULTERATIONS.** It is not unfrequently sophisticated with the fibres of smoked beef, or the petals of flowers, especially of the marigold, (*Calendula Officinalis*), and of the safflower, (*Carthamus Tinctorius*.) The former of these fraudulent ingredients is indicated by the unpleasant odour which arises when the saffron is thrown upon live coals; the latter, by infusing the specimen in hot water, when the expanded stigmata may be easily distinguished from the other petals of substituted flowers; a deficiency of colour and odour in the infusion indicates that a tincture or infusion has already been drawn from the saffron, and that it has been subsequently pressed again into a cake. In the market is to be found saffron from Sicily, France, and Spain, besides the English; that which is imported from Spain, is generally spoiled with oil, in which it is dipt with the intention of preserving it. The cake saffron sold in some of the less respectable shops, consists of one part of saffron and nine of marigold, made into a cake with oil, and then pressed: it is sold in considerable quantities for the use of birds, when in moult.

CUBEBA.* L. (Piper Cubeba.) *Bacêw.*

Cubebs, or Java Pepper.

This Indian spice, a native of Java, formerly held a place in our materia medica, and entered into the composition of *mithridate* and *theriaca*, but being inferior in pungency and aromatic warmth to pepper, it fell into disuse. Lately, however, it has been ushered into surgical practice for the cure of gonorrhœa, with all the extravagance of praise which usually attends the revival of an old, or the introduction of a new medicine.† It has been pronounced to be a specific in this complaint, if taken in the early stages, in the dose of a dessert spoonful three times a day, in a sufficient quantity of water.‡ The Indians have been long acquainted with the influence which cubebs exerts upon these organs; thus Garcias, "*Apud Indos cubebæ in vino maceratarum est usus ad exitandam venerem.*" **CHEMICAL COMPOSITION.** M. Vauquelin has lately made a very accurate analysis of this pepper, from which its

* Cûbêba—Indis Cubab: Avicennæ Kebâba. It makes short the penultima, because Actuarius and other modern Greeks call it *κὺβιπέρ*, *κὺμπιπέρ*, and *κομβίβα*.

† See "Practical Observations on the use of Cubebs, in the cure of Gonorrhœa," by H. JEFFREYS, Esq.

‡ It is very questionable whether Cubebs is entitled to any other preference over the copaiva, than that it is not so liable to derange the digestive organs. As a specific for gonorrhœa it has received praise altogether too unqualified. The most convenient form in which it can be given is that of Tincture. *Ed.*

composition may be stated as follows : 1. A volatile oil, which is nearly solid.—2. A resin, *resembling Balsam of Copaiba*.—3. Another and coloured resin.—4. A coloured gummy matter.—5. An extractive principle, similar to that which is found in leguminous plants.—6. Some saline substances. He considers the resin *resembling the Copaiba*, to be the peculiar matter in which that property resides, which imparts to it the power of curing gonorrhœa. As the qualities of this spice do not reside in volatile elements, an extract made with rectified spirit will be found to possess the whole of its virtues. The French, in their new *Codex Medicamentarius*, have introduced the cubebs into their list of materia medica. There is a precaution with respect to the exhibition of Cubebs, which it is important for the practitioner to remember—to keep the bowels thoroughly open; for where hardened fæces are allowed to accumulate, the spice insinuates itself into the mass, and produces excoriations in the rectum. ADULTERATIONS. The “Turkey Yellow Berries,” i. e. the dried fruit of the *Rhamnus Catharticus*, are often substituted for the Cubebs, and the similarity between them is so great, that the casual observer may be easily deceived.

CUMINI * SEMINA. L. Cumin Seeds.

QUALITIES. *Odour*, strong, heavy, and peculiar; *Taste*, bitterish and warm. CHEMICAL COMPOSITION. Gum, resin, and a yellow pungent oil, upon which the peculiar properties of the seeds depend. SOLUBILITY. Water does not extract more than their odour, but alcohol dissolves all the principles in which their virtues reside, and leaves upon evaporation a powerful extract. MEDICINAL USES. Carminative and stomachic; they are however but rarely used, except as an ingredient in plasters.

CUPRI SULPHAS. L.E.D. Sulphate of Copper. *vulgo Blue Vitriol. Blue Copperas.*

QUALITIES. *Form*, crystals, which are rhomboidal prisms. *Colour*, a deep rich blue. *Taste*, harsh, acrid, and styptic; they slightly effloresce; when treated with Sulphuric acid, no effervescence occurs, a circumstance which at once distinguishes this salt from *Ærugo*. CHEMICAL COMPOSITION. According to the latest experiments, it is an *oxy-sulphate*, consisting of one proportional of peroxide with two proportionals of sulphuric acid, and when crystallized, it contains ten proportionals of water; its beautiful colour depends on this last ingredient. SOLUBILITY. It is soluble in four parts of water at 60, and in less than two at 212°; the solution shews an excess of acid by reddening litmus. In alcohol it is insoluble. INCOMPATIBLE SUBSTANCES. *Alkalies and their carbonates* :

* “Cūminum makes long the penultima, thus—

“Rugosum Piper et pallentis grana Cumini :”

Pers : Sat : v.

This line of the satirist also records an opinion which is worthy notice, that Cumin will make those who drink it, or wash themselves with it, or as some say, who smoke it, of a pale visage. This belief is mentioned by Dioscorides; and Pliny informs us that the disciples of Porcius Latro, a famous master of the art of speaking, were reported to have used Cumin, in order to imitate that paleness which their master had contracted by his studies; thus too Horace,

Proh si

“Pallarem casu, biberent exsangue Cuminum.”

Epist. 19. Lib. 1, lin: 18.

sub-borate of soda ; acetate of ammonia ; tartrate of potass ; muriate of lime ; nitrate of silver ; subacetate, and acetate of lead ; oxy-muriate of mercury ; all astringent vegetable infusions and tinctures. Iron immersed in the solution, precipitates copper in a metallic form ; hence the exhibition of the filings of iron has been proposed as an antidote.* **MEDICINAL USES.** It is emetic from grs. ij to xv. tonic gr. $\frac{1}{4}$; it is, however, but rarely used internally except as an emetic ; externally it is employed as an escharotic ; and, in solution, as a stimulant to foul obstinate ulcers.† In the proportion of half a drachm to eight ounces of rose water,

* It may be here observed that Copper, in its metallic form, exerts no action on the system. A most striking instance of this fact occurred during my hospital practice, in the case of a young woman who swallowed six copper penny pieces with a view of destroying herself ; she was attended by Dr. Maton and myself in the Westminster Hospital for two years, for a disease which we considered visceral, but which was evidently the effect of mechanical obstruction, occasioned by the coin. After a lapse of five years she voided them, and then confessed the cause of her protracted disease, during the whole course of which no symptom arose which could in any way be attributed to the poisonous influence of copper. Dr. Baillie, in his morbid anatomy, relates a case, in which five halfpence had been lodged in a pouch in the stomach, for a considerable time, without occasioning any irritation ; and Theodore Gardelle, after his conviction for the murder of Mrs. King, in Leicester Square, swallowed a number of halfpence, for the purpose of destroying himself, but without any ill effects. Mr. A. T. Thomson relates also two cases of halfpence being swallowed by children, in one of which the copper coin remained six months in the intestines, and in the other two months. The filings of copper were formerly a favourite remedy in rheumatism, a drachm of which has been taken with impunity for a dose. It appears therefore that metallic copper does not undergo any change in the digestive organ, by which it is converted into a poison, notwithstanding the presence of substances, which, out of the body, would at once render it destructive, as we have too many cases to show, from the careless use of copper utensils in cookery. It is, however, a very important fact, that copper cannot be dissolved while tin is co-existent in the mixture, hence the great use of tinning copper utensils : and farther, it is asserted that untinned coppers are less liable to be injurious when pewter spoons are used for stirring, than when silver ones are employed for that purpose : the explanation of this fact is to be sought for in the well known principle of Electro-Chemistry, and which has lately been applied with so much ingenuity by the illustrious President of the Royal Society, for the protection of copper on the bottom of ships, by the juxtaposition of small discs of Tin or iron.‡ For the same reason, M. Proust has shewn that the tinning of kitchen utensils, which consists of equal parts of tin and lead, cannot be dangerous from the presence of the latter metal, since it is sufficient that the lead should be combined with tin, in order to prevent it from being dissolved in any vegetable acid. M. Guersent therefore is wrong when, speaking of the tinning of copper vessels, he says, " it is a light veil, which conceals the danger, instead of being a true preservative, and that it only inspires a security often fatal." Some recent experiments, however, of Dr. Bostock, have shewn, that, in consequence of the volatility of acetic acid, copper is not protected by the juxtaposition of discs of tin ; since the acid under such circumstances ceases to form a part of the galvanic circle. The poisonous effects of the salts of Copper have been strikingly illustrated during the prosecution of Sir H. Davy's experiments above alluded to, for it is found that when the copper sheathing of ships is not protected by the contact of another metal, they are uniformly free from marine animals, but that where the solution of the copper is prevented by galvanic action, the bottoms soon become covered with every species of sea insect.

† **BATES'S AQUA CAMPHORATA.**—Sulphate of Copper is the base of this preparation, which was strongly recommended by Mr. Ware. The following was his recipe ; \mathcal{R} . Cupri Sulph. Boli Gallic, a. a. gr. xv. Camphoræ gr. iv. solve. in aq. fervent. f3 iv, dilueque cum aquæ frigidæ oiv ut fiat Collyrium.

‡ For a further explanation of this curious fact the student may consult my work on Medical Chemistry.

it forms a lotion which has been found very efficacious in phagedenic ulcers of the face, and in allaying itching when attended with erysipelatous inflammation about the anus and labia pudendi. It is also a styptic when applied in solution. OFFICIAL PREPARATION. *Solut. Cupri Sulphat. com. E. Cuprum Ammoniatum. L.E.D. (I) (Form. 68.)*

CUPRUM AMMONIATUM. L.D.

Ammoniaretum Cupri. E. Ammoniated Copper.

QUALITIES. *Form*, a violet coloured mass, which on exposure to air becomes green, and is probably converted into a carbonate. *Taste*, styptic and metalline. *Odour*, ammoniacal. **CHEMICAL COMPOSITION.** It is a triple salt, a sub-sulphate of oxide of copper, and ammonia. The Edinburgh college is certainly incorrect in calling it an *ammoniuret*. **SOLUBILITY**, f3j of water dissolves ʒj of this salt. **INCOMPATIBLE SUBSTANCES**; *Acids*; the *fixed Alkalies*; *Lime water*. **MEDICINAL USES.** It is tonic and antispasmodic. Dr. Cullen first proposed its exhibition in epilepsy, and it has frequently been employed with evident advantage in that disease. It has been also given in chorea, after a course of purgatives. Brera considers it quite equal to Arsenic, in the cure of obstinate Intermittents; other physicians have commended it in cases of Hysteria. **FORMS OF EXHIBITION.** It may be formed into pills with bread; to which an addition of sugar has been recommended, to prevent them from becoming hard; but we must remember that recent experiments have shewn that sugar has the power of counteracting the operation of copper. **DOSE**, gr. $\frac{1}{4}$ cautiously increased to grs. v. twice a day. **OFFICIAL PREPARATIONS.** *Liquor Cupri Ammoniat. L.*

CUSPARIÆ CORTEX. L. (Cusparia febrifuga.)

BONPLANDIÆ TRIFOLIATÆ CORTEX. E.

ANGUSTURA, CORTEX. D.

Cusparia or Angustura Bark.

QUALITIES. *Form*, pieces covered with a whitish wrinkled thin epidermis; the inner surface is smooth, of a brownish yellow colour. *Odour*, not strong, but peculiar. *Taste*, bitter, slightly aromatic, and permanent. **CHEMICAL COMPOSITION.** Cinchonia, resin, extractive, carbonate of ammonia, and essential oil. **SOLUBILITY.** Its active matter is taken up by cold and hot water, and is not injured by long decoction, but the addition of alcohol precipitates part of the extractive. Alcohol dissolves its bitter and aromatic parts, but proof spirit appears to be its most complete menstruum. **INCOMPATIBLE SUBSTANCES.** *Sulphate of Iron*; *Sulphate of Copper*; *Oxy-muriate of Mercury*; *Nitrate of Silver*; *Tartarized Antimony*; *Subacetate, and acetate of Lead*; *Potass*; and perhaps the *Mineral Acids*, for they produce precipitates, as also the *infusions of Galls*, and *Yellow Cinchona*. **MEDICINAL USES.** Stimulant and tonic; it does not, like cinchona, oppress the stomach, but imparts a degree of warmth, expels flatus, and increases the appetite for food: with respect to its powers in the cure of intermittents, many doubts are entertained. **FORMS OF EXHIBITION.** In substance, infusion, decoction, tincture, or extract; its nauseous taste is the best disguised by cinnamon. **DOSE** of

the powder, grs. v to ℥j; of the infusion or decoction, f℥j; in large doses all the forms are liable to produce nausea. *Form.* 58. **OFFICIAL PREP.** *Infusum Cuspariæ.* L. *Tinct. Bonplandiæ Trifoliatæ.* E. *Tinct. Angusturæ.* D. **ADULTERATIONS.** There is found in the market a particular bark, which has been called FINE ANGUSTURA, but which is of a different species, and is a very energetic poison. This bark is characterized by having its epidermis covered with a matter which has the appearance of rust of iron, and which, moreover, possesses certain chemical properties of this metal; for if water acidulated with muriatic acid be agitated in contact with its powder, it assumes a beautiful green colour, and affords with an alkaline prussiate, (*Hydro-cyanate of Potass*) a Prussian blue precipitate. Late researches have detected the presence of an alkaline element in this bark, on which the name of *Brucia* has been bestowed. When this alkali is dissolved in boiling alcohol, and crystallized by spontaneous evaporation, it yields colourless and transparent crystals in the form of oblique quadrangular prisms.

DATURÆ STRAMONII HERBA. E.D.

The Herbaceous part of the Thorn Apple.

QUALITIES. *Odour*, foetid and narcotic, occasioning head-ache and stupor; *Taste*, bitter and somewhat nauseous. **CHEMICAL COMPOSITION.** Gum, resin, and carbonate of ammonia; the recent experiments of M. Brandes have also developed an alkaline element of activity, to which the name of *Daturia* has been assigned; it appears to exist in native combination with malic acid; when in an uncombined state it is nearly insoluble in water, and in cold alcohol, but boiling alcohol dissolves it. It has been obtained with difficulty in the form of quadrangular prisms. **SOLUBILITY.** The medicinal powers of the herb are alike extracted by aqueous and spirituous menstrua. **INCOMPATIBLE SUBSTANCES.** The infusion is precipitated by the salts of lead, silver, mercury, and iron; the mineral acids would also appear to produce some essential changes which may diminish its efficacy. Acetic acid increases its powers, although it relieves the effects of an over-dose, if administered after the stomach has been emptied. This apparent anomaly is easily explained when we consider, that in the first case its operation is purely *chemical*, increasing the solubility of the active principle of the plant, while in the latter case it operates as a *vital* agent, restoring to the nervous system that energy which has been suspended by the narcotic influence of the vegetable. **MEDICINAL USES.** It is narcotic, and has been regarded by many authors as eminently antispasmodic; Dr. Barton, an American physician, made very extensive trials of its efficacy in Mania, the result of which is highly favourable to its use. Dr. Marcet first noticed its salutary effects in chronic diseases attended with violent pain; he found it to lessen powerfully, and quickly, sensibility and pain, and to produce a sort of nervous shock, attended with a momentary affection of the head and eyes, with a degree of nausea, and with phænomena resembling those which are produced by intoxication. It seems to be more particularly beneficial in chronic rheumatism, sciatica, &c. Its root, smoked in the manner of tobacco, has been much extolled as a remedy in the paroxysms of spasmodic asthma; this practice, however, is not unattended with danger;* the

* It is said to have been introduced into this country from Ceylon. See the observations made upon the subject of the narcotics used by the Indians, in page 9.

same transient feelings of relief may be procured by smoking a mixture of opium and any aromatic herb. **FORMS OF EXHIBITION.** Some discrepancy of opinion has existed upon this point; the native practitioners in the Carnatic gave the powdered root; Hufeland recommends a tincture of the whole plant; in this country an extract of the leaves, or more lately, of the seeds, has been preferred, and I have been recently informed by Sir Henry Hallford, that he has found a tincture made with the seeds,* a very efficient and unobjectionable preparation. Dr. Davy, at my request, has made a series of experiments upon the extracts prepared by Mr. Barry *in vacuo*, and his report upon the effects of that of Stramonium, will be found under the article *Extract. Stramonii*, which see. **DOSE.** In the commencement, of the leaves powdered gr. i. of the seeds gr. ss. It is said that the Turks sometimes use the Stramonium instead of Opium, and the Chinese infuse the seeds into beer. Cataplasms of the fresh bruised leaves have been very successfully used in sores of a highly irritable and painful nature. **OFFICIAL PREPARATION.** *Extract. Stramonii*,

DECOCTA. L.E.D. *Decoctions.*

These are solutions of the active principles of vegetables, obtained by boiling them in water. To decide upon the expediency of this form of preparation, in each particular case, requires a knowledge of the chemical composition of the substance in question. In conducting the operation, the following rules must be observed:

1. *Those substances only should be decocted, whose medicinal powers reside in principles which are soluble in water.*

2. *If the active principle be volatile, decoction must be an injurious process; and, if it consist of extractive matter, long boiling, by favouring its oxidizement, will render it insipid, insoluble, and inert.*

3. *The substances to be decocted should be previously bruised, or sliced, so as to expose an extended surface to the action of the water.*

4. *The substances should be completely covered with water, and the vessel slightly closed, in order to prevent, as much as possible, the access of air: the boiling should be continued without interruption, and gently.*

5. *In compound decoctions, it is sometimes convenient not to put in all the ingredients from the beginning, but in succession, according to their hardness, and the difficulty with which their virtues are extracted; and if any aromatic, or other substances containing volatile principles, or oxidizable matter, enter into the composition, the boiling decoction should be simply poured upon them, and covered up until cold.*

6. *The relative proportions of different vegetable substances to the water, must be regulated by their nature: the following general rule may be admitted: of roots, barks, or dried woods from ʒij to ʒvj to every pint of water: of herbs, leaves, or flowers, half that quantity will suffice.*

7. *The decoction ought to be filtered through linen, while hot, as important portions of the dissolved matter are frequently deposited on cooling; care must also be taken that the filtre is not too fine, for it frequently happens, that the virtues of a decoction depend upon the presence of particles which are suspended in a minutely divided state.*

* The seeds undoubtedly contain, in an eminent degree, all the properties of the plant. It was in the seeds that Brandes first discovered the Daturia.

8. A decoction should be prepared in small quantities only, and never employed, especially in summer, forty-eight hours after it has been made. It should be considered as an extemporaneous preparation, but introduced into the pharmacopœia for the purpose of convenience, and for the sake of abridging the labour of the physician.

It is very important that the water employed for making decoction, should be free from that quality which is denominated *hardness*.

The officinal decoctions may be classed into simple and compound preparations.

1. Simple.

DECOCTUM CINCHONÆ. See Cinchona, and *Form.* 41, 42, 127. The codex of Paris directs a decoction of bark, "*Decoctum Kinæ Kinæ*," which is only half the strength of ours, but contains an addition of a small quantity of carbonate of potass.

DECOCTUM CYDONIÆ. The inner coats of the seeds of the Quince (*Pyrus Cydonia*) yield a very large proportion of mucilage, but, as hot water extracts from them also fecula and other principles, the decoction very soon decomposes. It has been strongly recommended as an application to erysipelatous surfaces; and it would seem to be peculiarly adapted for such a purpose, since it is not so easily washed away from the part to which it is applied, as ordinary mucilage; for the same reason it has been preferred as an ingredient in injections, gargles, &c. It is stated by some practitioners to be a very useful application, when united with the *acetate of lead*, in cases of acute ophthalmia; such a combination, however, is extremely unchemical, and must invalidate the powers of the other ingredients. The native practitioners of India employ it as a cooling mucilaginous drink in gonorrhœa. An ounce of bruised Quince seed will make three pints of water as thick and ropy as the white of an egg; hence two drachms, the quantity directed by the College, is amply sufficient for a pint of the decoction. It is coagulated by *alcohol, acids, and metallic salts*.

DECOCTUM DIGITALIS. D. This is a very improper form for the exhibition of digitalis, being variable in strength.

DECOCTUM DULCAMARÆ. L. In making this decoction we must take care that the operation of boiling is not continued too long. See *Dulcamaræ Caules*. Dose, from fʒss to fʒj.

DECOCTUM LICHENIS. L.E.D. In this preparation we have the bitter principle of the plant united with its fecula. A portion of the former may be removed by macerating the lichen, and rejecting the first water. If ʒj of the mass be boiled for a quarter of an hour in fʒvj of water, we shall obtain mucilage of a consistence similar to that composed of one part of gum arabic and three of water. Its exhibition requires the same precaution as that of *Mucilago Acaciæ*. From the large proportion of fecula which this moss contains, it is perhaps as nutritive as any vegetable substance, the *Cereal*ia of course excepted. See *Lichen Island*. Dose, a wine glass full occasionally.

DECOCTUM PAPAVERIS. L. In making this decoction the whole of the capsule should be bruised, in order to obtain its mucilage and anodyne principle; the seeds should be also retained, as they yield a portion of bland oil which increases the emollient quality of the decoction. A large quantity of fixed oil is constantly in the market, which is derived from the

seeds of the poppy. This decoction is a useful fomentation in painful swellings, &c.

DECOCTUM QUERCUS. L.E. Decoction is the usual form in which *Oak Bark* is exhibited, since all its active principles are soluble in water. Its astringent virtues depend upon gallic acid, tannin, and extractive. The decoction is disturbed by the following substances: *the infusion of yellow cinchona; sub-acetate and acetate of lead; solutions of isinglass; the preparations of iron; oxy-muriate of mercury; and sulphate of zinc; all alkaline substances* destroy its astringency, and are consequently incompatible with it. It is principally useful as a local astringent, in the forms of gargle, injection, or lotion. Its internal exhibition in obstinate diarrhœas, and alvine hemorrhages, has also proved highly beneficial. See *Form: 51, 61.* Dose, f3ss to f3j. Dr. Eberle states that in the Intermittents of very young children, he has in some cases used this decoction as a bath with efficacy.

DECOCTUM SARSAPARILLÆ. L.E.D. See Sarsaparilla. In making this decoction, it is rarely properly digested or boiled for a sufficient length of time to extract its virtues. The only salts which occasion precipitates in this decoction are, *nitrate of mercury and acetate of lead; lime water* has the same effect. Dose, f3iv to f3vj.

DECOCTUM VERATRI. Stimulant and acrid; internally, it is cathartic, but too violent to be safely exhibited; it is useful as a lotion in scabies, and other cutaneous eruptions.

2. Compound Decoctions.

DECOCTUM ALOES COMPOSITUM. It resembles the well known *Beaume de vie*, although less purgative, and is a scientific preparation, constructed upon the true principles of medicinal combination. Aloes is the base, to which are added, 1st, sub-carbonate of potass, 2ndly, powdered myrrh, 3dly, extract of liquorice, 4thly, saffron, and after the decoction is made, 5thly, compound tincture of cardamoms. By the 1st ingredient the aloes is rendered more soluble; the 2d and 3d suspend the portion not dissolved, and at the same time disguise its bitterness; the 4th imparts an aromatic flavour, and the 5th not only renders it more grateful to the stomach, but prevents any spontaneous decomposition from taking place. Its taste is improved by keeping. It is a warm, gentle cathartic. *Form: 80.* Dose, f3ss to f3j. Its operation is different from that of simple aloes. See *Aloes.* The following substances are incompatible with it; *strong acids, oxy-muriate of mercury; tartarized antimony; sulphate of zinc; and acetate of lead; and those salts which are decomposed by sub-carbonate of potass.*

DECOCTUM GUAIACI COMPOSITUM. E. Commonly called *Decoction of woods.* This decoction has fallen into disuse, and deservedly, for it can possess but little power, except as a diluent, or demulcent; the water takes up from the guaiacum only a small portion of extractive matter, and the virtues of sassafras, if any, must be dissipated. Dose, f3ss to f3j.

DECOCTUM HORDEI COMPOSITUM.* An elegant and useful demulcent, with an aperient tendency.

* The oriental beverage, Sherbet, from the Arabic word Sherb to drink, so celebrated in eastern song, is a decoction of barley-meal and sugar, perfumed with roses, violet, or citron.

DECOCTUM SARSAPARILLÆ COMPOSITUM, L.D. This decoction, which is an imitation of the once celebrated *Lisbon Diet Drink*,* differs materially from the *Decoct : Guaiaci comp* : from the addition of the mezereon root, which renders it diaphoretic and alterative, and useful in the treatment of secondary syphilis, and chronic rheumatism. Dose, from fʒiv to fʒvj three or four times a day.

DIGITALIS FOLIA. L.E.D. (*Digitalis Purpurea.*)

Foxglove.

QUALITIES. The leaves, when properly dried, have a slight narcotic odour, and a bitter nauseous taste, and when reduced to powder, a beautiful green colour. **CHEMICAL COMPOSITION.** Extractive matter, and a green resin, in both of which the narcotic properties reside; they appear also to contain ammonia, and some other salts.† **SOLUBILITY.** Both water and alcohol extract their virtues, but decoction injures them. **INCOMPATIBLE SUBSTANCES.** See *Infusum Digitalis*. **MEDICINAL USES.** It is directly sedative, although some maintain the contrary opinion, diminishing the frequency of the pulse, and the general irritability of the system, and increasing the action of the absorbents, and the discharge by urine. The effects appear to be in a great degree connected with its sensible influence upon the body, which is indicated by feelings of slight nausea and languor; accordingly, every attempt to prevent these unpleasant effects, or to correct the operation of digitalis, by combining it with aromatic, or stimulant medicines, seems to be fatal to the diuretic powers of the remedy. Dr. Blackall, in his "Observations upon the cure of Dropsies," has offered some remarks which bear upon this point, and to which I have before referred. See pages 99 & 154.

Several of the formulæ introduced under the class of diuretics are combinations supported by high authority; but it is doubtful whether their adoption can be sanctioned upon principle; they are, however, well calculated to illustrate the nature of diuretic compounds, and this is the only purpose for which they were selected. See *Form* : 103. The French have introduced in their new Codex, an ethereal tincture, *Tinctura Ætherea, Digitalis purpureæ*, in which the sedative influence of the plant must be entirely overwhelmed by the stimulant properties of the menstruum. Under the head of *Diuretics*, I have so fully considered the value of diuretic combinations, and the *modus operandi* of *Digitalis*, that it is unnecessary to dwell upon the subject in this place. *Digitalis* has considerable influence over the action of the heart;

* LISBON DIET DRINK. *Decoctum Lusitanicum.*—*R.* Sarsap : concis : Rad : Chinæ, aa ʒj—Nucum Jugland : Cortice Siccatarum, No. xx. Antimonii Sulphureti ʒij. Lapidis Pumicis pulverisat ;—Aquæ distillat : lib : x.—The powdered antimony and pumice stone are to be tied in separate pieces of rag, and boiled along with the other ingredients. The use of the pumice stone is merely mechanical, to divide the antimony.

† It is said that M. Royer has lately succeeded in obtaining from *Digitalis* its active basis; to which he has given the name of *Digitalin*. It was procured by digesting the plant in æther, and treating the solution with hydrated oxide of lead. It appears as a brown pasty substance, capable of slowly restoring the blue colour of reddened litmus paper; very bitter, and deliquescent. It was difficult to obtain it crystallized, but a drop of its solution in alcohol, evaporated on glass, over a lamp, when examined by the microscope, exhibited abundance of minute crystals. (Bib. Univ. xxvi. 102.) Farther experiments, however, are required to establish the truth of this statement.

and in certain diseases, attended with inordinate motions of that organ, it proves eminently serviceable ; I have employed it with great satisfaction in cases of palpitation connected with a state of general irritability, so frequently occurring in female disorders ; and according to my observations where it succeeds, opium generally does harm. *Form : 32. FORMS OF EXHIBITION.* In substance, tincture, or infusion ; the latter form is most efficient as a diuretic. *DOSE* of the powdered leaves gr. j, in a pill, twice a day ; the augmentation of the dose should proceed at the rate of one fourth of the original quantity, every second day, until its operation becomes apparent, either on the kidneys, or on the constitution generally. If it produce such a disturbance in the primæ viæ as to occasion vomiting or purging, its diuretic powers will be lost ; in such a case the addition of a small portion of opium, or opiate confection, may be expedient. The distressing effects of an overdose are best counteracted by tincture of opium in brandy and water, and by the application of a blister to the pit of the stomach. A London Surgeon has lately stated that he has prescribed the tincture of *Digitalis*, in the dose of twenty-five drops, three times a day, in barley water, with great success in Gonorrhœa. *OFFICIAL PREPARATIONS.* *Infus : Digitalis. L.E. Tinct : Digital : L.E.D. Decoct : Digitalis : D.* It is very important that the leaves of this plant be properly collected, and accurately preserved : they should be gathered when the plant is beginning to flower, and, as it is biennial, in the second year of its growth ; the largest and deepest coloured flowers should be also selected, for they are the most powerful ; they should be also carefully dried until they become crisp, or they will lose much of their virtue ; the too common method of tying them in bundles, and hanging them up to dry, should be avoided, for a fermentation is produced by such means, and the parts exposed soon become rotten. The powdered leaves ought to be preserved in opaque bottles, and kept from the action of light as well as of air and moisture ; a damp atmosphere has, upon a principle already explained, a very injurious operation, by carrying off those faint poisonous effluvia with which its efficacy seems to be ultimately connected.

DULCAMARÆ CAULES. L.D.

(*Solanum Dulcamara.*)

The Twigs of *Woody Nightshade*, or *Bitter-sweet*.

The virtues of this plant are extracted by boiling water, but long coc-tion destroys them ; the usual and best form in which it can be administered is that of decoction or infusion. This plant is much more appreciated on the continent than in this country ; we rarely use it except in cutaneous affections ; Professor Richter of Gottingen states that he has employed it in *Phthisis Pituitosa* with very extraordinary success ; and Sir A. Crichton says that in the few cases of chronic tubercular Phthisis in which he has given it, it appeared to increase the powers of the Sarsaparilla with which it was usually combined. *OFFICIAL PREP : Decoct : Dulcam : L.*

ELATERII PEPONES. L.E.D.

(Momordica Elaterium.)

Wild, or Squirting Cucumber.

This plant appears from the testimony of Dioscorides and other writers, to have been employed by the ancient physicians with much confidence and success. All the parts of the plants were considered as purgative, although not in an equal degree; thus Geoffroy, "*radicum vis cathartica major est quam foliorum, minor vero quam fructuum.*" This question has very lately been set at rest by the judicious experiments of Dr. Clutterbuck,* which prove that the active principle of this plant resides more particularly in the juice which is lodged in the centre of the fruit, and which spontaneously subsides from it; when this substance is freed from extraneous matter, it possesses very energetic powers, and appears to me to be entitled to consideration as a distinct proximate principle, which I shall venture to call *Elatin*. See *Extractum Elaterii*.

ELEMI. L.D. (Amyris Elemifera. Resina.) *Elemi*.

This substance is what is generally termed a *gum-resin*; that is, a compound consisting of gum, resin, and volatile oil: late researches however seem to shew that these bodies are compounds of a peculiar character, consisting of a volatile substance, something between essential oil and resin, and a constituent which possesses the properties of extractive rather than those of gum.

True Elemi has a fragrant aromatic odour, not unlike that of fennel-seeds, but more potent. *Sp. gr.* 1.0182. When powdered it mixes with any unguent; it also combines with balsams and oils, and by the aid of heat, with turpentine. **USES.** It is only employed for forming the *mild digestive ointment* which bears its name, viz. *Unguent: Elemi comp: L.D.*

EMPLASTRA. L.E.D. Plasters.

The principles upon which this form of preparation is to be constructed are fully detailed in the first part of this work, p. 213.

EMPLASTRUM AMMONIACI. L. *Ammoniacum* reduced to a suitable consistence by distilled vinegar. It adheres to the skin without irritating it, and without being attended with any unpleasant smell.† There is a peculiar disease of the knee, to which servant maids, who scour floors upon their knees, are liable, and for which this plaster is a specific. I have also found it particularly eligible in cases of delicate women with irritable skins.

EMPLASTRUM AMMONIACI CUM HYDRARGYRO. L.D. The mercury in this plaster is in the state of oxidation *ad minimum*. It is discutient and resolvent, and is applicable to indurated glands, and venereal nodes, and for removing indurations of the periosteum, remaining after a course of mercury; the addition of the ammoniacum increases the stimulating and discutient powers of the mercury, which gives this plaster a superiority over the *Emplastrum Hydrargyri*. It is also powerfully adhesive.

EMPLASTRUM ASSAFÆTIDÆ. E. *Emplast. Plumbi and Assafœtida*, of

* See London Medical Repository, Vol. xii. No. 67.

† A person of the name of STERRY, in the Borough, prepares a plaster of this description, which is sought after with great avidity. What a blessing it would be upon the community, if every nostrum were equally innocuous!

each *two parts*, galbanum and yellow wax, of each *one part*. I have seen it useful in flatulent cholic, when applied over the umbilical region.

EMPLASTRUM CANTHARIDIS. L. *Emplast : Cantharidis vesicatoria*. E.D. A variety of substances has in different times been employed for producing vesication, but no one has been found to answer with so much certainty and mildness as the *Lyttæ*. All the others are apt to leave ill conditioned ulcers; true it is, that the emplastrum lyttæ will occasionally fail, but this is generally attributable to some inattention, or want of caution on the part of the person who prepares it; in spreading it, the spatula should never be heated beyond the degree of boiling water; the plaster also should be sufficiently secured on the part by slips of adhesive plaster, but it ought not to be bound on too tight; where the cuticle is thick, the application of a poultice for an hour, previous to that of the blister, will be useful, or the part may be washed with vinegar. In consequence of the absorption of the active principle of the *Lyttæ*, blisters are apt to occasion strangury and bloody urine; it has been a problem therefore of some importance to discover a plan by which such an absorption may be obviated; for this purpose, camphor has been recommended to be mixed with the blistering composition, and a piece of thin gauze has been interposed between the plaster and the skin; but it has been lately found, that ebullition in water deprives the *Cantharides* of all power of thus acting on the kidneys, without in the least diminishing their vesicatory properties: the ordinary time required for the full action of a blister is ten or twelve hours, but if it be applied to the head, double that period will be necessary. Children, owing to delicacy of skin, are more speedily blistered, the epispastic may therefore be removed earlier. In some cases the blistered parts, instead of healing kindly, become a spreading sore; whenever this occurs, poultices are the best applications; it may arise from a peculiar irritability of the constitution, although I apprehend that it not unfrequently depends upon the sophistication of the plaster with euphorbium. In cases where it is desirable to keep up the local irritation, it is still a question with some practitioners whether it be more advisable to encourage a discharge from the vesicated part by some appropriate stimulant, or to renew the vesication at short intervals by repeated blisters; the latter mode is perhaps to be preferred, as being more effectual, and certainly less troublesome to the patient; it has moreover been stated,* that by a repeated application of this nature, the influence excited appears to extend much deeper, so as to derive a greater quantity of blood from the immediate neighbourhood of the vessels, or from the vessels themselves which are in a state of disease, than the influence excited by an application less stimulating upon the surface of a part already abraded. The character of the discharge would likewise appear essentially different; it being in the latter case a purulent secretion from the superficial exhalants of the surface only; in the former, a copious effusion of serum, mixed with a large portion of lymph, produced from a deeper order of vessels.

EMPLASTRUM CERÆ. L. *Emplast : Simplex* : E. This is the *Emplast : Ceræ* of P.L. 1787, the *Emplast : Attrahens* of 1745, so called because it was formerly employed to keep up a discharge from a blistered surface, and the *Emplastrum de meliloto simplex* of 1720.

* Pharmacopœia Chirurgica, p. 89.

EMPLASTRUM CUMINI. L. A valuable combination of warm and stimulant ingredients.

EMPLASTRUM GALBANI COMPOSITUM. L.D. *Emplast : Gummos. E.* More powerful than the preceding plaster. In indolent glandular enlargements of a strumous character, in fixed and long continued pains in the neighbourhood of the joints, or in anomalous or arthritic pains of the ligaments, this plaster is said to be frequently beneficial.

EMPLASTRUM HYDRARGYRI. L.E. The mercury in this plaster is in the state of oxidation *ad minimum* ; each drachm containing about fifteen grains of mercury, (*sixteen grains, Edinb.*) It is alterative, discutient, and sometimes sialogogue ; but it is inferior to the *Emplast : Ammoniac : cum Hydrargyro.*

EMPLASTRUM OPII. L.E. This plaster is supposed to be anodyne, but it is very doubtful whether the opium *can*, in such a state, produce any specific effect. See *Form : 5.*

EMPLASTRUM PICIS COMPOSITUM. L. *Emplast : Picis Burgundiæ, P.L. 1787.* It is stimulant and rubefacient, and is often employed as an application to the chest, in pulmonary complaints ; the serous exudation however which it produces, frequently occasions so much irritation that we are compelled to remove it.

EMPLASTRUM PLUMBI. L. *Emplast : Oxydi Plumbi semi-vitrei. E. Emplast : Lythargyri, P.L. 1787. Emplast : commune, 1745. Diachylon* Simplex, P.L. 1720.* This is a very important plaster, since it forms the basis of a great many others ; under the name of *Diachylon* it has long been known, and employed as a common application to excoriations, and for retaining the edges of fresh cut wounds in a state of apposition, and at the same time for defending them from the action of the air ; when long kept it changes its colour, and loses its adhesive properties, and by high temperature the oxyd of lead is revived.†

EMPLASTRUM RESINÆ. L. *Olim, Emplast : commune adhæsivum, P.L. 1745. Emplast : Resinosum, E. Emplast : Lithargyri cum Resina. D.* It is defensive, adhesive, and stimulant.‡

EMPLASTRUM SAPONIS. L.D. *Emplastrum Saponaceum. E.* The Soap Plaster is said to be a mild discutient application.

* *Diachylon*, a *δια* et *χυλος* succus, i. e. a Plaster prepared from expressed juices. It has been asserted that all the pharmaceutical names beginning with *Dia*, are of Arabian origin ; this however, is not the fact ; we frequently meet with the expression in Galen, *ἡ δια δεικνύμενη ἢ δια δυνάμει ἀριστολογιστῶν ἢ δι, &c. &c.*

† At Apothecaries' Hall, this plaster, as well as others, is made in a steam apparatus, which is so well regulated, that a uniform temperature of 240° Fah : is insured during the whole process.

‡ **BAYNTON'S ADHESIVE PLASTER.** (Strapping.) Differs only from this preparation in containing less resin, six drachms only being added to one pound of litharge plaster. This excellent plaster is sold ready spread on calico.

COURT PLASTER. Sticking Plaster. Black Silk is strained and brushed over ten or twelve times, with the following preparation. Dissolve ʒss of Benzoin in fʒvi of rectified spirit ; in a separate vessel, dissolve ʒj of Isinglass in oss of water ; strain each solution, mix them, and let the mixture rest, so that the grosser parts may subside ; when the clear liquor is cold, it will form a jelly, which must be warmed before it is applied to the silk. When the Plaster is quite dry, in order to prevent its cracking, it is finished off with a solution of Terebinth : Chia, ʒiv, in Tinct : Benzoës fʒvj.

CORN PLASTER. The green coloured plaster sold under this title is usually composed of three parts of wax, 4 of Burgundy pitch, and 2 of common turpentine ; to which is added one part of verdigris.

EUPATORIUM PERFOLIATUM.

Boneset.

Herba et flores.

[The boneset is a plant indigenous to the United States and is to be found in the neighbourhood of marshes and low situations. It is intensely bitter and somewhat astringent. According to the analysis of Dr. Andrew Anderson of New-York, it yields 1. A free acid ; 2. Tannin ; 3. Extractive matter ; 4. A gummy matter ; 5. A resin ; 6. Azote ; 7. Lime, probably the acetate of lime ; 8. Gallic acid, probably modified ; 9. A resiniform matter, soluble in water and in alcohol, and which seems to contain a bitter principle. It also appears from this analysis that the free acid may be obtained from all parts of the plant—that tannin is obtained in much the largest quantity from the leaves, and least from the roots—that the extractive and gummy matter reside chiefly in the roots—that the leaves and flowers also contain a larger portion of resin than the roots—and that azote exists in the flowers, leaves, and roots. The principal properties of the boneset are those of a tonic and diaphoretic. The diseases in which it has been prescribed with success are intermitting and remitting fevers, typhoid peripneumony and catarrh. It may be given in powder, infusion, or tincture. When given as a tonic, the tincture is the preferable form. The dose of the powder is from 20 to 30 grains. When used as a sudorific, it is to be taken in infusion, and in large quantities.]

EUPHORBIA IPECACUANHA.

American Ipecacuanha. *Radix.*

[This plant is peculiar to the United States. The root is perennial, and of a sweetish taste. By analysis it yields caoutchouc, resin, mucus, and fecula. In its medicinal properties it resembles, and perhaps equals, the common ipecacuanha. As an emetic the dose is from 15 to 25 grains.]

EUPHORBIAE GUMMI-RESINA. L.

(Euphorbia Officinarium,) *Euphorbium.*

QUALITIES. This substance is imported from Barbary, in drops or irregular tears ; its fracture is vitreous ; it is inodorous, but yields a very acrid burning impression to the tongue. **CHEMICAL COMPOSITION.** It is what is termed a *gum resin*, but its acrid constituent is exclusively in that portion which is soluble in alcohol, and which might be named *Euphorbin* ; it appears to form as much as 37 per cent. to which are added of wax 19, malate of lime 20.5, malate of potass 2, and water 5. **SOLUBILITY.** Water by trituration is rendered milky, but dissolves only one-seventh part ; and alcohol one-fourth of it. **USES.** Internally administered, it proves very violently drastic, but it is never employed except as an errhine, cautiously diluted with starch, or some inert powder. The Indian practitioners administer it as a purge in obstinate visceral obstructions ; and in those cases of costiveness which so often attend an enlargement and induration of the spleen and liver. Farriers use it for blistering horses, and there is good reason to believe that it is sometimes fraudulently introduced to quicken the powers of our Emplastrum Cantharidis. It enters as an ingredient into a plaster, which has been much celebrat-

ed by Cheselden and others, as a stimulating application, to relieve diseases of the hip-joint, and to keep up inflammation of the skin in chronic states of visceral inflammation; the following is its composition. R. *Emplast: Picis comp: 3iv.—Euphorbiæ gum resinæ 3ss.—Terebinth: Vulgar. q. s.* CAUTION, in pulverizing this substance, the dispenser should previously moisten it with vinegar to prevent its rising and exco-riating his face.

EXTRACTA. L.E.D. *Extracts.*

These preparations are obtained by evaporating the watery or spirituous solutions of vegetables, and the native juices obtained from fresh plants by expression, to masses of a tenacious consistence. The London college does not arrange the extracts under the titles of *watery* and *resinous*, which is the arrangement of the Edinburgh Pharmacopœia, nor under those of simple and resinous, which is in the division observed in that of Dublin, but rejecting all *specific* distinctions, includes, under the *generic* appellation of extract, both the species, as well as all the *inspissated juices*. Since however the former of these arrangements will afford greater facilities for introducing the observations which it is my intention to offer, it is retained in this work.

The chemical nature of extracts must obviously be very complicated and variable, depending in a great degree upon the powers of the *menstruum* employed for their preparation; although Fourcroy and Vauquelin considered that *one peculiar* principle was the basis of them all, which they called *Extract*, *Extractive*, or the *Extractive Principle*. It is distinguished by the following characters, *viz.*

It has a strong taste, varying in different plants; it is soluble in water, and in alcohol when it contains water, but is quite insoluble in *absolute* alcohol and æther; its aqueous solution soon runs into a state of putrefaction; by repeated solutions and evaporations, or by long ebullition, it acquires a deeper colour, and in consequence of its combination with oxygen it becomes insoluble and inert, a fact which is of extreme importance as it regards its pharmaceutical relations; it unites with alumine, and if boiled with its salts, precipitates it; hence wool, cotton, or thread, impregnated with alum, may be dyed of a fawn-colour by *extractive*; its habitudes with alkalis are very striking, combining most readily and forming with them compounds of a brownish yellow colour, which are very soluble in water; if to a colourless and extremely dilute solution of extractive, an alkali be added, a brown or yellowish tint is immediately produced, so that under certain circumstances I have found an alkali to be a serviceable test in detecting the presence of extractive matter. The usual brown hue of the *liquor ammoniæ acetatis*, is owing to the action of the ammonia upon traces of vegetable extractive contained in the distilled vinegar.

Much confusion has arisen from the word *extract* having been employed in this double meaning—*chemically* to express a peculiar vegetable proximate principle, and *pharmaceutically* to denote any substance however complicated in its nature, which has been obtained by the evaporation of a vegetable solution or a native vegetable juice. It is in the latter sense that it is to be understood in the present article.

The different proximate principles of vegetable matter undergo various and indefinite changes with such rapidity, when acted upon by heat, that

the process of *extraction* must necessarily more or less impair the medicinal efficacy of a plant, and not unfrequently destroy it altogether, and hence, says Dr. Murray, "with the exception of some of the pure bitters, as gentian, or some of the saccharine vegetables, as liquorice, there is no medicine perhaps but what may be given with more advantage under some other form;" this however is not exactly true, for when care is taken in the preparation, we are thus enabled to concentrate *many* very powerful qualities in a small space, and the process lately adopted of evaporating the solutions by the aid of steam, contributes very materially to obviate the failures which so frequently occurred from a too exalted temperature. There is, for instance, great reason to suppose that the black colour which so often characterizes the extracts of commerce, is frequently owing to the decomposition and carbonization of the vegetable matter; the colour therefore of an extract becomes in some degree a test of its goodness. I have lately examined the extracts of commerce with some attention, and I find the presence of iron by no means an uncommon circumstance; when thus contaminated they afford a very dirty coloured solution, which rapidly becomes darker on exposure to air. The extracts mentioned in the preface as made by Mr. Barry, by *evaporating in vacuo*, deserve the attention of the profession: the principle is without doubt well calculated to secure the active matter of the plant from those changes to which it is constantly liable during the ordinary operations of inspissation. The extracts, thus prepared, are certainly more powerful in their effects, and some few of them appear also to possess properties which are not to be distinguished in the Extracts of Commerce; those of narcotic plants, as *Hemlock*, *Hyoscyamus*, &c. are decidedly more efficacious; where the practitioner directs their use, he should, to prevent any mistakes, add the words *in vacuo præp.* as in *Formula 4*; for on account of the difference in the strength of these preparations, and of those prepared by the ordinary method, they cannot be indiscriminately employed. Dr. John Davy, at my request, has made trial of these extracts in the Military Hospital at Fort Pitt, and as his results coincide with those obtained in my own practice, I shall relate, under the history of each Extract, the comparative conclusions which have been obtained.

I. WATERY OR SIMPLE EXTRACTS.

Mucilaginous Extracts of Rouelle.

These extracts must, of course, contain all the principles of a plant which are soluble in water, such as gum, extractive matter, tannin, cinchonin, sugar, fecula, &c. together with any soluble salts which the vegetable may contain. I have also found by experiment that an aqueous extract may even contain, in small proportions, certain elements which, although quite insoluble in water, are nevertheless partially soluble in vegetable infusion. This law of vegetable chemistry, has never been expressed, although we have repeated instances of its truth, and a knowledge of it may explain some hitherto unintelligible anomalies. It has been stated that an extractive matter is perfectly insoluble in æther, but Mr. A. Thomson found repeatedly, that if a small portion of resin was present, æther would in that case take up extractive in combination with the resin which it so readily dissolves. As decoction or infusion is a process preliminary to that of extraction, the practitioner must refer to those

articles for an enumeration of the different sources of error which are attached to them.

EXTRACTUM ALOES PURIFICATUM. L. The resinous element of the aloes is got rid of in this preparation; on which account it is supposed, in an equal dose, to be more purgative and less irritating. *Dose*, gr. x to xv. *Form*: 12, 13, 36.

EXTRACTUM ANTHEMIDIS. L.E. *Extract. Florum Chamæmeli. D.* This extract furnishes an example of the change effected on some plants by the process of extraction; in this case the volatile oil is dissipated, and a simple bitter remains, possessing scarcely any of the characteristic properties of chamomile. This remark, however, does not apply to this extract, when prepared *in vacuo*. I have lately received from Mr. Pope of Oxford Street, a specimen which retains, in the most eminent degree, all the odour and taste of the recent flower. *Dose*, gr. x.— \mathfrak{z} j.

EXTRACTUM CINCHONÆ. L.D. The properties of the bark in this preparation are much invalidated, owing to the oxidizement of its extractive matter, which takes place to such an extent, that not more than one half of the preparation is soluble in water; it is not however altogether devoid of utility, and will often sit lightly on the stomach, when the powder is rejected. Its taste is very bitter, but less austere than the powder: The most beautiful extract of bark, which I have ever seen, was prepared by Mr. Barry of Plough Court; its colour was that of a deep brilliant ruby, and its flavour preserved all the characteristic peculiarity of the recent substance.* *Dose*, grs. x to 3ss. Fourteen ounces of the bark will yield about three ounces and a half of the extract. It should be kept *soft*, so as to be fit for forming pills, and *hard*, so that it may be reduced to powder.

EXTRACTUM COLOCYNTHIDIS. L. This extract is much milder, although less powerful, than the pulp; *Dose*, grs. v to 3ss. It soon becomes hard and mouldy.†

EXTRACTUM GENTIANÆ. L.E.D. The bitter principle suffers no deterioration in the process: it is used principally as a vehicle for metallic preparations. *Form*. 36, 53, 103. *Dose*, gr. x to \mathfrak{z} j.

EXTRACTUM GLYCYRRHIZÆ. L.D. It is usually imported from Spain; in the coarser kinds, the pulps of various plums and of prunes are added; it should dissolve in water without leaving any feculence.‡

EXTRACTUM HÆMATOXYLI. L.E.D. The astringent properties of the

* Mystery is rarely practised but as the cloak of imposture; it is therefore unnecessary to add that Mr. Barry made no difficulty in stating the following to be the formula by which it was prepared.

A tincture of Bark, made with rectified spirit, was distilled until the whole of the spirit was driven off, the remaining solution was then left to cool, after which the resin that floated on the surface was removed, and the residuum inspissated at a low temperature.

† **BARCLAY'S ANTIBILIOUS PILLS.** Take of the Extract of Colocynth \mathfrak{z} ij, Resin of Jalap (extract Jalap) \mathfrak{z} j, Almond Soap 3jss, Guaiacum \mathfrak{z} ij, Tartarized Antimony, grs. viij, essential oils of Juniper, Carraway, and Rosemary, of each gtt. iv, of Syrup of Buckthorn, as much as will be sufficient to form a mass, which is to be divided into sixty-four pills.

‡ **REFINED LIQUORICE.** This article, which is sold in the form of cylinders, is made by gently evaporating a solution of the pure extract of liquorice with half its weight of gum arabic, rolling the mass, and cutting it into lengths, and then polishing, by rolling them together in a box: many impurities however are frequently introduced into this article, such even as glue, &c.

logwood are preserved in the extract, but it becomes so extremely hard, that pills made of it very commonly pass through the body without undergoing the least change. *Dose*, grs. x to 3ss dissolved in cinnamon water: it sometimes imparts a bloody hue to the urine of those who have taken it.

EXTRACTUM HUMULI. L. The bitter taste of the hop characterises this preparation; whether it possesses or not, any anodyne properties, seems very doubtful. *Dose*, grs. v to ʒj.

EXTRACTUM OPII. L.D. As it contains less resinous matter than crude opium, it is supposed to produce its effects with less subsequent derangement. See *Opium*. *Dose*, gr. j to v. for an adult.

EXTRACTUM PAPAVERIS. L.D. It is a weak opium. *Dose*, grs. ij to ʒj.

EXTRACTUM SARSAPARILLÆ. Notwithstanding the reputation which this preparation has acquired, it is very doubtful whether it possesses any medicinal powers. *Dose*, gr. x to 3j in pills, or dissolved in the decoction.

EXTRACTUM STRAMONII. This extract was first recommended by Stöerck, as a powerful remedy in maniacal affections; its probable value in such diseases appears to have been suggested by a very curious process of reasoning, viz. that as it deranged the intellect of the sane it might possibly correct that of the insane. Experience has certainly not confirmed the very sanguine report of Stöerck with regard to its powers, but it has satisfactorily shewn its occasional value in violent paroxysms, in quieting the mind, and procuring rest. I am informed by my friend Dr. Davy, that, for such an object, it has been very frequently and successively given, in the Lunatic Military Hospital at Fort Clarence. He farther states that he has himself made many trials with the extract of Stramonium, prepared by Mr. Barry (*in vacuo*) as well as with the common extract; and that he finds the former to be uniformly more powerful. "In most diseases," says he, "this medicine would seem uncertain in its operation, sometimes occasioning an anodyne effect, and at other times, producing irritation, and preventing sleep; I have however, seen very beneficial effects from it in asthma, and in coughs that have a nightly exacerbation, in doses of from gr. $\frac{1}{4}$ to gr. 2, daily."

EXTRACTUM TARAXACI. L.D. The medicinal powers of Dandelion are asserted to exist unimpaired in this preparation, but it becomes inert by keeping. See *Taraxacum*. *Dose*, grs. x to 3j, in combination with sulphate of potass.

2. *Spirituos or Resinous Extracts.*

These may contain, with the exception of gum, all the ingredients contained in watery extracts, besides resin; their composition however will greatly depend upon the strength of the spirit employed as the solvent; but of this I shall speak more fully under the article *Tincture*.

EXTRACTUM CINCHONÆ RESINOSUM. L.E.D. The operation of spirit in this preparation is twofold; it extracts from the bark the element which is insoluble in water, and it diminishes the tendency in the extractive matter to absorb oxygen during the process. *Dose*, grs. x to xxx. It is said that a spurious extract of bark is to be met with in the market, consisting of the extract of the horse-chesnut tree bark, and yellow resin.

EXTRACTUM COLOCYNTHIDIS COMPOSITUM. L.D. *Extract. Catharticum*. P.L. 1775. *Pilulæ Rudii*. P.L. 1720. This preparation has been established through successive pharmacopœias, and has undergone some modification in each; in the present edition the soap has been restored, and its solubility is thereby increased, as well as its mildness as a cathartic. The omission of this ingredient was formerly suggested by the consideration of its being incompatible with *Calomel*; this, however, is not the case. It presents a combination of purgative substances, which is highly judicious, and will be found to be more powerful than an equivalent dose of any one of the ingredients. *Dose*, gr. v to 3ss, *Form.* 71, 81, 88.

EXTRACTUM JALAPÆ. L.E.D. It is purgative, but is liable to gripe, unless it be triturated with sugar and almonds, or mucilage, so as to form an emulsion. *Dose*, grs. x to ʒj.

EXTRACTUM RHEI. L. The powers of the Rhubarb are considerably impaired in this extract. *Dose*, grs. x to 3ss. *Form.* 78.

3. *Inspissated Juices.*

These preparations are obtained by expressing the juices from fresh plants, and evaporating them in a water bath; they are generally of a lighter colour than common extracts, and they are certainly much more active, although there is a great difference in the activity of different samples; and perhaps the medicinal powers of the juices themselves are very much under the controul of soil and season. That they vary in quantity from such causes we have ample proof; thus in moist seasons, Beaumé obtained five pounds of inspissated juice from thirty pounds of elder berries, whereas, in dry seasons, he could rarely get more than two. From hemlock he procured in October, 1796, 7.5 per cent. of inspissated juice, and in May of the same year only 3.7; on the contrary, in August, 1768, 4 per cent., and in May, 1776, as much as 6.5; but in general, the product in the autumnal months was the most considerable.

The modes of preparing the inspissated juices of the same plant vary in the different pharmacopœias, and in several points that are very essential: some direct the expressed juices to be immediately inspissated, others allow them to undergo a slight degree of fermentation, and some defecate them, before they proceed to their inspissation.

EXTRACTUM (*Succus Spissatus*. E.) ACONITI. L.E. The medicinal properties of this preparation are analogous to those of the recent *Wolfsbane*, viz. narcotic, and in some cases diuretic, (see *Form.* 128.) It is, however, rarely used. *Dose*, at first, should not exceed gr. ½, but it may be gradually increased. I have not yet, says Dr. Davy, in a letter recently received from him, had much experience of the *Extractum Aconiti*, but that little is favourable to its use; "in some cases of chronic rheumatism, and in some of intermittent fever, complicated with visceral disease, it has had a beneficial effect not to be mistaken; the dose has been from one to two grains." Dr. Stöerck, who first tried this medicine, observed from it a powerful diaphoretic effect; this, says Dr. Davy, "I have not noticed, and yet the extract which I have used was prepared by Mr. Barry, *in vacuo*, which is certainly far more powerful than that employed by Stöerck; the latter, when applied to the tongue, "*levissimam tantum titillationem excitabat*," whereas that of Mr. Barry produces a most disagreeable sensation of burning, which extends to the throat; and in one instance, when applied to the tip of my tongue, it occasioned ulceration."

EXTRACTUM BELLADONNÆ. L.E. *Belladonnæ Folia.* Dose, gr. j, gradually increased to gr. v, in the form of pill. Dr. Davy has made a few trials of Barry's Extract; the results of which he informs me are not at all favourable to the use of this medicine; it is much more powerful than the common extract, and can only be given with safety in small doses; "in several instances," says he, "I have not been able to repeat a grain dose daily, more than thrice, on account of the alarming symptoms produced, as head-ache, vertigo, indistinct vision with dilated pupil, and, in one case, irritation of the bladder, occasioning very frequent micturition; in chronic rheumatism and catarrh, with severe cough, the only diseases in which I have yet given it, it has not appeared to be the least serviceable; it may probably prove valuable to the oculist; from trials that have been made of it here by Mr. Miller, Assistant Surgeon to the Forces, it has been found to dilate the pupil beyond the common extract. Stöerck even introduced his extract into the eye with impunity. Acrid as the preparation is which I have used, the patients have never complained of it, nor have I known any disagreeable effects from it, when applied in solution, sufficiently dilute."

EXTRACTUM (Succus Spissatus. E.D.) CONII. L. Much of this extract, as it is found in commerce, has not been prepared with equal fidelity, nor with due attention to the season when the plant is in its greatest perfection; Dr. Fothergill says, "I know from repeated experiments, that the extract which has been prepared from *hemlock*, before the plant arrives at maturity, is much inferior to that which is made when the plant has acquired its full vigour, and is rather on the verge of decline: just when the flowers fade, the rudiments of the seeds become observable, and the habit of the plant inclines to yellow, *is the proper time* to collect it;" the plants which grow in places exposed to the sun should be selected, as being more *virose* than those that grow in the shade: still, however, with every precaution, it will always be uncertain in strength. Orfila found that an extract prepared by boiling the dried powder in water, and evaporating the decoction, was inert; in fact, the whole of the activity of the plant resides in a resinous element *insoluble* in water, and for which I have proposed the name of *Conein*. Extract of hemlock, when judiciously prepared, is a very valuable sedative; I state this from ample experience, and when combined with *Hyoscyamus*, and adapted by means of mucilage and syrup, to the form of a mixture, it affords a more effectual palliative than any remedy with which I am acquainted, for coughs and pulmonary irritation. *Form.* 19 is that, from which I have derived the greatest benefit in such cases. See also *Form.* 2, 3, 4, 19, 57. Since the fourth edition of the present work, I requested my friend Dr. John Davy to make trial of its efficacy in the Military Hospital at Chatham, and I here introduce his report upon the subject;—"My experience of the effects of the *Extractum Conii* perfectly agrees with that of Dr. Paris, as stated in the fourth edition of the *Pharmacologia*, and I am of his opinion that when properly prepared and administered, it is a very valuable sedative; I have given it to the extent daily of from a scruple to a drachm, in chronic catarrh, and in phthisis pulmonalis, either alone or in conjunction with the Extract of *Hyoscyamus*, and it has afforded more relief than any other medicine that I have tried. From two or three trials of it in pneumonia, I am disposed to think it may be very serviceable in certain forms of this disease, in which venesection is contra-indicated by

extreme debility ; and also in measles. In the trials alluded to, I commenced giving it in the large dose of a drachm, daily, suspended in water containing in solution a grain of *Antimonium Tartarizatum*. In a very few instances where I have from the commencement given it in a large dose, as from 3j to 3iss, it has occasioned hallucination of ideas, which in two cases was attended with excitement of the sensorium and increased action of the heart, and in one case, with diminished activity of both. The extract of Conium, prepared by Mr. Barry, is the most powerful one I have ever used, indeed, until I tried it, I had no just idea of the virtues of Conium as a medicine ; but I am now disposed to give credit to Stöerk's account of its efficacy in various chronic diseases ; and I have no doubt but that this valuable medicine has fallen into comparative disrepute and disuse from the bad quality of the extract commonly employed." Dr. Maton has found that the value of this extract is greatly increased by including the seeds in its preparation. *Dose*, grs. v to ʒj or more, twice or thrice a day ; in a full dose it produces giddiness, a slight nausea, and a tremor of the body ; a peculiar heavy sensation is also experienced about the eyes ; and the bowels become gently relaxed ; unless some of these sensations are produced, we are never sure that the remedy has had a *fair trial* of its effects. Patients will generally bear a larger dose at night than at noon, and at noon than in the morning.

EXTRACTUM ELATERII. L. This substance spontaneously subsides from the juice of the wild cucumber, in consequence I presume of one of those series of changes which vegetable matter is perpetually undergoing, although we are hitherto unable to express them by any known chemical law. It is therefore not an *extract*, either in the chemical or pharmaceutical acceptation of the term, nor an *inspissated juice*, nor is it a *fecula*,* as it has been termed ; the Dublin College has perhaps been more correct in simply calling it *Elaterium*, the name given to it by Dioscorides.

It occurs in commerce in little thin cakes, or broken pieces, bearing the impression of the muslin upon which it has been dried ; its *colour* is greenish, its *taste* bitter, and somewhat acrid ; and when tolerably pure, it is light, pulverulent, and inflammable.

The early history of this medicinal substance is involved in great perplexity, each author speaking of a different preparation by the same name ; for instance, the *Elaterium* of Dioscorides must have been a very different substance from that of *Theophrastus* ; and wherever Hippocrates mentions the term, he evidently alludes to *any* violent purgative. "*Hippocrati Elaterium medicamentum est quod per alvum expurgat.*" (*Bod. in Theophrast.*) This will, in some degree, reconcile the discordant testimonies of different authors with regard to the powers of *Elaterium* ; for example, Dioscorides states its dose to be from grs. ii to ʒj—in *Ætius*, *Paulus*, and *Actuarius*, it is recommended to the extent of 3ss—in *Mesue* from ʒss to ʒj—in *Bontius* (*Med. Ind.*) from ʒj to 3ss—*Massari* exhibits it in doses of gr. vj—*Fernelius* and *Sennertus* to ʒj—*Herman* from grs. v vj—*Quincy* to grs. v—and *Boerhaave* does not venture

* The juices of the *Iris* root, and *Bryony* root, and those of many other plants, allow their medicinal elements to separate and subside in a similar manner, leaving the super-natant liquid perfectly inert ; if we must have a generic name to express such a substance, it should be termed a *feculence*, rather than a *fecula*.

to give more than gr. iv—while the practitioners of the present day limit their dose from gr. $\frac{1}{2}$ to grs. ij. Dr. Clutterbuck, with a laudable intention to discover some method of procuring this article at a cheaper rate, and at the same time of establishing some process which might ensure a preparation of more uniform strength, has lately performed a series of interesting and instructive experiments,* the results of which prove in a satisfactory manner “that the active principle of this plant is neither lodged in the roots, leaves, flowers, nor stalks, in *any considerable quantity*; nor is it to be found in the body of the fruit itself, or in the seeds, but in the *juice around the seeds*; the substance which spontaneously subsides from this liquor, obtained without pressure, is *genuine Elaterium*, the quantity of which, contained in the fruit, is extremely small, for Dr. Clutterbuck obtained only six grains from *forty cucumbers*. This gentleman communicated the detail of these experiments to the President of the College of Physicians, who requested me, as professor of *Materia Medica*, to report upon them. I accordingly deemed it to be my duty to enter upon a series of new experiments, which I have lately completed, with the able assistance of Mr. Faraday, in the laboratory of the Royal Institution. The results of which will shew, that although Dr. Clutterbuck found that an eighth part of a grain of elaterium seldom failed to *purge violently*, yet, strange as it may appear, that *not more than one grain in ten* of elaterium, as it occurs in commerce, possesses any active properties, and that this decimal part is a vegetable proximate principle, not hitherto noticed, to which I shall give the name of *ELATIN*. I shall subjoin the detail of my experiments, and I think it will appear that their results will authorise me to express the chemical composition of *Elaterium* in the following manner :

I. {	F.	Water	-	-	-	-	-	-	.4
	B.	Extractive	-	-	-	-	-	-	2.6
	B.DJ.	Fecula	-	-	-	-	-	-	2.8
	C.	Gluten	-	-	-	-	-	-	.5
	K.	Woody matter	-	-	-	-	-	-	2.5
	H.	<i>Elatin</i>	-	-	-	-	-	-	} 1.2
G.	Bitter Principle	-	-	-	-	-	-		
									<hr/>
									10 grains.

Proximate Analysis of *Elaterium*.

Experiments. Series 1st.

A.

Ten grains of *Elaterium*, obtained from a respectable chemist, and having all the sensible properties which indicated it to be genuine, were digested for twenty-four hours with distilled water, at a temperature far below that of boiling; *four grains* only were dissolved.

B.

The solution was intensely bitter, of a brownish yellow colour, and was not in the least disturbed by alcohol, although a solution of *Iodine* produced a blue colour; the solution therefore contained no gum, and only *slight traces* of starch.

C.

The solution, after standing twenty-four hours, yielded a *pellicle* of insoluble matter, which when burnt appeared to resemble *Gluten*.

* “Observations on the nature and preparation of the *Elaterium*,” read at the Medical Society of London, April 24, 1819, and which were published in the *Medical Repository*, vol. xii. No. 67.

D.

The six grains which were insoluble in water, were treated for forty-eight hours with alcohol of the specific gravity $\cdot 817$, at 66° of Fahrenheit: a green solution was obtained, but by slow evaporation *only half a grain* of solid green matter was procured. The insoluble residue obstinately adhered to, and coated the filtre like a varnish, and completely defended the mass from the action of the alcohol; it is probable that it consisted principally of *Starch*.

Experiments. Series 2d.

E.

Ten grains of *Elaterium*, from the same sample, were treated with alcohol of the specific gravity $\cdot 817$, at 66° Fahrenheit, for twenty-four hours; upon being filtered, and the residuum washed with successive portions of alcohol, the *Elaterium* was found to have lost $1\cdot 6$ of a grain. The high specific gravity of the alcohol in this experiment was important: had it been lower, different results would have been produced.

F.

The alcoholic solution obtained in the last experiment, was of a most brilliant and beautiful green colour, resembling that of the oil of cajeput, but brighter; upon slowly evaporating it, $1\cdot 2$ grains of solid green matter were obtained.

G.

The solid green matter of the last experiment was treated with boiling distilled water, when a minute portion was thus dissolved, and a solution of a most intensely bitter taste, and of a brownish yellow colour, resulted.

H.

The residue, insoluble in water, was inflammable, burning with smoke and an aromatic odour, not in the least bitter; it was soluble in alkalies, and was again precipitated from them unchanged in colour; it formed, with pure alcohol, a beautiful tincture, which yielded an odour of a very nauseous kind, but of very little flavour, and which gave a precipitate with water; it was soft, and of considerable specific gravity, sinking rapidly in water; circumstances which distinguish it from common resin; in very minute quantities it purges. It appears to be the element in which the purgative powers of the *Elaterium* are concentrated, and which I have denominated *ELATIN*.

I.

The residuum, insoluble in alcohol, weighing $8\cdot 4$ grs. (Expt. E) was boiled in double distilled water, when $5\cdot 9$ grs. were dissolved.

J.

The above solution was copiously precipitated blue by a solution of Iodine, and was scarcely disturbed by the Persulphate of Iron.

K.

The part insoluble, both in alcohol and water, which was left after experiment I, amounting to $2\cdot 5$ grains; it burnt like wood, and was insoluble in alkalies.

It appears that the whole of the *Elatin* does not separate itself from its native juice by spontaneous subsidence, and that, on this account, the supernatant liquor possesses some powers as a cathartic. We cannot be surprised therefore that the *Elaterium* of commerce should be a very variable and uncertain medicine; for independent of the great temptation which its high price holds out for adulterating it, which is frequently done with starch, it necessarily follows that where the active principle of a compound bears so small a proportion to its bulk, it is liable to be affected by the slightest variation in the process for its preparation, and even by the temperature of the season; were pressure is used for obtaining the juices a greater or less quantity of the inactive parts of the cucumber will be mixed with the *Elatin*, in proportion to the extent of such pressure,

and the *Elaterium* will of course be proportionally weak.* There is one curious result obtained in my experiments which deserves notice, viz. that there is a *bitter* principle in the *Elaterium*, very distinct from its extractive matter, and totally unconnected with its activity, for I diluted the solution obtained in experiment G, and swallowed it, but it produced upon me no effect, except that which I generally experience upon taking a powerful bitter,—an increased appetite; and yet notwithstanding this fact, when in combination with *Elatin*, it is far from being inert, since this latter body is considerably quickened by its presence. See page 157. The solution B was given to a person, but no effect whatever ensued. Dose of good *Elaterium*, as it occurs in commerce, is about one grain, or it is better to give it only to the extent of half a grain at a time, and to repeat that dose every hour until it begins to operate. It is probably when thus managed, the best hydragogue cathartic which we possess; it differs however from the class of remedies to which it belongs, for it excites the pulse and whole animal system, so as to produce a considerable degree of febrile action. It was strongly recommended by Sydenham, Lister, and Hoffman, and all their cotemporaries and immediate successors, as a valuable remedy in dropsy; but in consequence of some fatal results from its improper application, it was driven from practice with a violence that marks prejudice rather than conviction; one author, in descanting upon its virulence, exclaims, "*Elaterium esse in catalogo diaboli quo necat homines.*" For its restoration to medicine, we are indebted to Dr. Ferriar of Manchester, who used it with great success in the cure of Hydrothorax.

EXTRACTUM (*Succus Spissatus*. E.D.) HYOSCYAMI. L. This preparation is certainly powerfully narcotic, and tends to relax rather than astringe the bowels; where the constitution is rebellious to opium, it furnishes a more valuable resource to the practitioner than any other narcotic extract. Dose, gr. v to ʒj, in pills. See Form. 1, 3, 4, 19, 139.

EXTRACTUM LACTUCÆ. L. SUCCUS SPISSATUS LACTUCÆ SATIVÆ. E. This preparation has found its way into the London Pharmacopœia, in consequence of the testimony of many highly respectable practitioners in favour of its sedative properties. In the memoirs of the Caledonian Horticultural Society, various suggestions are offered as to the best mode of obtaining an extract from the milky juice of the garden Lettuce, to which Dr. Duncan has bestowed the name of "*LACTUCARIUM*;" it was first recommended to take the milk with cotton, afterwards with a sponge, and more recently with a painter's brush; all these methods however are attended with considerable difficulty, and the juice cannot be collected in any quantity. Mr. Probart, a chemist in Great Portland Street, has lately cultivated large plantations of the lettuce, for the purpose of insti-

* When it has a dark green colour, approaching to black, it is compact, and very heavy, and breaks with a shining resinous fracture, we may reject it as an inferior article.

Since the publication of my experiments upon the ordinary *Elaterium* of Commerce, I have been favoured by Mr. Barry with the results of his trials upon the *Elaterium* made by W. Allen & Co. according to the improved process of Dr. Clutterbuck; of the first sample, he found that out of ten grains, 5.5 were soluble in spirit of the specific gravity 809, of the second, 6.2, and of the third 6.4; of that prepared by the same process at Apothecaries' Hall, 6 grs. were soluble. The residue, insoluble in the spirit, was administered to a patient, and ascertained to be perfectly inert. This report confirms beyond a doubt the great superiority of the *Elaterium* when prepared, without pressure, according to the suggestion of Dr. Clutterbuck.

tuting experiments upon the subject, and I am happy in being enabled through his liberality, to introduce in this place, an account of the process which he pursues, and which he considers the only one by which the article can be brought into the market at any reasonable price.*

In concluding the history of Inspissated juices, it deserves notice that the London College uniformly directs that the *feculence* should be preserved in the compound; there can be no doubt of the propriety of such advice, but the Colleges of Edinburgh and Dublin reject it. The French Codex gives directions for two extracts from each of these substances, one containing what they please to denominate the *fecula*, the other not; thus there is "*Extractum Cicutæ absque Fecula*," and "*Extract: Cicut: cum Fecula*." There is one curious fact respecting these narcotic preparations, that most, if not all of them, contain *nitre*, *common salt*, and *muriate of potass*.

Manufacturing chemists, in order to give a smooth and glossy appear-

* "I have the Cos Lettuce planted about eight inches asunder in rows, between which there is sufficient space to enable persons to pass up and down without injuring the plants. I commence my operations just before the plant is about to flower, by cutting off an inch of the stem; the milky juice immediately exudes, and is collected on pieces of Wove Cotton, about half a yard square. As soon as this becomes charged, it is thrown from time to time into a vessel containing a small quantity of water, which when sufficiently impregnated is evaporated at the common temperature of the atmosphere, by exposure in a number of shallow dishes. The LACTUCARIUM, in a few hours, is found adhering to the vessels in the form of an Extract, but differing from every other in all its sensible properties: this method enables me to collect LACTUCARIUM with great facility and dispatch, but it is still attended with considerable expense, as the proportion of milky product is necessarily very small, and the price of the medicine consequently high, and therefore not within the reach of general practice. This consideration led me to make farther experiments, for the purpose of ascertaining whether an EXTRACT might not be obtained from the plant possessing all the properties of Lactucarium, when administered in large doses, and which could be introduced at a comparatively trifling cost. In prosecuting this enquiry, I found that the plants contain most of the milky juice when they have flowered and the leaves are beginning to assume a yellow hue, and I observed that when cut down, the milky juice assumes for the most part a concrete form, having subsided in the bark of the stalk and in the old leaves, a circumstance which accounts for the extreme bitterness of these parts. I was naturally led from these circumstances to choose the above period for my operations, and to select those parts only of the plant for my extract, rejecting the substance of the stalk, and the young sprouts. My method of procuring the extract is as follows. I first macerate the parts in water, for twenty-four hours, and then boil them for two, after which I allow the clear decoction to drain through a sieve, without using any pressure; this is then evaporated, as far as it can be done with safety, and the process is finished in shallow dishes, in the manner above described, for obtaining Lactucarium. This extract, which I have called "*EXTRACTUM LACTUCÆ CONCENTRATUM*," is of course less powerful than Lactucarium, but it possesses all the properties in larger doses, and it has been found equally useful in a number and variety of cases, and is not more than a sixth part of the price."

Mr. Probart has retired from trade, but I have just learnt that the same article is now prepared, by a similar process, by Mr. Selway, Chemist, of New Cavendish Street, and the specimens which I have received authorise me to recommend it for trial. A concentrated tincture is also prepared.

The "*Succus Spissatus Lactucæ sativæ*," of the shops, must of necessity be almost inert, since it is commonly prepared at that period, when the plant contains none, or very little of the milky juice; and even if the Lettuce be employed at a more mature season, it must still fail to afford an extract of any strength, as it is merely the expressed juice, and that too of the whole plant indiscriminately, and will be found to contain a very minute proportion of Lactucarium, the great bulk being nothing more than inspissated green juice.

ance to their Extracts, generally add to every lbj, about 3ss of gum, f3j of olive oil, and ℥xx of rectified spirit : there is no harm in the practice.

FERRI SUB-CARBONAS. L. CARBONAS FERRI PRÆCIPITATUS. E.

CARBONAS FERRI. D.

Carbonate of Iron.

In a former Pharmacopœia of London, a sub-carbonate of iron was prepared under the name of *ferrirubigo* (rust of iron), by exposing iron-filings to the action of air and water ; and although the Colleges of Edinburgh and Dublin still retain this mode of preparation, yet they admit at the same time of another, which, like the *sub-carbonate* of the present London Pharmacopœia, is produced by precipitation. **QUALITIES.** *Form*, a chocolate brown powder. *Odour*, none. *Taste*, slightly styptic. **CHEMICAL COMPOSITION.** Mr. Phillips has shewn that this precipitate is liable to vary according to the temperature at which it is prepared, as well as from other differences of manipulation ; it generally consists of mixtures of per-oxide, and proto-carbonate of iron, in the proportion of four parts of the latter, and six of the former. By referring to the *Medicinal Dynameter* the practitioner may find the quantity of those ingredients in any given weight of the preparation, and compare its strength with the other chalybeate medicines. **SOLUBILITY.** It is insoluble in water, but acids dissolve it with effervescence. **FORMS OF EXHIBITION.** In powder or pills, combined with aromatics. **DOSE**, gr. v to xxx. (*Form. 38.*) It has lately been brought into particular notice by the publication of Mr. Hutchinson of Southwell, who states that in doses of half a drachm to a drachm, two or three times a day, it has proved in his hands a most efficacious remedy in the cure of *Tic doloureux*. Mr. Hutchinson is well known to the profession as a judicious and inquiring practitioner, and we are well satisfied that he would not recommend any remedy to the attention of his brethren, without a well grounded assurance of its efficacy ; at the same time it must be remembered that this disease is very frequently the consequence of an irritation in some nerve, by the mechanical operation of osseous spiculæ ; in such cases we cannot expect the sub-carbonate of Iron to afford relief. A noble Marquis who lost his leg at Waterloo, suffered excruciating pains in his face, in consequence of exfoliation in the stump, which were relieved as soon as the local irritation subsided ; and a late lamented physician appears to have owed his severe sufferings to the irritation produced on the brain by a bony excrescence. I have little doubt if cases of *Tic doloureux* were more carefully examined, they would be frequently found to derive their origin from a similar source. If it were necessary I could add several of such instances to those already enumerated.*

FERRI RAMENTA ET FILA. L. FILA ET LIMATURA. E. FERRI SCOBS. D.

Iron Filings and Wire.

Iron seems to be a metal that proves active in its *metallic* state ; its filings may be given in the form of powder, conjoined to some aromatic,

* Doctor Eights of Albany has related two cases of Neuralgia, in which the use of the Carbonate of Iron was attended with complete success. See New-York Medical and Physical Journal, Vol. I. p. 323.

or what is perhaps more eligible, in the form of an electuary. The Mahometan practitioners are in the habit of prescribing them, in conjunction with ginger, and cummin seeds, in cases requiring tonics. Dose, grs. v to 3ss. IMPURITIES. Iron filings should be carefully purified by the application of the magnet, since those obtained from the work-shop, are generally mixed with copper and other metals. For pharmaceutical purposes, iron wire should be preferred, as being the most pure, since the softest iron only can be drawn, and Mr. Phillips has shewn us in his experiments upon the "*Ferrum Tartarizatum*," that soft iron is more easily acted upon by Tartar.

FERRI SULPHAS. L. SULPHAS FERRI. E.D.

Ferrum Vitriolatum. P. L. 1787. *Sal Martis*. P.L. 1745.

Sal, seu Vitriolatum Martis. P.L. 1720.

Sulphate of Iron, formerly Green Vitriol.

QUALITIES. *Form*, crystals, which are rhomboidal prisms, transparent, and of a fine green colour; when exposed to the air they effloresce, and at the same time become covered with a yellow powder, owing to the attraction of oxygen; when exposed to heat, they undergo watery fusion, and at a higher temperature, the acid is driven off and the peroxide of iron alone remains, which in commerce is known by the name of *Colcothar*. CHEMICAL COMPOSITION. According to Dr. Thomson, it consists of 27.7 of sulphuric acid, 28.3 of protoxide of iron, and 45 of water; 8 parts, however, of this water, exist in combination with the oxide of iron. The Medicinal Dynameter will shew the proportion of protoxide in any given weight of this salt. SOLUBILITY. It is soluble in two parts of water at 60°, and three fourths at 212°. The solution reddens vegetable blues. It is insoluble in alcohol; when however the iron is farther oxidized, it becomes soluble in that menstruum.* INCOMPATIBLE SUBSTANCES. Every salt whose base forms an insoluble compound with sulphuric acid; the earths, the alkalies, and their carbonates; borate of soda; nitrate of potass, muriate of ammonia; tartrate of potass, and soda; acetate of ammonia; nitrate of silver; sub-acetate and acetate of lead; and Soaps. Whether the medicinal virtues of a salt of iron are injured by combination with astringent vegetable matter, seems to admit of doubt. Such substances have been usually ranked amongst the *incompatibles*, but I am disposed to think without sufficient grounds, for I have frequently witnessed the salutary effects of iron when exhibited in this questionable state of combination—may not the absorbents be more disposed to take up iron, when combined with vegetable matter, than when it is presented in a more purely mineral form?† MEDICINAL USES. Tonic, astringent, emmenagogue, and anthelmintic; in large doses, it occasions griping in

* This fact furnishes the Pharmaceutic Chemist with an easy and effectual mode of cleansing the green crystals from the yellow peroxide which forms upon their surface, viz. by washing them in spirit.

† By a parity of reasoning, Mr. Carmichael is led to prefer the phosphate of iron to any other preparation of that metal, in cancer, because he thinks iron, combined with an animal acid, enters the system in greater quantity, and unites more intimately with the juices.

AROMATIC LOZENGES OF STEEL. These consist of sulphate of iron, with a small proportion of the tincture of Cantharides.

the bowels. Dose, gr. j to v, combined with rhubarb, or some bitter extract. (*Form* : 72, 87.) If given in solution, the water should be previously boiled, or the oxygen contained in the atmospherical air, which is diffused through it, will partially convert the salt into an oxy-sulphat, and render it insoluble. As an external astringent it is useful in the aphthæ of children.* OFFICIAL PREP. *Mist* : *Ferri comp* : L. (K) *Pil* : *Ferri comp* : L. (J)

FERRUM AMMONIATUM. L. MURIAS

AMMONIÆ ET FERRI. E.D.

Ferrum Ammoniacale, P.L. 1787. *Flores Martiales*.

P.L. 1745. *Ens Veneris*. P.L. 1720.

QUALITIES. *Form*, crystalline grains, which deliquesce ; *Colour*, orange yellow ; *Odour*, resembling that of saffron ; *Taste*, styptic. CHEMICAL COMPOSITION. This is very variable ; depending upon the degree of heat and length of time employed for its preparation. It seems to be a mixed mass, consisting of sub-muriate of ammonia and sub-muriate of iron, the metal being in the state of red oxide ; and Mr. Phillips states that in the London preparation a portion of sub-carbonate of ammonia is necessarily present. The same chemist has also shewn that the proportion of Peroxide of iron in 200 grains is not more than three grains. Its equivalents will be seen in the Medicinal Dynameter. SOLUBILITY, f3j of water dissolves 3iv of it ; it is also very soluble in alcohol. INCOMPATIBLE SUBSTANCES. *The Alkalies, and their Carbonates ; Lime-water, and Astringent vegetables.* MEDICINAL USES. It is tonic, emmenagogue, and aperient, but it is so uncertain in its composition and effects that it is rarely used. OFFICIAL PREP : *Tinct* : *Ferri Ammon.* L. *Form* : 36, 43, 95. IMPURITIES. These are indicated by the dull and pale yellow colour of the salt ; it may be purified by re-subliming it.

FERRUM TARTARIZATUM. L.

TARTRAS POTASSÆ ET FERRI. E.

TARTARUM FERRI. D.

QUALITIES. *Form*, a powder of a brownish green colour ; *Odour*, none ; *Taste*, slightly styptic ; it attracts humidity from the atmosphere, but does not deliquesce. CHEMICAL COMPOSITION. Mr. Phillips has devoted much attention to this subject, and he states that as it is frequently prepared, it is a mere mixture of metallic iron with super-tartrate of potass, coloured by oxide of iron ; when however it is made with more care, it appears to be a double salt, consisting of tartrate of potass and tartrate of iron ; or may it not be one of those combinations which cream of tartar forms with metal, and of which I have spoken under the article *Antimonium Tartarizatum* ? The quantity of peroxide of iron contained in any

* FORGE WATER. This popular remedy as a lotion for Aphthæ and other similar diseases, I am well satisfied possesses considerable efficacy. It may, perhaps, be necessary to state that Forge-water is that in which the Blacksmith has plunged his hot iron for the purpose of refrigeration. It is to be taken early in the morning, when, all the mechanical impurities having had time to subside, it is beautifully limpid. Upon examining some of this water I found it to contain sulphate of iron. The sulphuric acid was probably derived from the sulphur of the coals.

weight of this preparation may be seen by referring to the *Medicinal Dynameter*; five grains, for instance, will be found to contain gr. j of peroxide, which it will be observed, are equivalent to ℥xiv of the *Tinctura Ferri Murialis*, and to ℥xxv of the *Liquor Ferri Alkalini*, or to f3j of the *Vinum Ferri*. **SOLUBILITY.** It is very soluble in water, and the solution remains for a great length of time without undergoing any change, except that of depositing *tartrate of lime*, which is an incidental impurity in the supertartrate of potass. **INCOMPATIBLE SUBSTANCES.** *All strong acids; lime water; hydro-sulphuret of potass; astringent vegetables; The fixed alkalies and their carbonates* decompose the solution very slowly, unless heated; but *ammonia* and its *sub-carbonate* produce upon it no effect whether it be hot or cold; this fact, observes Mr. Philips, will enable us to exhibit iron in solution with an alkali, without the occurrence of any precipitate. **FORMS OF EXHIBITION.** The perfect preparation, from its tendency to deliquesce, cannot be well ordered in the form of powder; that of solution is probably the most judicious. **M.D. USES.** It is supposed to add to its chalybeate virtues those of a diuretic nature. **DOSE,** grs. x to 3ss. See *Form*: 34, 53, 92. Dr. Bateman has recommended a watery solution of it, as a chalybeate peculiarly suited to children, from its tasteless quality.*

FILICIS RADIX. L.E.D.

(*Aspidium Filix, Mas.*)

Root of the *Male Fern*.

QUALITIES. This root is nearly inodorous; its taste slightly bitter, sweetish, sub-astringent, and mucilaginous; as it contains no volatile ingredient, it may be given in decoction, but on account of its astringency, it must not be conjoined with a *chalybeate*. **CHEMICAL COMPOSITION.** According to M. Morin, the Male Fern root owes its anthelmintic property to a fatty substance, capable of being saponified; of a nauseous odour quite like that of the root; of a very disagreeable taste, heavier than water, and distilling with water, and when burnt, giving a dense aromatic smoke. The root, moreover, contains gallic and acetic acids; uncrystallizable sugar; tannin; starch; a gelatinous matter insoluble in

* Besides the preparations of Iron mentioned by our author, there is another which has recently been introduced into practice, by Dr. Zollickhoffer of Maryland, and this is the *Prussiate of Iron*, or *Prussian Blue*. Like the other forms of iron it acts as a powerful tonic, and as a remedy in intermitting and remitting fevers, Dr. Z. conceives it to possess many advantages over Cinchona. These he states to be the following; "1. It is void of taste, and may therefore be much more readily exhibited than the Cinchona Officinalis, which to some is extremely unpleasant. 2. It may be given in every stage of the disease, while the administration of bark is confined to the apyrexia. 3. The dose is much smaller, being from four to six grains twice or thrice in twenty-four hours; or at morning, noon, and night; while bark, to be effectual, must be given in much larger doses. 4. It never disagrees with the stomach, or creates nausea, even in the most irritable state of this viscus; while bark is not unfrequently rejected. 5. In its effects as a remedy calculated to prevent the recurrence of future paroxysms, it is more certain, prompt, and effectual, than the justly celebrated Cort. Peruvian. 6 and lastly, A patient treated with this article will recover from the influence of intermitting and remitting fevers, in the generality of cases, in much less time than is usual in those cases in which bark is employed." In using the Prussiate of Iron, Dr. Zollickhoffer directs that care should be taken to select that which is of a very dark blue colour, approaching to a black, having a shining coppery fracture, and adhering firmly to the tongue.
Ed.

water and alcohol; lignine; and various salts. M. Morin considers the fatty matter as formed of a fixed and volatile oil, but farther experiments are required to make the characteristic principle of this root better understood. (Ann. de Chim. xxvi. 219.) Dose, as an anthelmintic,* 3j to 3iij, followed by a cathartic; its use however is superseded by more powerful and certain vermifuges. The root is sometimes boiled in ale to flavour it.

GALBANI GUMMI RESINA. L.E.D.

Galbanum.

QUALITIES. *Form*, variegated masses, of a yellowish brown colour; *Odour*, fetid; *Taste*, bitter and acrid. **CHEMICAL COMPOSITION.** It is one of those vegetable products to which the name of *gum-resin* has been given, see *Elemi*. The latest analysis of galbanum by M. Meisner, affords the following results, Resin 65.8; Gum 22.6; Cerasin 1.8; Malic acid 0.2; Volatile oil 3.4; Vegetable Debris 2.8; loss 3.4. **SOLUBILITY.** Water, wine, and vinegar, by trituration, take up one fourth of its weight, and form a milky mixture, which deposits its charge by rest; a permanent suspension, however, may be effected by the intermedium of egg or of gum arabic, for which purpose the galbanum will require half its weight of gum. Alcohol takes up one fifth of its weight, and a golden yellow tincture results, which has the sensible qualities of the galbanum, and becomes milky on the addition of water, but no precipitate falls. A mixture of two parts of rectified spirit and one of water, will dissolve all but the impurities. By distillation, galbanum yields half its weight of volatile oil, which at first has a blue colour. **MED. USES.** It is antispasmodic, expectorant, and deobstruent, and in a medical classification, might be placed between ammonia and assafœtida. **FORMS OF EXHIBITION.** No form is preferable to that of pill. **OFFICIAL PREP.** *Pil. Galbani comp. L. Pil. Assafœtid. comp. E. (B) Pil. Myrrh co. D. Tinct. Galb. D. Empl. Galb. D. Emplast. Galb. co. L. Emplast. Assafœtid. E. (B) Emplast Gummos. E.*

GALLÆ. L.E.D.

(*Cynips Quercus folii Nidus.*) *Gall Nuts.*

QUALITIES. *Form*, excrescences, nearly round and of different magnitudes, smooth on the surface, but studded with tuberosities; they are heavy, brittle, and break with a flinty fracture. *Odour*, none; *Taste*, bitter and very astringent. **SOLUBILITY.** The whole of their soluble matter is taken up by forty times their weight of boiling water. Alcohol, by digestion, dissolves .7, and æther .5 of their substance. The watery infusion possesses all the properties of the gall-nut, and reddens vegeta-

* **MATHIEU'S VERMIFUGE.** This consisted of two distinct Electuaries, the one for *killing*, the other for *expelling* the Tape-worm. The former of these was composed of an ounce of Tin Filings, six drachms of the Fern root, half an ounce of Semina Santonici, a drachm of the resinous extract of Jalap, and of Sulphate of Potass, and a sufficient quantity of Honey to make an Electuary, of which a teaspoonful was taken every three hours for two days; after which the latter electuary was given in the same dose, and consisted of two scruples of powdered Jalap, and Sulphate of Potass, one scruple of Scammony, and ten grains of Gamboge, made into an Electuary with Honey. The inventor of this receipt received the title of Counsellor of the Court, as well as a large pension for life, from the King of Prussia, for making it public!

ble blues. **CHEMICAL COMPOSITION.** Is at present involved in some obscurity; it contains tannin, gallic acid, a concrete volatile oil, and perhaps extractive and gum. M. Braconnot has also lately discovered in the gall-nut a new acid, which he calls *Ellagic acid*, from the word *galle* reversed, a nomenclature which it must be confessed is at least free from the objections urged against that which is founded upon chemical composition. (See *Annales de Chimie*, vol. ix. p. 187, new series; also *Children's Essay on Chemical Analysis*, p. 276.) **INCOMPATIBLE SUBSTANCES.** The infusion and tincture of galls possess habitudes with which it is very important for the medical practitioner to be acquainted, not only for the purpose of directing their exhibition with success, but because the elements which impart to them their characteristic traits, viz. *Gallic Acid* and *Tannin*,* are very widely diffused through the products of the vegetable kingdom, and will be found to be constantly active in their chemical, medicinal, and pharmaceutical relations. Metallic salts, especially those of iron, produce precipitates with infusion of galls, composed of tannin, gallic acid, and the metallic oxide; of these compounds the *tanno-gallate of iron* is the most striking, being of a black colour; those of *sub-acetate* and *acetate of lead* are greyish; *tartarized antimony* produces a yellowish; *sulphate of copper* a brown; *sulphate of zinc* reddish black; *nitrate of silver*, a deep olive; and *nitrate of mercury*, a bright yellow precipitate; the *oxy-muriate of mercury* produces only an opacity. *Sulphuric acid* throws down a yellowish curdy precipitate, *muriatic*, a flaky and white one, and *nitric acid* merely modifies the colour of the infusion, although it destroys its astringency; the solution of *ammonia* occasions no precipitate but renders the colour deeper, the *carbonate*, however, throws down a precipitate; the carbonates of the *fixed alkalies* produce a yellowish flaky, and *lime water* a copious green precipitate. The *tannin* in the infusion of galls is precipitated by a solution of isinglass or of any other animal jelly, by that of starch, and by many metallic oxides. **MEDICINAL USES.** Galls are most powerfully astringent. The native practitioners of India not only administer them as astringents in dysentery, but as tonics in cases of intermittent fever. **FORMS OF EXHIBITION.** In that of powder; and in combination with other astringents (*Form.* 51,) or with aromatics and bitters. As a local remedy the gall-nut enters into gargles and injections; for *blind piles*, an ointment composed of 2½ parts of finely powdered galls, and a small portion of opium, with three parts of simple ointment as an excipient, offers a very valuable resource. (*Form.* 55). In some cases of hemorrhoids, prolapsus ani, and fluor albus, the application may be made in the form of a fomentation, for which purpose two drachms of bruised galls should be macerated for an hour in a pint of boiling water, which, when cold, may be used in the usual manner. **DOSE**, for internal exhibition, grs. x—ʒij, or more. **OFFICIAL PREP.** *Tinct. Gallarum.* E.D. **OBSERVATION.** Those which are small, protuberant, bluish, and heavy, are the best, being such as have been collected before the *larvæ* within them had changed to the state of fly, and eaten their way out; a white, or a red hue indicates an inferior quality,

* Seguin first proved that gallic acid, and tannin or the astringent principle, are different substances; it is to the former that the property of giving a black colour to the solutions of iron is owing.

Mr. Hatchett has shewn that tan or tannin may be artificially produced by the action of nitric acid upon various vegetable substances.

and are those from which the insect has escaped. Aleppo galls are the most valuable, as being the most astringent.

GENTIANÆ RADIX. L.E.D.

(*Gentiana Lutea, Radix.*) *Gentian Root.*

QUALITES. *Form*, wrinkled pieces of various length and thickness; *Odour*, not particular; *Taste*, intensely bitter, but not nauseous. **CHEMICAL COMPOSITION**, resin, a small portion of oil, bitter extractive, and a proportion of tannin; it contains also mucilage, in consequence of which the infusion frequently becomes ropy. Since the last edition of this work, the continental chemists have announced the existence of an alkaline principle, which they call *Gentia* or *Gentiana*, and which is said to concentrate within itself, all the virtues of the Gentian root; it does not appear to be in the least poisonous; *M. Majendie* has injected it into the veins without any obvious effects, and has himself swallowed two grains without experiencing any sensation but that of extreme bitterness, followed by gentle warmth in the region of the stomach. The root, moreover, contains saccharine matter, for when fermented with water, it yields a spirit which is extensively used by the Swiss. **SOLUBILITY.** The virtues of this root are extracted by water and alcohol; proof spirit is perhaps its most perfect menstruum. See *Infus. Gentian. comp.* **MED. USES.** It is tonic and stomachic, and its use for such purposes is of ancient date;* in dyspepsia, hysteria, and in all cases where a vegetable bitter is indicated, it will be found a serviceable remedy. **DOSE**, in substance, from grs. v to 3j. **OFFICINAL PREPARATIONS.** *Extract: Gentian. L.E.D.* *Infusum Gentianæ comp. L.E.D.* *Tinct. Gentian. comp. L.E.D.†* *Vinum Gentianæ compositum. E.*

GERANIUM MACULATUM.

(Spotted Geranium.)

Radix.

[This plant is very common in the United States, and is usually found in the vicinity of moist, woody situations. From the analysis of Bigelow, it appears to contain a very large proportion of tannin. It is accordingly powerfully astringent, and has been used with advantage in diarrhœa, chronic, dysentery, and cholera infantum. In powder the dose of the Geranium is from 20 to 30 grs.—in extract, 10 grs.—in tincture from 3j to 3ij—and in decoction from 3j to 3ij.]

GLYCYRRHIZÆ RADIX. L.E.D.

(*Glycyrrhiza Glabra.*)

Liquorice Root. Stick Liquorice.

QUALITIES. *Taste*, sweet and mucilaginous. **CHEMICAL COMPOSITION.** Gum, with a peculiar modification of saccharine matter (*Glycion*),

* It takes its name from GENTIUS, king of Illyria, its discoverer, who was vanquished by Anicius the Roman Prætor, A.U. 585. i. e. A.C. 167, so that it is neither to be found in Hippocrates nor Theophrastus.

† BRODUM'S NERVOUS CORDIAL consists of the tinctures of Gentian, Calumba, Cardamom, and Bark, with the Compound Spirit of Lavender, and Wine of Iron.

STRAUGHTON'S ELIXIR. Is a tincture of Gentian, with the addition of Serpentaria, Orange Peel, Cardamoms, and some other aromatics.

or sugar in its purest form, for it is not fermentable ; on which account it is added to beer for the purpose of imparting a sweet taste, and at the same time enabling it to keep better. **SOLUBILITY.** Water extracts both its principles, but by long coction it becomes bitter ; alcohol extracts only its saccharine matter. **MED. USES.** It is principally employed as a demulcent in combination with other mucilaginous vegetables ; the root will yield nearly half its weight of extract. Liquorice covers the taste of some unpalatable medicines more effectually than any other substance, and it has long enjoyed the reputation of assuaging thirst, whence the Greeks distinguished this root by the term *Adipson* ; and, perhaps, the English word *Liquorice* may be derived from the same belief. **OFFICIAL PREP.** *Decoct : Sarsaparill : comp.* L.D. (●) *Infus : Lini*, L. (B) *Extract : Glycyrrhizæ*. L.E.D. *Confectio Sennæ*.* L.E. (●) **ADULTERATIONS.** The powdered root is generally sophisticated with flour, and sometimes with powdered guaiacum ; the fraud may be detected by its colour being a fine pale, instead of a brownish yellow, and by its reduced or foreign flavour.

GRANATI CORTEX. L.E.D.

Punica Granatum. Pomorum Cortex.

Pomegranate Bark.

What has been said respecting the Gall-nut, applies with equal truth to this substance. The efficacy of the bark of the root of the pomegranate, says Dr. Ainslie (*Mat. Med. of Hindostan*), as a remedy for the tape-worm is now well established in India ; it is given in decoction, prepared with two ounces of the fresh bark, boiled in a pint and a half of water until only three quarters of a pint remain.

GUAIACI RESINA ET LIGNUM. L.E.D.

(*Guaiacum Officinale*).

The Resin and Wood of Guaiacum.

A. THE WOOD.

QUALITIES. This wood is heavier than water, and emits when heated an aromatic odour ; *Taste*, bitterish and sub-acrid ; to extract its virtues long decoction is required. It has enjoyed great reputation as a specific in the venereal disease ; it was imported into Europe in 1517, and gained immediate celebrity from curing the celebrated Van Hutten : long before this period, however, it was used by the natives of St. Domingo. Boerhaave, so late as the eighteenth century, maintained its specific powers. It seems probable that the discipline which always accompanied its exhibition, such as sweating, abstinence, and purgation, might be the means, in the warmer climates, of effecting cures which were attributed to the guaiacum. **OFFICIAL PREPARATIONS.** *Decoct : Guaiaci comp : E.* *Decoct : Sarsaparill : comp : L.D.*

B. THE GUAIAIC, or Resin.

QUALITIES. *Form* ; it has the aspect of a gum resin ; *Colour*, greenish brown ; it is easily pulverized, and the powder, which is at first grey,

* **PECTORAL BALSAM OF LIQUORICE.** The proprietor of this nostrum gravely affirms that f3iss contains the virtues of a whole pound of Liquorice root ; but upon investigation it will be found to consist principally of Paregoric Elixir, very strongly impregnated with the Oil of Aniseed.

becomes green on exposure to air and light, which appears to depend upon the absorption of oxygen: when heated, it loses its colour; it melts by heat; and has a *sp. grav.* of 1.2289. **SOLUBILITY.** *Water* dissolves out of it about 9 per cent. of extractive matter; *alcohol* 95, and *æther* 40 parts in a hundred. The *alkaline* solutions and their *carbonates* dissolve it readily; *Sulphuric acid* dissolves it with scarcely any effervescence, and affords a solution of a rich claret colour; *Nitric acid* dissolves it with a copious extrication of nitrous fumes; *Muriatic acid* dissolves a small portion only; but in all these cases the guaiacum is decomposed; the acids are therefore incompatible with it. **CHEMICAL COMPOSITION.** The experiments of Mr. Hatchett demonstrate that it is a substance *sui generis*, and not a resin, or gum-resin. **MED. USES.** Stimulant, diaphoretic,* and in large doses, purgative. **FORMS OF EXHIBITION.** In that of bolus; or diffused in water, by means of one half of its own weight of gum arabic. **DOSE,** gr. x to ʒss. **OFFICINAL PREP:** *Mist: Guaiac: L. Tinct. Guaiac. L.E.D. Tinct. Guaiac. Ammoniat. L.E.D. Pulv. Aloes com. L.D. (C.M.)* **ADULTERATIONS.** *Common resin* may be detected by the turpentine emitted when the guaiac is thrown upon hot coals; *Manchinal gum*, by adding to the tincture a few drops of sweet spirit of nitre, and diluting with water; the guaiac is thus precipitated, but the adulteration floats in white striæ.

HÆMATOXYLI LIGNUM. L.E.D.

(Hæmatoxylon Campechianum). *Logwood.*

QUALITIES. The wood is hard, compact, and heavy. *Odour*, none: *Taste*, sweet, and astringent; *Colour*, deep red. **CHEMICAL COMPOSITION.** The colouring matter of this wood has been very recently submitted to a rigid examination; and the name of *Hematin* has been given to it; it affords small brilliant crystals of a reddish white colour, and slightly astringent, bitter, and acrid flavour; sulphuretted hydrogen passed through its solution in water, gives it a yellow colour, which disappears in a few days. Gelatine throws it down in reddish flakes. The habitudes of Logwood are curious with respect to mutability of colour. The recent infusion, made with distilled water, is yellow, but that with common water has a reddish purple colour, which is deepened by the alkalies, and changed to yellow by the acids; various salts precipitate it; *acetate of lead*; *alum*; the *sulphates of copper and iron*; *tartarized antimony*; and *sulphuric, muriatic, nitric, and acetic acids*, are on this account incompatible with it. **MED. USES.** It is supposed to be astringent, and is therefore given in protracted diarrhœas, and in the latter stage of dysentery. **OFFICINAL PREP.** *Extract. Hæmatoxyli. L.*

* **THE CHELSEA PENSIONER.** An empirical remedy for the rheumatism is well known under this name: it is said to be the prescription of a Chelsea Pensioner, by which Lord Amherst was cured; the following is its composition—Gum Guaiac ʒj Powdered Rhubarb ʒij—Cream of Tartar ʒj—Flowers of Sulphur ʒj—One Nutmeg finely powdered; made into an Electuary with one pound of Clarified Honey. Two large spoonfuls to be taken night and morning.

WALKER & WESSEL'S JESUIT DROPS. This is nothing more than the Elixir Anti-venereum of Quincey, consisting of Guaiacum, Balsam of Copaiba, and Oil of Sassafras, made into a Tincture by Spirit.

HATFIELD'S TINCTURE. Guaiac and Soap, equal parts, ʒij—Rectified Spirit oiss.

HILL'S ESSENCE OF BARDANA. Guaiac ʒj—Spirit fʒij.

HELLEBORI FÆTIDI FOLIA. L.

(Helleborus Fœtidus). HELLEBORASTER. D.

The Leaves of Fœtid Hellebore.

As this plant is merely retained in the list of materia medica on account of its anthelmintic properties, it might be well dispensed with, since we possess many others which are much more safe, as well as more efficacious.

HELLEBORI NIGRI RADIX. L.E.D.

*The Root of Black Hellebore. Melampodium.***Christmas Rose.*

QUALITIES.—The fibres of the root are the parts employed; they are about the thickness of a straw, corrugated, externally of a deep dark colour, hence the epithet *black*; internally white, or of a yellowish hue. *Odour*, unpleasant; *Taste*, bitter and acrid. **CHEMICAL COMPOSITION.** An analysis of this root has lately been effected by M. M. Feneulle and Capron, from which it appears that its active principle, unlike that of the white Hellebore (*Veratrum*) is not an alkali, the following substances enter into its composition, viz. 1. A Volatile Oil.—2. A Fatty matter.—3. A Resin.—4. Wax.—5. A Volatile Acid.—6. A bitter principle.—7. Mucus.—8. Alumina.—9. Gallate of Potass.—10. Acidulous Gallate of Lime.—11. A Salt, with an Ammoniacal base. **SOLUBILITY.** Both water and alcohol extract its virtues, but the spirituous solution is the most active; long coction diminishes its powers, hence the watery extract acts more mildly than the root. **MEDICINAL USES.** This is one of the most ancient articles of the materia medica. Ctesias, who lived in the time of Plato, and anterior to Hippocrates, speaks of it as a medicine of important virtues. By the Greek and Roman physicians it was highly esteemed as a remedy in Mania, (see page 8.) The extraordinary cures performed at the island of Anticyrus, famous for its Hellebore, are celebrated by the poets and historians of antiquity. It is a drastic cathartic, and may prove therefore emmenagogue, and hydragogue, but in this country, its reputation has been destroyed by the decided manner in which Dr. Cullen reprobated its use. **FORMS OF EXHIBITION.** It is seldom given in substance, but in the form of tincture or extract; or in that of decoction, made with two drachms of the root to a pint of water. Dose of the powdered root, grs. x to ℥j; of the decoction, f℥j. **OFFICIAL PREPARATIONS.** *Tinct. Hellebori Nigri. L.E.D. Extractum Hellebori Nigri. E. D.* **ADULTERATIONS.** The roots of the poisonous aconites are often fraudulently substituted; this is easily discovered, for the aconite is lighter coloured than the palest specimens of black hellebore; it is safe therefore to choose the darkest.

* **MATTHEW'S PILLS.**—**STARKEY'S PILLS.** Of the Roots of Black Hellebore, Liquorice, and Turmeric, equal parts, purified Opium, Castille Soap, and Syrup of Saffron, the same quantity, made into pills with Oil of Turpentine.

BACHER'S TONIC PILLS. These are composed of equal parts of the Extract of Hellebore, and Myrrh ℥j, with ℥iij of powdered Carduus Benedictus: which are made into a mass, and divided into pills, each weighing one grain; from two to six of which may be given three times every day, according to the effects they produce.

HORDEI SEMINA. L.E.D.

(Hordeum Distichon. *Semina, tunicis nudata.*)Hordeum Perlatum. *Pearl Barley.*

Barley is formed into *Pearl Barley* by the removal of its bark or cuticle,* and afterwards by being rounded and polished in a mill. These well known granules consist chiefly of fecula, with portions of mucilage, gluten, and sugar, which water extracts by decoction, but the solution soon passes into the acetous fermentation; the bran of barley contains an acrid resin, and it is to get rid of such an ingredient that it is deprived of its cuticle. OFFICIAL PREPARATIONS. *Decoct. Hordei*. L.E.D. *Decoct. Hordei comp.* L.D.

HUMULI STROBILI. L.E.

(Humulus Lupulus. *Stroboli Siccati.*)

QUALITIES. *Odour*, fragrant, and sub-narcotic. *Taste*, bitter, astringent, and aromatic. CHEMICAL COMPOSITION. Dr. A. W. Ives, of New-York, has shewn that the characteristic and valuable properties of the hop reside exclusively in a substance forming not more than one-sixth part of their weight, and which is easily separable from it by the mechanical processes of threshing and sifting. To this substance he has given the name of *Lupulin*. It is an impalpable yellow powder, peculiar to the female plant,† and is probably secreted by the Nectaria. From various experiments made upon it, Dr. Ives arrived at the conclusion that *Lupulin* contains a very subtile *Aroma*, which is yielded to water and to alcohol, and which is rapidly dissipated at a high temperature; but he could not discover by distillation that the *Hop* contained any essential oil. That the *Lupulin* moreover contains Gallic acid and Tannin; an extractive matter, which is soluble only in water, and a bitter principle, which is soluble in both‡ alcohol and water; and a Resin, in which the narcotic property of the hop exclusively resides. The following is the more accurate expression of its composition. Tannin, 5 grs.; Extractive, 10 grs.; Bitter principle, 11 grs.; Wax, 12 grs.; Resin, 36 grs.; Lignin, 46 grs. This fact, with respect to the residence of the properties of the hop in the yellow grains scattered over its scales, has been since confirmed by the observations of M. Payen and A. Chevalier, who have moreover detected a volatile oil in the *Lupulin*, amounting to 2 per cent; its proportion, however, appears to vary in the *Hop* of different countries; the French hop, for instance, has been found to contain more than the Belgic, but less than the English; Hops, moreover, soon after having been picked, yield, *cæteris paribus*, more oil and less resin than the old; a cir-

* Whence the decoctions of this substance have been termed *Ptisans*, from *πλίσσω* decortico, to peel.

† The common domestic Hop is invariably the female plant; that which bears the male flowers is not cultivated, and is called the wild hop. The researches of Dr. Ives shew the importance of this distinction.

‡ The chemist will not fail to observe this fact, as being similar to that which I noticed in the analysis of *Elaterium*, viz. the existence of a bitter principle quite distinct from, and independent of, Extractive matter; for in my experiments upon *Elaterium*, it will be seen, that the bitter principle was soluble in Alcohol of 817, whereas the extractive matter was soluble only in water.—See *Extract. Elaterii*.

cumstance which induced M. M. Payen and Chevalier to suspect that the oil is capable of being resinified. (*Journal de Pharmacie*, Juin 1822.) This oil is similar in odour to the hop, but much more penetrating, narcotic, and very acrid² in the throat. This oil appears to have escaped the notice of Dr. Ives, from the fact of its being very volatile, and, to a great extent, soluble in water.

SOLUBILITY. Boiling water, alcohol, and æther, extract their virtues ; but their aromatic flavour is destroyed by decoction ; like most vegetable bitters, the cold is more grateful than the warm infusion ; its colour is deepened by alkalies, and rendered turbid by the mineral acids ; metallic salts also produce decomposition. **MEDICINAL USES.** Hops have been said to be tonic, narcotic, and diuretic ; they have been recommended in the cure of rheumatism ; and, like many articles in the *materia medica* which have received the sanction of respectable practitioners, they have been extolled far beyond their merit. They undoubtedly possess the advantages of a pleasant bitter combined with a feeble narcotic ; the late Mr. Freake was very sanguine as to their powers, and at his request I made a series of experiments at the Westminster Hospital, but I confess that their results have not established my confidence in their efficacy. **OFFICINAL PREPARATIONS.** *Extract. Humuli. L. Tinct. Humuli. L.* Their use as a preservative of beer is well known, and the philosophy of their agency is fully described in the first part of this work, (*page 172*) ; it is equally notorious, that various vegetable substances are daily substituted for them, such as *Quassia** and *Wormwood*, both of which are inferior to the *Menyanthes Trifoliata*, or *Marsh Trefoil*. The people of Jersey are said to use the wood-sage, *Teucrium Scorodonia* ; it imparts however a very high colour to the beer. During the first four years that the Cape of Good Hope was in the possession of the British, more than 300,000 pounds of Aloes were imported into England ; how could such a quantity be consumed ; except, as Mr. Barrow states, by the London Porter Brewers ; it must however be allowed that a considerable quantity of this article is used by the Varnish makers.

HYDRARGYRUM.† L.D. HYDRARGYRUS. E.

Olim, Argentum vivum. *Mercury, or Quicksilver.*

Mercury, in its metallic state, is never applied to any medicinal use,† except in visceral obstruction, in hopes of forcing a passage by its gravity ; but under various forms of preparation, it affords a series of

* A Compound, consisting of Extract of Quassia and Liquorice, is used by fraudulent brewers to economise both malt and hops, and is technically called "MULTUM." An Extract of *Cocculus Indicus* is sold under the name of "BLACK EXTRACT," for imparting an intoxicating quality to the Beer.

† *Υδραργυρος* of the Greeks, from its fluidity and colour.

Quicksilver. Quick in the old Saxon tongue signifies living, an epithet derived from its mobility.

Mercury. Mythologists inform us that he was the winged messenger of the Gods, and the Patron of Thieves—What name therefore could be more appropriate for the metal in question than that of this Deity ? for it is not only distinguished from all other metals by its mobility, but its universal agency has rendered it the resource of those worst of Thieves—Quacks and Nostrummongers.

‡ There is indeed another purpose to which pure quicksilver has been applied that deserves notice. Its administration has been proposed in cases where silver coin has been swallowed, with a view of forming with it an amalgam that would speedily pass through the alimentary canal.

very active remedies. **ADULTERATIONS.** With the exception of Peruvian Bark, there is perhaps no active article in the materia medica more shamefully adulterated; its impurity is at once indicated by its dull aspect; by its tarnishing, and becoming covered with a grey film; by its diminished mobility, in consequence of which its globules are unable to retain the spherical form, and therefore *tail*, as it is technically expressed. *Lead* is discovered by dissolving it in nitric acid, and adding to the solution water impregnated with sulphuretted hydrogen, when if lead be present a dark brown precipitate will ensue. *Bismuth*, by pouring the nitric solution into distilled water, when it will appear as a white precipitate. *Zinc*, by exposing the mercury to heat. *Tin* is detected by a dilute solution of nitro-muriate of gold, which throws down a purple precipitate. The presence of lead in mercury is a most dangerous circumstance; I have once witnessed a case of *cholica pictonum* in consequence of it. The usual mode of purifying quicksilver, by pressing it through chamois leather, will not separate the lead, if it be, as is generally the case, in combination with bismuth; for the manner in which the adulteration is effected, is by melting with a gentle heat these two metals, and adding the alloy to the mercury; and although this alloy should exceed one-fourth of the whole bulk, it will pass, together with the mercury, through chamois leather. On standing, the bismuth will be thrown upon the surface, in the form of a dark powder, but the lead will remain in solution. The greatest part of the mercury of commerce comes from Istria and Friuli, and from the Palatinate, and as it passes through the hands of the Dutch, we must expect to receive it in a state of alloy. On a superficial examination, it ought not, when shaken with water, to impart to it any colour; when agitated or digested with vinegar, it should not communicate a sweetish taste; and when exposed in an iron spoon to heat, it ought to evaporate entirely. The French are so well aware of the mischievous extent to which this metal is falsified, that in their late Codex they direct the reduction of the *red oxyd* in order to obtain it; the process however is too expensive for general adoption. The Italian Jews purify quicksilver for their barometers, by digesting it in dilute sulphuric acid, which is by no means an improper process. The mode directed for the purification of mercury by the London College, (*Hydrargyrum Purificatum*) is unable to separate it *completely* from its more deleterious contaminations. It is a general opinion in Germany, that mercury, boiled in water, will impart to it an anthelmintic virtue;* this, if it happens, can only depend upon the impurities of the mercury; but large draughts of cold water are in themselves anthelmintic. Although metallic mercury in its fluid form exerts no effect upon the animal system, it nevertheless, in a state of vapour, manifests considerable powers; and it is necessary for the practitioner to be informed that it assumes this condition at the ordinary temperature of the atmosphere. I have stated several experiments in proof of this fact in my work on medical Jurisprudence, Art. "*Aerial Poisons*," to which the reader may refer.

* Foderé (Med. Leg. T. iii. p. 455) states that he has seen water, in which mercury has been boiled, become purgative and vermifuge; and yet the metal, in such cases, has not lost any of its weight.

HYDRARGYRUM PRÆCIPITATUM ALBUM. L.

SUBMURIAS HYDRARGYRI AMMONIATUM. D.

White Precipitate.

QUALITIES. *Form*, an impalpable powder of a snowy whiteness; *Odour and Taste*, none. **CHEMICAL COMPOSITION.** It is a triple compound of oxide of mercury 81, muriatic acid 16, ammonia 3 parts. **SOLUBILITY.** It is insoluble in water, and in alcohol; when triturated with lime-water it does not become black. It is now only used in combination with lard as an ointment; formerly it was administered internally, and Boerhaave strongly recommends it as a safe and mild mercurial, and as seldom, if ever, exciting copious salivation. **OFFICINAL PREP.** *Unguent. Hydrarg. præcipitati albi.* L.D.

HYDRARGYRUM CUM CRETA. L.D.

Mercury with Chalk.

This is mercury slightly oxydized by trituration, and mixed with chalk. Grs. iij contain about one grain of mercury. **DOSE**, grs. v. to 3ss. It is a mild and excellent mercurial, and has been known to cure syphilitic affections, when the constitution had proved rebellious to every other form of preparation. Dr. George Fordyce committed a great error, when he denied to this compound any mercurial efficacy. The peculiar mildness of this preparation has been very justly attributed to the effects of the carbonate of lime, in neutralizing acid matter in the primæ viæ. In Mesenteric affections I have employed it with much advantage; in certain forms of Dysentery it is also a very valuable medicine.

HYDRARGYRI NITRICO-OXYDUM. L.

OXYDUM HYDRARGYRI RUBRUM PER ACIDUM NITRICUM. E.

OXYDUM HYDRARGYRI NITRICUM. D.

Nitric Oxyd of Mercury—Red Precipitate.

QUALITIES. *Form*, small scales of a bright red colour; *Taste*, acrid, and corrosive. **CHEMICAL COMPOSITION.** It is strictly speaking a *sub-nitrate* of mercury, for if it be boiled for a short time with six times its weight of water, the liquor when filtered yields a precipitate with ammonia. **SOLUBILITY.** It is slightly soluble in water, but extensively in nitric acid, without any effervescence. **USES.** It is used only externally, as an escharotic. **OFFICINAL PREP.** *Unguent. Hydrargyri Nitrico-oxyd.* L.E.D. **ADULTERATIONS.** *Red Lead* may be detected by digesting it in acetic acid, and adding sulphuret of ammonia, which will produce a dark-coloured precipitate: it should be totally volatilized by heat.

HYDRARGYRI OXYDUM CINEREUM. L.E.

PULVIS HYDRARGYRI CINEREUS. D.

Grey Oxyd of Mercury.

QUALITIES. *Form*, an impalpable grey coloured powder, which becomes paler on exposure to air and light. *Odour and taste*, none. **CHEM. COMPOSITION.** When properly prepared it is protoxide of mercury; but, as frequently found in the shops, it contains a mixture of the triple salt consisting of oxide of mercury, ammonia, and nitric acid. It

is rarely used ; although Dr. Saunders suggested it as a succedaneum for Plenck's remedy, and Mr. Abernethy considers it preferable to the red Sulphuret for mercurial fumigation, on account of its not yielding any suffocating vapour. OFFICINAL PREP. *Unguent. Hydrarg. ciner. E.*

HYDRARGYRI OXYDUM RUBRUM. L.

OXYDUM HYDRARGYRI. D.

Red Oxyd of Mercury.

The Precipitate per se of the older Chemists.

QUALITIES. *Form*, minute crystalline scales, of a deep red colour, inodorous, but acrid and caustic ; it is soluble in several of the acids without decomposition ; it is also slightly soluble in water ; from which solution it is precipitated by ammonia. USES. It is very active as a mercurial, and has been a favourite remedy with John Hunter (*Form. 141*) and other celebrated practitioners ; it is however apt to affect the stomach and bowels, and is therefore now rarely employed except as an external application. DOSE, gr. j. combined with opium gss. ADULTERATIONS. It is seldom adulterated as it would be difficult to find a substance suited to that purpose. If well prepared it may be totally volatilized by heat.

HYDRARGYRI OXY-MURIAS. L.

MURIAS HYDRARGYRI CORROSIVUS. E.D.

Oxy-muriate of Mercury.

Corrosive Muriate of Mercury. Corrosive Sublimate.

QUALITIES. *Form*, a crystalline mass, composed of very small prismatic crystals, which is easily pulverized, and undergoes a slight alteration by exposure to air, becoming on its surface opaque and pulverulent. Light, however, has no effect upon it, although a different opinion has existed, and it has accordingly been recommended to be kept in black bottles. *Odour*, none. *Taste*, very acrid, with a metallic astringency, occasioning a sensation of obstruction in the throat which continues for some time. *Sp. gr.* 5.1398. When pulverized and thrown upon burning coals, it is immediately volatilized giving out a thick white smoke of a very pungent smell, which irritates the mucous membranes extremely, and is highly dangerous to those who inhale it. CHEMICAL COMPOSITION. According to the latest views it is a *Bi-chloride* of mercury, consisting of one proportional of mercury, to two proportionals of chlorine. In the French codex, it is termed "*Deuto-Chloruretum Hydrargyri.*" SOLUBILITY. It is soluble in eleven parts of cold, and in three of boiling water, and in half its weight of alcohol ; it is very soluble in æther ; indeed this latter liquid has the curious property of abstracting it from its solution in water, when agitated with it. Its solubility in water is greatly increased by the addition of a few drops of rectified spirit, or of muria-

tic acid. In a solution of muriate of ammonia it is seventeen times more soluble than in water, no decomposition, however, arises; it is therefore probable that a triple salt is formed: it is also soluble in the sulphuric, nitric and muriatic acids, and may be obtained again unaltered, by simply evaporating the solutions. Dr. Davy in his late researches upon corrosive sublimate states that with muriatic acid, common salt, and some other muriates, it forms definite compounds remarkable for their solubility. Its watery solution is said to change vegetable blues to green, but this is an optical fallacy. On exposure to light this solution slowly undergoes decomposition; but Dr. Davy has shewn that corrosive sublimate remains unaltered when exposed in solution in media having a strong affinity for it, as in alcohol, æther, muriatic acid, &c. and that decomposition only takes place under circumstances of complicated affinities, as in the instance of *Liquor Hydrargyri Oxymuriatis*, and in that of the aqueous solution; in which cases Calomel and Muriatic acid appear to be formed, and oxygen to be evolved. **INCOMPATIBLE SUBSTANCES.** The carbonates of the fixed alkalies precipitate it of a yellow hue, but the precipitates are not pure oxides; ammonia forms with it a white triple compound. Lime water decomposes it more perfectly than any alkaline body, occasioning a precipitate of a deep yellow colour,* which is a peroxyd of mercury containing a little muriatic acid; this result forms an useful lotion to ill conditioned ulcers, and has been long known under the title of *Aqua Phagadenica*: f3j of lime water should be employed for the decomposition of two grains of the salt. Tartarized antimony, nitrate of silver, acetate of lead, sulphur, sulphuret of potass, and soaps, decompose it. Iron, lead, copper, bismuth, and zinc, in their metallic state, also decompose it, producing precipitates which consist of an amalgam of the metal employed, except in those cases where the metal in question refuses to amalgamate with mercury, when this latter metal appears as a metallic dew, composed of very minute globules, with calomel; hence mortars of glass or earthenware should be used for dispensing this article; when triturated with olive oil, the oil becomes white, and when boiled with it, calomel is precipitated; the same happens, if sugar be substituted for the oil. The volatile oils reduce it. When Oil of Turpentine was used, some traces of artificial camphor was discovered by Dr. Davy, and when the oils of Cloves and Peppermint, a purple compound distilled over, consisting of the oil employed and muriatic acid. The following vegetable infusions produce precipitates, viz. the infusions and decoctions of chamomile, horseradish root, columba root, catechu, cinchona, rhubarb, senna, sinarouba, oak bark, tea and almond emulsion. Swediaur observes, that "many authors have recommended sublimate combined with bark, but that a reciprocal decomposition is thus produced by which the energies of both remedies are alike annulled;" to this ignorance, however, he thinks that many patients have been indebted for their lives; for, says he, "I see every day examples of weak and very delicate persons, of both sexes, to whom ignorant practitioners prescribe, and sometimes in very large doses, the corrosive sublimate, with a decoction of bark; certainly without cur-

* If the quantity of Lime water be small, the precipitate will assume a red colour, and will be found to be a Submuriate of the peroxide.

ing the syphilis, but at the same time without occasioning those grave and dangerous symptoms, which that acrid medicine would certainly produce, if given alone, or without that decoction." We have here presented the reader with the opinion of Swediaur, but it is just to state that the experience of this country has rather tended to subvert, than to confirm, such a belief. That the corrosive sublimate of mercury is actually decomposed by the vegetable principles of the bark is sufficiently evident, but it would seem that the oxide thus developed and recombined with vegetable extractive, is a very active mercurial, especially with respect to its alterative powers. The same observation will, to a certain extent, apply to the results of its decomposition by other agents: the fixed alkalies have been found by actual experiment to be incapable of disarming this salt of its virulence, because, as Orfila has stated, the oxide liberated is, in itself, an active poison. Mr. Rose has lately transmitted to me a formula for the preparation of "*Alterative Drops*," which he states, from ample experience to possess very considerable powers as a mercurial, and to excite ptyalism, with a quickness and certainty which characterize but few preparations of the same class. The principal ingredients are an alcoholic solution of *corrosive sublimate*, and a vinous solution of *tartarized antimony*. It is scarcely necessary to observe that upon admixture a mutual decomposition takes place; the *peroxide of mercury* is precipitated by the alkaline element of the antimonial compound, whilst this latter salt, having its affinities thus overthrown, parts with the *protoxide of antimony*; so that the preparation holds a considerable quantity of insoluble matter in suspension, and which is to be carefully incorporated with the liquid by shaking the phial, whenever the drops are administered. Now there can be but little doubt but that the activity of this preparation is owing to the *peroxide of mercury*, thus diffused in a state of minute division, while at the same time the antimonial protoxide very probably disposes the stomach and system to be more readily influenced by it, for reasons which have been fully discussed in page 156 of this work. **MED. USES.** It is one of the most acrid and active of all metallic preparations; in well directed doses, however, it is frequently of service in secondary syphilis, and in cases of anomalous disease, when it would be improper to administer the other forms of mercury.* In obstinate cutaneous diseases its administration in

* As this salt has been supposed to arrest the progress of syphilis more rapidly, and at the same time, to excite the salivary glands less than any other preparation of mercury, it generally forms the basis of those dangerous nostrums, which are advertised for the cure of Syphilis without Mercury. The contrivers hope also to elude detection by the density and colour of the preparation.

GOWLAND'S LOTION. Is a solution of sublimate in an emulsion formed of bitter almonds, in the proportion of about gr. jss to f3j. A solution of this mercurial salt in Spirit of Rosemary, is also sold as an empirical cosmetic.

NORTON'S DROPS. A disguised solution of corrosive sublimate.

WARD'S WHITE DROPS. This once esteemed Anti-Scorbutic was prepared by dissolving mercury in nitric acid, and adding a solution of carbonate of ammonia; or frequently it consisted of a solution of sublimate with carbonate of ammonia.

SPILSBURY'S ANTISCORBUTIC DROPS. Of Corrosive Sublimate 3ij, Prepared Sulphuret of Antimony 3j, Gentian root and Orange peel, equal parts 3ij, Shavings of Red Saunders, 3j, made with a pint of proof spirit into a tincture, which is to be digested and strained.

small doses is often very serviceable ; I have, however, seen extreme emaciation and hectic fever produced by its too long continued exhibition, although ptyalism was never occasioned. Its application also as a lotion to leprous affections, in the proportion of about one grain to a fluid-ounce and a half of some liquid vehicle, I have frequently seen highly beneficial ; in directing the use of so acrid a lotion, we should caution the patient not to touch his eyes until his hands have been washed ; in consequence of a neglect of this kind I have seen a very severe ophthalmia produced. The practitioner should also remember that the system may become affected by such external applications ; a case stands recorded in which a girl of five years old became salivated, and died, in consequence of an application made to the head for the cure of *Tinea*, which consisted of Pomatum rubbed up with a few grains of this salt. Its internal exhibition should be accompanied with mucilaginous drinks ; when an overdose has been taken, the *white* of egg, diluted with water, is the best antidote, for Orfila has found that albumen decomposes it, reducing it to the state of mild muriate, whilst the compound which it forms with it is inert. Many examples are recorded of the success of this practice.

"THE ANTIVENEREAL DROPS," so famous at Amsterdam, were analysed by Scheele, who found that they were composed of muriate of iron, with a small proportion of corrosive sublimate.

MARSDEN'S ANTISCORBUTIC DROPS. A solution of sublimate in an infusion of Gentian.

GREEN'S Drops. The basis of these also is sublimate.

SOLOMON'S ANTI-IMPETIGINES. A solution of sublimate.

ROB ANTI-SYPHILITIQUE, par M. Laffeteur, Medicin Chemiste. This popular nostrum of the French contains as a principal ingredient, corrosive sublimate. A strong decoction of the *Arundo Phragmitis* (the bull rush) is made, with the addition of sarsaparilla and aniseeds towards the end, which is evaporated, and made into a rob, or syrup, to which the sublimate is added.

SIROP DE CUISINIERE. This consists of decoctions of sarsaparilla, burrage flowers, white roses, senna, and aniseed, to which sublimate is added, and the whole is then made into a syrup with sugar and honey.

TERRE FEUILLETEE MERCURIELLE of Pressavin. This is Tartarized Mercury, for it is made by boiling the oxyd of mercury (obtained by precipitating it from a nitric solution, by potass) with cream of tartar.

VELNO'S VEGETABLE SYRUP. There has been a great obscurity with respect to the genuine composition of this nostrum ; it has generally been supposed to consist of sublimate rubbed up with honey and mucilage. I have lately received from my friend Mr. Brodie a formula, by which a medicine perfectly analogous in its sensible characters, and medicinal properties, to the Syrup in question, may be prepared ; and I am assured that, wherever it has been tried, its effects are in every respect similar to those produced by the original nostrum. Take of Burdock root (young and fresh) sliced, \mathfrak{z} ij : Dandelion root \mathfrak{z} i ; Spear Mint (fresh) \mathfrak{z} j ; Senna Leaves, Coriander Seeds (bruised), Liquorice Root (fresh) of each \mathfrak{z} iss ; Water oiss ; boil gently until reduced to oj ; then strain, and, when cold, add lb of lump sugar, and boil it to the consistence of a syrup, and add a small proportion of the solution of Oxymuriate of Mercury. Swediaur says that volatile alkali enters into this nostrum as an ingredient ; this alkali was proposed by Dr. Peyrile, as a substitute for mercury, and it constitutes the active ingredient of the following composition, which was proposed by Mr. Besnard, Physician to the King of Bavaria.

TINCTURA ANTISYPHILLITICA. Sub-carb. potass, lbj. dissolved in Aq. Cinnam. oj. Opii puri, \mathfrak{z} ij. dissolved in Spir. cinnamom. \mathfrak{f} ℥iv. mix these separate solutions, and put them on a water-bath for three weeks, taking care to shake the vessel frequently ; to this add Gum arabic \mathfrak{z} ij, Carb. Ammoniae \mathfrak{z} j, dissolve in Aq. Cinnamomi ; mix, filter, and keep for use. Dose, twenty-four drops three times a day, in a glass of the cold decoction of Marsh Mallow root.

The external use of these drops is also advised for local syphilitical complaints !

In the Transactions of the King and Queen's College of Physicians in Ireland, an interesting case of this kind is related by Dr. Lendrick ; it is, however, at the same time but justice to state, that there are instances also of the failure of this antidote. In the 41st volume of the *London Medical and Physical Journal*, p. 204, the reader will find the case of a girl, who was poisoned by a drachm of Sublimate, and who, notwithstanding the copious ingestion of albumen, died in ninety hours. More recently vegetable gluten, as existing in wheat-flower, is said to answer as well as albumen ; for the administration of which all that is required is to give wheat flower and water. Dose, gr. $\frac{1}{8}$ to $\frac{1}{2}$, see *Liquor Hydrargyri Oxy-muriatis*, and *Form.* 142. ADULTERATIONS. It ought to be volatilized by heat ; it is frequently met with in commerce contaminated with muriate of iron, sometimes with arsenic ; the presence of calomel is at once discovered from its insolubility. TESTS OF ITS PRESENCE. If any powder be suspected to contain this salt, expose it to heat in a coated tube, as directed in the treatment of arsenic, but without any carbonaceous admixture, when corrosive sublimate, if present, will rise and line the interior surface with a shining white crust. This crust is then to be dissolved in distilled water, and assayed by the following tests ; 1st, *lime water* will produce, if the suspected solution contains this salt, a precipitate of an orange yellow colour. 2d, a single drop of a dilute solution of *sub-carbonate of potass* will at first produce a white precipitate, but on a still farther addition of the test, an orange-coloured sediment will be formed. 3rd, *sulphuretted water* will throw down a dark coloured precipitate, which when dried and strongly heated may be volatilized without any alliaceous odour. 4th, *ammonia* produces a white precipitate, which is an insoluble triple salt, composed of muriatic acid, ammonia, and oxide of mercury, which on being heated grows yellow ; it passes afterwards to a red, and gives out ammoniacal gas, nitrogen, calomel, and metallic mercury. In this operation the oxide is supposed to be decomposed by the hydrogen which results from a portion of the ammonia. 5th, *Nitrate of tin*, according to Dr. Bostock is capable of detecting the three-millionth part of a grain ; a single drop will occasion an immediate and copious dark-brown precipitate. All the above precipitates, if rubbed on a bright plate of copper, will render its surface silvery white. Where the salt is mixed with various coloured liquids, we must proceed, as directed under the head of Arsenic. A very ingenious application of galvanic electricity has been also proposed by Mr. Silvester, for the detection of *corrosive sublimate*, which will exhibit the mercury in a metallic state. A piece of zinc or iron wire about three inches in length, is to be twice bent at right angles, so as to resemble the Greek letter II, the two legs of this figure should be distant about the diameter of a common gold wedding ring from each other, and the two ends of the bent wire must afterwards be tied to a ring of this description. Let a plate of glass, not less than three inches square, be laid as nearly horizontal as possible, and on one side drop some sulphuric acid, diluted with about six times its weight of water, till it spreads to the size of a halfpenny. At a little distance from this, towards the other side, next drop some of the solution supposed to contain corrosive sublimate, till the edges of the two liquids become joined ; and let the wire and ring, prepared as above, be laid in such a way that the wire may touch the acid, while the gold ring is in contact with the suspected liquid. If the minutest quantity of corrosive

sublimate be present, the ring in a few minutes will be covered with mercury on the part which touched the fluid. This experiment may be beautifully simplified in the following manner: drop a small quantity of solution containing corrosive sublimate on a piece of gold, and bring in contact a key, or some piece of iron, so as to form a galvanic circuit, when the gold will be immediately whitened. A solution of nitrate of silver will, under similar circumstances, occasion on the gold a white precipitate, but as no amalgamation takes place, it is readily wiped off, and cannot possibly occasion any fallacy.*

Certain metals likewise decompose solutions of this salt, by virtue of superior affinity; in those cases where the precipitating metal is capable of forming a direct union with Mercury, we shall find the precipitates to consist of an amalgam of the metal employed; where no such combination takes place, the mercury will be frequently seen standing on the surface as a metallic dew. This is particularly striking where iron or steel has been employed; these metals are also at the same time blackened by it.

Brugnatelli† has proposed the following method of distinguishing *corrosive sublimate* from *arsenic*.—Take a quantity of fresh wheat starch, mix with water, and add a sufficient quantity of *iodine* to give the liquid a blue colour; if *corrosive sublimate* or *arsenic* be added to this liquor, the colour is alike destroyed and it becomes reddish, but if the change has been effected by the latter substance, a few drops of sulphuric acid will restore the blue colour, but if by the former, it is not recoverable by such means.‡

HYDRARGYRI SUB-MURIAS, L.

SUB-MURIAS HYDRARGYRI SUBLIMATUM. D.

SUB-MURIAS HYDRARGYRI MITIS. E.

vulgo. *Calomel*.§

This preparation has been known in pharmacy for upwards of two centuries under a variety of fanciful names, such as *Draco mitigatus*; *Aquila alba*; *Aquila mitigata*; *Menna metallorum*; *Panchymagogum minerale*; *Panchymagogus quercetanus*; *Sublimatum dulce*; *Mercurius dulcis sublimatus*; *Calomelas*; and yet there is not a name in this list that is so objectionable as the one at present adopted by our colleges; for whether we adhere to the theory of muriatic acid being the *simple* body, or accede to the new views of *chlorine*, the name is equally inappropriate; if we regard it as a compound of muriatic acid and oxyd of mercury, it is not a *sub-muriate*, but as much a *muriate* as the corrosive sublimate; the only difference depending upon the degree of oxidizement of the mercury, which is at a *minimum* in calomel, and at a *maximum* in sublimate. According to the new views respecting chlorine, calomel must

* By this simple and beautiful test, the late Mr. Archdeacon Wollaston identified the presence of Sublimate in the yeast dumplings by which Michael Whiting was poisoned at Ely; a case which I have recorded in my work on Medical Jurisprudence, Vol. II. p. 265.

† Ann. de Chimie et phys. iv. 334.

‡ For a more elaborate account of the various tests of corrosive sublimate, see Beck's Medical Jurisprudence, Vol. II. p. 267. Ed.

§ For the origin of the term Calomel, see note at page 40.

consist of one proportional of chlorine with one proportional of metal, and is therefore a *chloride of mercury*. ("Proto-chloruretum Hydrargyri." Codex Med. Paris.)

QUALITIES. *Form.* A semi-transparent mass, consisting of short prismatic crystals;* inodorous, insipid, and of an ivory colour, which deepens by exposure to light. **SOLUBILITY.** It is considered as being insoluble, since, according to Rouelle, one part requires 1152 of water, at 212° for its solution. **INCOMPATIBLE SUBSTANCES.** *Alkalies* and *lime water* decompose it and turn it black, in consequence of precipitating the black oxyd of the metal; it is also decomposed by *soaps*, *sulphurets of potass*, and *antimony*; and by *iron*, *lead*, and *copper*; hence it is improper to employ any metallic mortar for dispensing medicines which contain it. There seems to be reason for supposing that this preparation may undergo decomposition *in transitu*, and that therefore some substances may be *chemically*, and yet not be *medicinally* incompatible with it. If calomel be boiled for a few minutes in distilled water to which alcoholized potass has been added, it is completely decomposed, a *muriate of potass* and *black oxyd of mercury* being new products. Calomel is not affected by sulphuric acid in the cold, but at a boiling temperature, corrosive sublimate and deuto-sulphate of mercury are formed. **MEDICINAL USES.**† This mercurial preparation is more extensively and more usefully employed than almost any other article of the materia medica. It is capable of curing syphilis in every form, provided it does not run off by the bowels; and in obstructions and hepatic affections, it is in well-regulated doses a most valuable remedy; in combination, it probably merits the appellation of *Dirigens*, more decidedly than any other remedy with which we are acquainted, for when combined with certain diuretics, it is diuretic, (*Form.* 103, 104) and in diaphoretic arrangements, it is diaphoretic: it moreover imparts force to many of the mild, and moderates the severity of drastic medicines: whenever we wish a strong and permanent impression to be made on the alimentary canal, and through it on the neighbouring viscera or the system generally, Calomel by universal consent is adopted for such a purpose. (*Form.* 81, 88, 119, 151). In larger doses it is one of the most efficient purgatives which we possess, especially when in combination with other cathartics: it appears to be particularly eligible in the

* Mr. William Phillips has favoured me with a model of this crystal cut in wood; it is a rectangular prism whose solid angles are deeply replaced by planes.

† Many of the nostrums advertised for the cure of worms, contain Calomel as their principal ingredient, combined with scammony, jalap, gamboge, or some other purgative; they are uncertain and dangerous medicines; the method of exhibiting them in the form of lozenges (worm cakes), is also attended with inconvenience, for the sugar and the gum generating an acid, by being kept in damp places, may considerably increase the acrimony of the mercury; besides which, the calomel is frequently diffused very unequally through the mass, one lozenge may therefore contain a poisonous dose, whilst others may scarcely possess any active matter.

CHING'S WORM LOZENGES. These consist of yellow and brown lozenges, the former are directed to be taken in the evening, the latter the succeeding morning.

THE YELLOW LOZENGES. Take of Saffron ʒss, of water oj, boil, and strain; and of White Panacea of Mercury (Calomel washed in spirit of wine) lbj, white sugar, 28lb. mucilage of Tragacanth as much as may be sufficient to make a mass, which roll out of an exact thickness, so that each lozenge may contain one grain of Panacea.

THE BROWN LOZENGES. Panacea ʒviij, resin of jalap, lb iiijss, white sugar lb ix, mucilage of tragacanth q. s. each lozenge should contain gr. ½ of panacea.

STORY'S WORM CAKES. Calomel and jalap made into cakes and coloured with cinnabar.

diseases of children; and it is singular that infants can generally bear larger doses of it than adults. **DOSE**, as an alterative, from gr. ss to j, night and morning; as a purgative from gr. ij to gr. x. or in some cases even to gr. xv, or ʒj. **FORMS OF EXHIBITION.** That of pill; its insolubility and specific gravity render any other form ineligible. **OFFICINAL PREPARATIONS.** *Pil. Hydrargyri submuriat. comp*: L. **IMPURITIES.** *Corrosive sublimate* may be detected by precipitation being produced, by the carbonate of potass, in a solution made by boiling the suspected sample with a small portion of muriate of ammonia, in distilled water; calomel ought also, when rubbed with a fixed alkali, to become intensely black, and not to exhibit any trace of an orange hue.

HOWARD'S OR JEWEL'S Hydro-sublimate. Instead of subliming so as to obtain the calomel in a concrete state, as directed by the Pharmacopœia, the salt in the act of sublimation is exposed to aqueous vapour, and received in water. Being in a state of very minute division, it is lighter than common calomel in the proportion of three to five, and it cannot contain any corrosive sublimate. The French in their late *codex* have introduced a similar formula, under the title of "*Murias Mercurii dulcis mediante aqua subtilissime divisus, juxta Methodum Josiæ Jewel.*"

This *Patent Calomel* of Howard is undoubtedly to be preferred, and appears, in consequence probably of its minute division, to affect the system more readily than that made according to the Pharmacopœias.

SUB-MURIAS HYDRARGYRI PRÆCIPITATUS. E. D. This is produced by precipitating a nitrate of mercury by muriate of soda; the preparation will generally contain a small portion of *sub-nitrate*, and it is on that account more liable to run off by the bowels in small doses: in other respects it is essentially the same as that procured by sublimation.

HYDRARGYRI SULPHURETUM RUBRUM. L.

SULPHURETUM HYDRARGYRI RUBRUM. D. Olim, *Hydrargyrus Sulphuretus ruber. P.L. 1817—Cinnabaris* factitia, 1745.*

QUALITIES. *Form*, a red crystalline cake, inodorous, insipid, and insoluble in water, alcohol, acids, and alkalies, although these last bodies decompose it when melted with it; it is also decomposed by nitro-muriatic acid, which unites with the metal, and disengages the sulphur. **CHEMICAL COMPOSITION.** It is a *bi-sulphuret of Mercury*, i. e. it consists of two proportionals of sulphur and one of mercury. **USES.*** It is

* For the origin of this term see page 40.

† **CHAMBERLAIN'S RESTORATIVE PILLS.** "The most certain cure for the Scrofula, or King's Evil, Fistula, Scurvy, and all Impurities of the Blood."

My attention has been particularly directed to these pills, in consequence of having lately seen, during the course of my professional duty, several highly respectable persons, who had been induced to make trial of their efficacy. Their inventor, if I am rightly informed, resides at Ipswich, where, for the benefit of suffering humanity, he prepares these wonderful pills, and, with the alacrity of his patron deity, Mercury, transmits them to every corner of the United Kingdom. It appears from the printed directions which accompany the "*Restorative Pills*," that their use must be continued for a long period; but upon this occasion we must allow the Doctor to speak for himself. "It may be necessary to observe, that in some cases of Scrofula, especially when the seat of the disease is in the feet, ancles, or hands, it may take a long time to effect a cure, even two years, and it may be twelve or sixteen months, with seeming little or no improvement, yet the cure is certain by perseverance." What—two years! and to be taken during a period of sixteen months without any sensible benefit! Is it possible that persons can be found with sufficient credulity and

now only used for the purpose of mercurial fumigation, which is done by inhaling the fumes, produced by throwing 3ss of it on red hot iron; the effect which is generally produced is violent salivation; this however does not depend upon the action of the substance as a *sulphuret*, but upon its decomposition, and the volatilization of the metallic mercury with a portion of sulphate and sulphureous vapour. Mr. Pearson observes that it is useful in those cases of venereal ulcers in the mouth, throat, and nose, where it is an object to put a *sudden* stop to the progress of the disease, but that mercury must at the same time be introduced into the constitution, by inunction, just as much as if no fumigations had been made use of. Ulcers and excrescences about the pudendum and anus in women are particularly benefitted by it; and in these cases it is conveniently applied by placing a red hot heater at the bottom of a night-stool pan, and after sprinkling on it a few grains of the sulphuret, placing the patient upon the stool. ADULTERATIONS. *Red Lead** may be discovered by digesting it in acetic acid, and by adding sulphuret of ammonia, which will produce a black precipitate; or by burning a small portion of the suspected sample on a piece of bread in the candle, when metallic globules will announce its presence; for the oxide of mercury, although revived by this process, will at the same time be volatilized. The bread, by combustion, affords the carbon by which the metallic reduction is effected. *Dragon's Blood*, by its giving a colour to alcohol when digested with it; *Chalk*, by its effervescence, on the addition of an acid. It is known in the arts under the name of *Vermillion*; and by the following simple expedient its presence may, in very minute quantities, be easily recognized; boil a portion with sulphuric acid in a platina spoon, and lay the sulphate thus produced, in a drop of muriatic acid, on a piece of gold, and bring a piece of metallic tin in contact with both, when the white mercurial stain will be produced.

resolution to submit to so preposterous a proposal? we have no doubt that Mr. Chamberlain can produce as great a proportion of cures *after* such an ordeal, as was adduced in former times, in proof of the efficacy of the Royal Touch, and for the same obvious reason. (See page 16.)

Upon examining these said pills, I find them to consist of Cinnabar, Sulphur, Sulphate of Lime, and a little vegetable matter, perhaps gum. Each pill weighs a fraction less than three grains; upon dividing one with a penknife, and examining the cut surface through a lens, it exhibited the appearance of scoræ of a brick red colour, having small yellowish masses imbedded in its substance. When exposed on a piece of platinum foil to the action of the blow-pipe, it yielded vapours of a strong sulphureous smell, and left a residuum of a pearly white matter, which consisted almost entirely of Sulphate of Lime. Upon submitting a portion of the pill, in a glass tube, to the heat of a spirit lamp, two distinct sublimates were produced, the first consisting of Sulphur, the second of Cinnabar; and a small carbonaceous deposit remained. The Pill was then assayed, *via humida*; distilled water dissolved the Sulphate of lime, which was identified by appropriate tests, and left sulphur and cinnabar on the filtre. By the above experiments I feel warranted in considering the composition of this pill as fully ascertained.

BOERHAAVE'S RED PILL. The basis of this nostrum is Cinnabar.

* The anatomist employs it for giving colour to his injections; for this purpose it is very essential that it should be quite free from red lead, or his preparations will in a short time lose their splendour, and ultimately become black. This has unfortunately happened with some preparations which Dr. Baillie presented to the College of Physicians. Mr. Accum, in his work entitled "Death in the Pot," states a case of poisoning from cheese which had been coloured with adulterated Vermillion. I am ready to admit, however, that the source of this information is of very doubtful authority; never did a work appear which so little merited the attention it received; even the title, which seemed to have some claim to originality, was borrowed from a work by Mouchart, called "Mors in Olla."

HYDRARGYRI SULPHURETUM NIGRUM. L.E.

Hydrargyrus cum Sulphure. P.L. 1787. Olim, *Ethiops Mineral*.

QUALITIES. *Form*, a very black, impalpable, insipid, and inodorous powder. **CHEMICAL COMPOSITION.** It is a *Sulphuret of Mercury*, i. e. it consists of one proportional of sulphur, and one proportional of mercury; when heated in contact with the air it is converted into a *bi-sulphuret*. **SOLUBILITY.** It is entirely soluble in a solution of pure potass, from which the acids precipitate it unchanged; it is insoluble in nitric acid. **MED. USES.** It is supposed to be alterative, and has been given for such a purpose in doses from gr. v to 3ss, but its medicinal virtues are very questionable. **ADULTERATIONS.** It is frequently imperfect, globules of mercury being still discoverable in it by a magnifying glass, or by its communicating a whiteness to a portion of gold upon which it is rubbed; *ivory black* may be discovered by the residue, after throwing a suspected sample on a red hot iron; it is also sometimes mixed with equal parts of crude antimony.

HYOSCYAMI FOLIA ET SEMINA. L.E.D.

(*Hyoscyamus Niger*.) *Henbane*.

QUALITIES. This plant, when recent, has a strong fetid, and narcotic odour; properties which are nearly lost by exsiccation. **CHEMICAL COMPOSITION.** Resin, mucilage, extractive matter, gallic acid, and some salts; an alkaline element (*Hyoscyama*) is said to constitute its active principle. This principle differs from the other vegetable alkalies, in being able to resist a low red heat, without undergoing decomposition. **SOLUBILITY.** Water freely extracts the narcotic powers of this plant, and decoction destroys them; diluted alcohol is the best menstruum. **INCOMPATIBLES.** Precipitates are produced by *acetate of lead*, *nitrate of silver*, and *sulphate of iron*; vegetable acids weaken its narcotic powers. The extract or inspissated juice is the best form in which it can be exhibited; see also the *Tincture*; its leaves form an anodyne cataplasm, and the smoke from its seeds, when applied by a funnel to a carious tooth, is recommended in severe fits of odontalgia. The root of this plant is poisonous.* In Dr. Molyneux's appendix to Threlkeld's "SYNOPSIS STIRPIUM HIBERNICARUM" are related several cases of its effects on persons who had eaten them instead of *Skirrets*. **OFFICIAL PREP.** *Extract: Hyoscyam: Tinct: Hyoscyam: L.E.D.*

ICHTHYOCOLLA.

(*Acipenser Huso & Ruthenus*. The great and small Sturgeon.)

Isinglass. Fish Glue.

The following kinds, imported from St. Petersburg, are found in the market. *Short Staple; Long Staple; Book; and Leaf. Picking the Sta-*

* **ANODYNE NECKLACES.** The roots of *Hyoscyamus* are commonly strung in the form of beads, and sold under this name, to tie round the necks of children, to facilitate the growth of their teeth, and allay the irritation of teething. The application of medicated necklaces is a very ancient superstition. (See page 13.) Such remedies were sometimes called *Periapts*, *περιαπτόν*.

ple, as it is called, is a peculiar art practised by persons in this town, who gain a very good livelihood by it; they engage to return the same weight of isinglass in shreds, as they receive in *Staple*; this in itself secures very fair profit, for by damping the isinglass in order to pick it, it gains considerable weight; these persons moreover are in the habit of adulterating it with pieces of bladder, and the dried skin of soles; such frauds, however, are easily detected by their insolubility, for pure isinglass will dissolve entirely, and yield a clear and transparent jelly; a single grain will produce, with an ounce of water, a solution of considerable thickness; it is also soluble in acids and alkalies; and although insoluble in alcohol, yet it is not precipitated by it from its watery solutions, unless when in a very considerable quantity; it is coagulated by the infusions and decoctions of vegetable astringents; *carbonate of potass* likewise throws down a precipitate. 100 parts of good isinglass consist of 98 of gelatine, and 2 of the phosphates of soda and lime. Its solutions soon putrefy. **USES.** It is now rarely used except as a nutrient; its mechanical application in fining wines and turbid liquors is well known, and its mode of operation is equally obvious, for by forming a skin, or fine network, which gradually precipitates, it acts just like a filtre, with this difference, that in this case the filtre passes through the liquor, instead of the liquor through the filtre.

INFUSA. L.E.D. *Infusion.*

These are *watery* solutions of vegetable matter, obtained by maceration, either in cold or hot* water without the assistance of ebullition. In selecting and conducting the operation, the following general rules should be observed:

- I. *Infusion should always be preferred to decoction, where the medicinal virtues of the vegetable substance reside in volatile oil, or in principles which are easily soluble; whereas, if they depend upon resinomucilaginous particles, decoction is an indispensable operation.*
- II. *The temperature employed must be varied according to the circumstances of each case;† an infusion made in the cold, is in general more grateful, but less active, than one made with heat.*
- III. *The duration of the process must likewise be regulated by the nature of the substances, or the intention of the prescriber; for the infusion will differ according to the time in which the water has been digested on the materials; thus, the aroma of the plant is first taken up, then, in succession, the colouring, astringent, and gummy parts.*

Infusions are liable to undergo decompositions by being kept, and

* In many cases it is essential that the water should be at the boiling point, a few degrees even less than this will often prove a source of failure; this is well exemplified by the familiar fact of the weakness of our Tea, when made by water that does not quite boil. The monks of St. Bernard, in the Alps, complain that they cannot make good Bouillie; the case is simply this, that from the altitude of their monastery, the water boils before it can arrive at a sufficiently high temperature. Whence we may deduce this important inference, that the solvent powers of water are affected by a very slight range of temperature. See a fuller account of this subject in my work on "Medical Chemistry."

† Where the vegetable matter contains much starch, if the water be of a temperature higher than 165°, instead of dissolving, it will coagulate the starch, and produce a very untractable mass. This fact is well known to Brewers, who are extremely cautious in avoiding a too high temperature.

therefore, like decoctions, they must be regarded as *extemporaneous* preparations. Unless the dose of them be otherwise stated, it is generally from $f\overline{3}j$ to $f\overline{3}ij$.

I. Simple Infusions.

INFUSUM ANTHEMIDIS. L.E. It is a good stomachic; and when exhibited warm, is well calculated to assist the operation of emetics: (*Form.* 66:) the cold infusion, i. e. made with cold water, is more grateful. *Incompatibles.* All soluble preparations of iron; nitrate of silver; oxy-muriate of mercury; acetate, and sub-acetate of lead; solutions of isinglass; infusion of yellow cinchona bark. Dose, $f\overline{3}j$ — $f\overline{3}ij$.

INFUSUM CALUMBÆ. L.E. See *Calumbæ Radix*. This infusion is more perishable than that of other bitters; in twenty-four hours a copious precipitation takes place in it, and in two days it becomes ropy, and even musty. *Form.* 155. Dose, $f\overline{3}i$ — $f\overline{3}ij$.

INFUSUM CARYOPHYLLORUM. L. $f\overline{3}j$ of this infusion holds in solution the active matter of grs. vj of cloves. *Incompatibles.* Precipitates are produced by sulphate of iron; sulphate of zinc; acetate of lead; nitrate of silver; tartarized antimony; lime water, and yellow cinchona. Dose, $f\overline{3}j$ — $f\overline{3}ij$.

INFUSUM CASCARILLÆ. L. It is incompatible with the substances mentioned under *Infus. Caryophyll*: *Form.* 33. Dose, $f\overline{3}j$ — $f\overline{3}ij$.

INFUSUM CINCHONÆ. L.E.D. We obtain in this preparation a feeble solution of the active constituents of bark, which will agree with many stomachs that are rebellious to the stronger preparations. Dose, $f\overline{3}i$ — $f\overline{3}ij$.

INFUSUM CUSPARIÆ. L. This is a judicious form of the bark, possessing its stimulant and tonic properties. Dose, $f\overline{3}i$ — $f\overline{3}ij$.

INFUSUM DIGITALIS. L.E. This is the best form in which we can administer the fox-glove, where our wish is to obtain its diuretic effects as speedily as possible. (*Form.* 110.) Dose, $f\overline{3}ij$ to $f\overline{3}ss$, twice a day, see *Digitalis*. *Incompatibles.* We shall counteract its effects by endeavouring to obviate its nauseating tendency by brandy and water, &c. Precipitates are produced by sulphate of iron, and the infusion of yellow cinchona, &c.

INFUSUM LINI COMPOSITUM. L.E. A cheap and useful demulcent; alcohol and preparations of lead, are of course incompatible with it; the *tinctura ferri muriatis* produces a flocculent precipitate.

INFUSUM QUASSIÆ. L.E. The proportion of Quassia directed for half a pint of water, is that of $\overline{3}j$ by the London, and $3ss$ by the Edinburgh College; the former is much too small, for in order to obtain a saturated infusion, $\overline{3}ij$ are required for that quantity of water. *Incompatibles.* The salts of iron produce no change in it; nor is it affected by any of those substances with which it is likely to come in contact in a medical prescription. It is highly useful in debilities of the stomach and intestinal canal, and in irregular and atonic gout, and it has been observed, that in hysterical atony, to which the female sex is so prone, the Quassia affords more vigour and relief to the system than the Peruvian Bark, especially when combined with a small portion of sulphate of zinc. To this, as well as the other stomachic infusions, it is usual to add at the time

of prescribing them a small quantity of aromatic tincture or spirit. *Form.* 35; 144. Dose, f3ss—f3iss.

INFUSUM RHEI. L.E. The Edinburgh infusion is stronger than that of London, and is rendered more grateful by the addition of spirit of cinnamon; these infusions, however, when given without any *adjuvants*, produce but a feeble effect. This is obvious since ℥j of rhubarb in substance, is at least equivalent in its effects to ʒiss when in infusion. *Incompatibles.* The stronger acids; the sulphates of iron and zinc; nitrate of silver; tartarized antimony; acetate of lead; oxy-muriate of mercury, and the infusions of *cusparia*, *cinchona*, *catechu*, galls, and some other astringent vegetables; the *Alkalies* deepen the colour, but produce no decomposition. Dose, f3j—f3ij.

INFUSUM SIMAROUBÆ. L. This infusion is inodorous, of a clear straw colour, with a slightly bitter taste. It presents the best mode of exhibiting *Simarouba bark*. Dose, f3ij, beyond this it will prove emetic. *Incompatibles.* Alkaline carbonates and lime water render it milky; and it is precipitated by the following substances; infusions of *catechu*; galls, and yellow *cinchona*; oxy-muriate of mercury; nitrate of silver, and acetate of lead. See *Simaroubæ Cortex*.

INFUSUM TABACI. L. It is never used but as an enema, in incarcerated hernia, and in ileus. See *Tabaci Folia*.

2. Compound Infusions.

INFUSUM ARMORACIÆ COMPOSITUM. L. In this preparation the stimulant property of the horse-radish is materially aided by the mustard; pure alkalies, but not their carbonates, may form extemporaneous additions; for the other incompatibles, see *Armoraciæ Radix*. Dose, f3iss. *Form.* 45.

INFUSUM AURANTII COMPOSITUM. L. A grateful stomachic, having the agreeable compound taste of its several ingredients; it has the merit of sitting easily on the stomach. Dose, f3j—f3iss.

INFUSUM CATECHU COMPOSITUM. L.E. This infusion is a powerful astringent, rendered grateful by the addition of cinnamon; it will keep for several months, provided the directions of the Edinburgh College be not followed in adding the syrup. In prescribing it, we must remember that it contains a large proportion of *tannin*. See *Catechu*. Dose, f3j—f3ij.

INFUSUM GENTIANÆ COMPOSITUM. L. An elegant tonic and stomachic infusion. It affords a good example of the virtues of a natural substance being enhanced by the additions of art, as discussed at page 168, for the bitterness of the gentian is here subdued by the aromatic quality of the lemon and orange peel. *Incompatibles.* Acetate of lead throws down a copious precipitate from the infusion, and sulphate of iron strikes a brown colour, but no precipitate takes place for several hours.

INFUSUM ROSÆ COMPOSITUM. L.E.D. This is an infusion of the petals of the red rose, rendered astringent and refrigerant,* by the addition of dilute sulphuric acid. By referring to the *DYNAMETER*, it will be seen that f3j does not contain more than four and a half minims of dilute acid, which are equivalent to three-sevenths of a minim of the strong concentrated acid. Wherever therefore we expect any advantage from this latter ingredient, the quantity must be increased by extemporaneous addi-

* **MADDEN'S VEGETABLE ESSENCE.** Is little else than the *Infusum Rosæ comp* : with an increased proportion of Acid.

tion. *Incompatibles.* All those bodies which are decomposed by the sulphuric acid; the *sulphates of iron and zinc* do not immediately alter the infusion, but they *slowly* decompose it, producing precipitates of a dark colour. Dr. Clarke of Cambridge detected *iron* in the petals;* may not the presence of this metal enhance the tonic powers of the infusion? It affords a most elegant vehicle for the exhibition of cathartic salts.

INFUSUM SENNÆ COMPOSITUM, L.E.D. A pint of water will take up the active matter of 3j of senna, but nothing beyond that proportion; hence there is an unnecessary waste in the London process. The quantity of infusion directed to be made at one time, is also injudicious, since by simple exposure to the air for only a few hours, in consequence of the powerful affinity of its extractive matter for oxygen, a yellow precipitate takes place, and the infusion loses its purgative quality, and excites *tormina* in the bowels; in preparing it, therefore, we see the necessity of conducting the process in *covered* vessels and of making only such a portion as may be required for immediate use; indeed, notwithstanding every precaution, the extractive will to a certain extent become oxidized, and the infusion have a tendency to gripe.† Dr. Cullen used to say that Senna was one of the best purgatives, if it could only be divested of its griping quality; this, however, he was unable to obviate, because he was not aware of its cause, and therefore conjoined it with various aromatics, instead of those salts‡ which might be capable of increasing the solubility of its oxidized extractive, or the purgative activity of the infusion; (see pages 154 and 165.) *Soluble tartar* and *alkaline salts* are its most useful adjuncts; it is, however, rarely prescribed in practice without the addition of other cathartics. (*Form.* 70, 76, 90.) Sydenham's favourite "*potio cathartica lenitiva*," consisted of an infusion of tamarinds senna leaves, and rhubarb, with the addition of manna and syrup of roses. The addition of tamarinds renders the infusion more grateful but less active; when made with *bohea tea*, it is in a great degree deprived of its nauseous taste; a decoction of guaiacum increases its powers, and is said at the same time to render it milder. Bitters also very considerably exalt its efficacy. (See page 157.) A pint of the infusion with a drachm of jalap forms an excellent combination for a purgative enema. *Incompatibles.* The infusion is disturbed by *strong acids*; *lime water*; *nitrate of silver*; *oxymuriate of mercury*; *acetate of lead*; *tartarized antimony*; and by an infusion of *yellow cinchona*. Dose, f3j—f3ij.

IPECACUANHÆ RADIX. L.E.D.

(*Callicocca* § *Ipecacuanha*.) *Ipecacuanha*.

QUALITIES. *Form*, tortuous pieces of the thickness of a goose-quill, surrounded by numerous prominent rings, separated by deep grooves.

* This fact has been lately confirmed by M. F. Cartier, who found 4 gr. of oxide of iron in 1000 gr. of red roses.

† A valuable paper upon this subject is to be found in the first volume of "The Reports of the Philomatic Society of Paris;" by Bouillon La Grange. It has been lately supposed, but without much probability, that the griping property of Senna depends upon its admixture with some foreign leaf.

‡ SELWAY'S PREPARED ESSENCE OF SENNA. This is a concentrated infusion of Senna, in combination with an alkali.

§ the plant yielding the *Ipecacuanha* of the shops, is more probably a species of *Viola* than that of *Callicocca*. According to Linnæus, it is not unfrequently obtained from the *Psycotria Emetica*. The word *Ipecacuanha* signifies *any* emetic substance.

This root, when powdered, has a faint disagreeable *odour*, and a bitter sub-acrid *taste*. **CHEMICAL COMPOSITION.** The late researches of M. M. Majendie and Pelletier have detected the existence of a new vegetable proximate principle in this root, to which ipecacuan is indebted for its emetic properties; they have, accordingly, denominated it *Emetine*.* It assumes the form of transparent brownish red scales, which are nearly inodorous, but have a slightly bitter, acrid, but not nauseous taste. *Emetine* is decomposed by a heat higher than that of boiling water; it is insoluble in water, in every proportion, without undergoing the least change: and in a moist atmosphere it deliquesces; it is also soluble in alcohol, but not in æther; *nitric acid* dissolves it, but at the same time decomposes it; *dilute sulphuric acid* has no action on it; *muriatic and phosphoric acid* dissolve it, without altering its nature; *acetic acid* dissolves it with great facility; *corrosive sublimate* precipitates it from its solutions, but *tartarized antimony* has no effect upon them; *gallic acid*, the *infusion of galls*, and *acetate of lead*, precipitate it. A grain excites violent vomiting, followed by sleep, and the patient awakes in perfect health! It exerts also a specific action on the lungs and mucous membrane of the intestinal canal; when taken in an overdose, its action can be instantly paralysed by a decoction of galls. There seems to be no great advantage in substituting this body for the ordinary powder of Ipecacuanha, except perhaps that its taste being much less offensive, it may very easily be given to children. *Emetine* appears to exist in Ipecacuanha, combined in the following manner, *emetine* 16, oils 2, wax 6, gum 10, starch 40, woody fibre 20.

Since the discovery of *Emetine*, whose properties are described above, Pelletier has extended his researches into its composition and nature; and he has lately been enabled to state that this body, which in conjunction with Majendie, he had formerly announced as "a new vegetable proximate principle," turns out to be a compound of a peculiar alkaline basis, which may be called *Emeta*, and some acid, together with an admixture of colouring matter; when compared with *Emetine*, it is what white crystallized sugar is to moist sugar. Its ultimate elements are oxygen, hydrogen and carbon; it is a white and friable substance; and unlike Emetin, is not altered by exposure to air; it is slightly bitter, and very sparingly soluble in water; with the mineral acids it forms salts, from whose solutions the infusion of galls throws down white and flocculent precipitates; the alcoholic solution of *Emeta* acts upon vegetable colour as an alkali.

MEDICINAL USES OF IPECACUAN. It is unquestionably the most valuable of the vegetable emetics, and in cases where the stomach is irritable it is to be preferred to Tartarized Antimony, and it is also less liable to act upon the bowels. In the form of decoction (made by boiling three drachms of

* A formula for its preparation is introduced in the new **CODEx** of Paris, being the one used by M. Pelletier; it is as follows: Let ℥j of the powder of Ipecacuan be macerated in ℥ij of æther with a gentle heat for some hours, in a distilling apparatus; let the portion which remains be triturated and boiled with ℥iv of alcohol, it having been previously macerated in it: filter and let the remainder be treated with fresh portions of alcohol, as long as any thing is taken up from the root; mix these alcoholic solutions and evaporate to dryness; let this alcoholic extract be macerated in cold distilled water, in order that every thing soluble in that menstruum may be dissolved; filter, and evaporate to dryness; this extract is **EMETINE**. In this state, however, it contains a small quantity of gallic acid, but which is too inconsiderable to affect its medicinal qualities.

the bruised root in a quart of water down to a pint) it has been found serviceable as an enema in Dysentery, and internal piles. **INCOMPATIBLE SUBSTANCES.** All vegetable astringents, as *infusion of galls*, &c. *vegetable acids*, especially the *acetic*, weakens its power; Dr. Irvine found that grs. xxx. administered in fʒij of vinegar produced only some loose stools. **FORMS OF EXHIBITION.** The form of powder is most energetic, although the vinous solution is both active and convenient. Dose. The medicinal operation of this substance varies with its dose, thus grs. x to ʒss act as an emetic; (*Form*: 65,) grs. j to ij, as an expectorant, (*Form*: 134, 138,) and in still smaller doses it proves stomachic and diaphoretic; by combination with opium, this latter quality becomes more powerful, (*Form*: 28, 130.) The primary effect of this medicine is that of stimulating the stomach, and it is equally obvious that its secondary ones depend on the numerous sympathies of other parts with the organs of digestion. The action of this remedy upon the pulmonary organs is extremely interesting; it would seem that in certain conditions of these organs, attended with a dry, hard cough, it promotes expectoration, while in affections attended with an inordinate secretion of mucus, it as certainly represses it, and acts the part of an astringent. In dysentery, and chronic diarrhœa, its astringent power is also very decided. *Form*. 58. When combined with cathartics it aids and accelerates their operation; *Form*: 84. In Hemorrhage from the lungs and uterus, it is decidedly useful, when administered in such doses as to excite a slight degree of nausea, by which the force of the circulation is controlled; I have usually combined it for such a purpose, with the Acetate of lead in Hæmophthisis; and Bergius relates a case of violent uterine hæmorrhage which was successfully treated by giving half a grain every half hour. In certain forms of Dyspepsia it proves highly beneficial, when administered as proposed by Daubenton, in doses just sufficient to excite a slight sensation of vermicular motion of the stomach, without carrying it to the point of nausea, which may be generally effected by half a grain three times a day. Its peculiar nauseous taste is completely covered by the addition of powdered Gum Arabic. **SOLUBILITY.** Alcohol takes up four parts in twenty of Ipecacuan; proof spirit six and a half; and boiling water rather more than eight parts; one pint of good sherry wine will dissolve about 100 grains; the alcoholic is more emetic than the aqueous solution; decoction destroys the emetic property of the root. **OFFICIAL PREP.** *Pulvis Ipecacuanhæ comp*: L.E.D. *Vinum Ipecac.* L.E.D.* The powder is liable to become inert, by exposure to air and light. The root is refractory, and is reduced to powder with difficulty, unless a few drops of oil, or an almond or two, be previously added. It is a curious fact that the effluvia of this root occasion in some persons the most distressing sensations of suffocation. I am acquainted with a lady, who is constantly seized with a violent dyspnœa, whenever the powder of Ipecacuan is brought into her presence. **ADULTERATIONS.** There are several varieties of Ipecacuan to be found in the market, which it is important to distinguish; viz. 1. *The brown variety*, which is the best, containing sixteen per cent. of emetin; 2, *the grey variety*, with fourteen per cent. of emetin; 3, *the white variety*, with only five of emetin. The two former varieties are those usually met with, being imported into this country in bales from Rio Janeiro; the brown is distinguished from the grey,

* IPECACUANHA LOZENGES. Each Lozenge contains half a grain of Ipecacuanha.

in being more wrinkled ; the white variety has no wrinkles whatever. We are informed by Decandolle that the genuine root is frequently mixed with those of *violets*, *Apocynæ Euphorbia*, &c. It is also sometimes mixed with the roots of several species of *Ionidum*.

JALAPÆ RADIX. L.E.D. (*Convolvulus Jalapa*) *Jalap*.

QUALITIES. This root is pulverulent, furnishing a powder of a pale brownish yellow colour. *Odour*, peculiar ; *Taste* sweetish and slightly pungent. **CHEMICAL COMPOSITION.** Resin, gum, extractive, fecula, lignin, and some salts. The combination of the three first principles appears requisite for the production of its *full* cathartic effect. The gum has been supposed to possess diuretic properties. Very lately a saline principle has been obtained from Jalap by Mr. Hume, jun : but I am not aware that its medicinal properties have been ascertained. It is procured by macerating the powdered root for twelve or fourteen days in acetic acid, by which a solution is obtained, which must be filtered, and then saturated with ammonia ; the mixture is to be shaken violently, when a *sabulous* deposit will take place, and a few crystals be collected on the sides of the vessel ; both of these must be collected, and washed in distilled water ; and then redissolved in concentrated acetic acid, and reprecipitated by ammonia added in access. By which means, small white acicular crystals are thrown down, to which the name of *Jalapine* has been given. **SOLUBILITY.** Proof spirit is its appropriate menstruum. **MED. USES.** It is a cathartic of a stimulating description, acting principally upon the colon, and notwithstanding the tormina it may sometimes induce, it is no less safe than efficacious ; as a hydragogue purgative it has been greatly extolled, but for such a purpose it will answer better in combination, as in *Form* 73. Its action is said to be promoted by the addition of Ipecacuan, or tartarized antimony. (*Form*. 84.) In dropsy its union with super-tartrate of potass is calculated to promote its beneficial operation. **FORMS OF EXHIBITION.** That of powder is the most eligible, especially when combined with some other powdered substance ; pulverization increases its activity, see *Pulveres*. Van Swieten advised it to be pulverized, and mixed with sugar, and a small quantity of some aromatic. The addition of Soap is supposed to render its operation much milder, and the Prussian Pharmacopœia contains a formula for such a combination, which is said to operate mildly and promptly. To this preparation the name SAPO JALAPINUS * is given. **DOSE**, grs. x to 3ss. **OFFICIAL PREPARATIONS.** *Pulv. Jalap comp.* E. *Extract. Jalap.* L.E.D. *Tinct. Jalap.* L.E.D. *Tinct. Sennæ comp.* E. (**B**) **ADULTERATIONS.** *Briony* root is sometimes mixed with that of jalap, but may be easily distinguished by its paler colour and less compact texture ; and by not easily burning at the flame of a candle. When the *teredo* has attacked it, it should be rejected.

JUGLANS CINEREA.

(Butternut.)

Cortex.

[The Butternut tree is to found in almost every part of the United States. The inner bark is the part used in medicine. It yields, according to Bigelow, a large quantity of soluble matter, principally of the extrac-

* SAPO JALAPINUS. It is prepared by taking equal parts of Castille Soap and of resinous extract of Jalap, and digesting them in a sufficient quantity of alcohol, with moderate heat, and evaporating to the consistence of a conserve.

tive kind. Water extracts its virtues. The extract, which is the form in which it is used, has been long known and used in this country as an excellent cathartic. As it is naturally mild in its operation, its effect may be much increased by the addition of calomel. To obviate habitual costiveness, the butternut is perhaps the best laxative that can be used. The dose is from 10 to 30 grs.]

JUNIPERI BACCÆ ET CACUMINA. L.E.D.

(*Juniperus Communis*.)

Juniper Berries and Tops.

The principal constituents of these berries are mucilage, sugar, and volatile oil; in the latter of which their diuretic virtues reside. **FORMS OF EXHIBITION.** That of an infusion, made with \mathfrak{z} ij of the berries, to \mathfrak{oj} of hot water. Unless pains however are taken, by strong contusion, to bruise and break the seeds, the preparation will contain but little of the juniper flavour. The bruised berries may be also triturated with sugar or some neutral salt, and be thus exhibited in substance, **DOSE** \mathfrak{g} j to \mathfrak{g} ij. **OFFICINAL PREPARATIONS.** *Oleum Junip.* L.E.D. *Spirit. Junip. Co.* L.E.D. The taste and diuretic properties of Hollands depend upon this oil; English gin is flavoured by oil of turpentine.

KINO. L.E.D. *Kino.*

(*Pterocarpus Erinacea*. * *Extractum*. L. *Eucalypti Resiniferi*. *Succus Concretus*, E. *Butea Frondosa*. D.)

There is very considerable obscurity with regard to the history and chemical constitution of this substance; three varieties of it are met with in the shops, viz. 1. *African Kino*, which bears the highest price, and has all the appearance of a natural production, slender twigs being often intermixed in its substance; it is of a reddish brown colour, and has a bitterish astringent taste. 2. *Botany Bay Kino*, has also the aspect of a natural production, it is in more solid masses than the former species, is less brittle (for it contains a very small proportion of resin) and, with its astringency, has a disagreeable sweetish taste. 3. *Jamaica Kino*, this is the one most commonly met with; it has the appearance of a dry extract, is in small fragments, of a colour more nearly approaching to black than that of the others, and has an astringent and slightly bitter taste. There is also a fourth variety mentioned, viz. the *East India* or *Amboyna*, but this does not appear to differ from the African variety. **CHEMICAL COMPOSITION.** In all the varieties the predominant principles are tannin and extractive. **SOLUBILITY.** The best menstruum is diluted alcohol. *Incompatible Substances*, vide *Gallæ*. Mr. Thomson also states a fact which I have reason to consider quite correct, that the alkalies destroy the astringent properties of kino. All the varieties are soluble in solutions of pure potass, and no precipitation takes place on the addition of water. **MEDICINAL USES.** It is principally employed as an astringent, but from its liability to vary in strength, it has been very generally superseded by Catechu.† **FORMS OF**

* The plant which yields Kino is at length satisfactorily proved to be the *Pterocarpus Erinacea*: the London College have accordingly made the alteration which I anticipated in the former edition of this work.

† Dr. Pemberton makes the interesting statement in relation to the operation of kino upon the system, that unless Diarrhoea be actually present, "it appears to have

EXHIBITION. Either in substance or in the form of watery infusion, or in that of tincture. DOSE, grs. x. to 3ss. OFFICIAL PREPARATIONS. *Tinct. Kino. L.E.D. Elect. Catechu. E.D. Pulvis Alum co. E.*

KRAMERIE RADIX. L. (*Krameria Triandra*)
Radix.

Rhatany.

This root, although it has been for some time employed in medicine, has only lately found its way into the *Materia Medica* of the London Pharmacopœia. Its extract, which was some years ago imported into this country, is supposed to have been employed for giving astringency to Port wine. According to recent analysis the root contains a peculiar modification of Tannin, with only a trace of Gallic acid; Gum; Fecula; and certain salts of Lime. It may be used either in decoction, or tincture, the latter of which may be made by dissolving two ounces of the root in a pint of proof spirit. In all its forms it is eminently astringent. I have used it with much success in Leucorrhœa, and in uterine hemorrhages. The extract may be distinguished from Kino, to which it bears a great resemblance in appearance and taste, by being very fusible by heat, whereas Kino does not possess that character.

LICHEN. L.E.D. (*Lichen Islandicus.*) *Lichen.*

Iceland Liverwort. Iceland Moss.

QUALITIES. *Odour*, none; *Taste*, mucilaginous and bitter. SOLUBILITY. The effect of water upon this vegetable substance is materially modified by temperature; if cold, the lichen absorbs nearly its own weight by maceration, but gives out to the menstruum little or none of its virtues; if the water be warm, it soon acquires a bitter impregnation; by ebullition, a decoction is obtained, which, as it cools, gelatinizes. See *Decoct. Lichen.* CHEMICAL COMPOSITION. Proust has shewn by analysis that 100 parts of this moss contain 64 parts of a substance bearing some analogy to vegetable gluten, 33 of a matter soluble in hot water, and resembling starch, and 3 parts of a bitter principle. MEDICINAL USES. This vegetable was introduced to the notice of the profession by Linnæus, who recommended its decoction, as having been administered with great success for coughs in Sweden. Upon its introduction into this country, its patrons bestowed so many extravagant eulogiums upon its powers, that the less sanguine practitioner at once abandoned its use in disgust, and it fell into unmerited disrepute. It would be idle to speak of its specific effects in phthisis; but, as a demulcent, it is certainly very superior to the mucilaginous mixtures in ordinary use, and its simple bitter principle at the same time tends to produce a tonic effect, which is frequently desirable in the debilitated condition which characterizes the latter stages of this disease. There are circumstances, however, which may render the removal of the bitter advantageous; in which case, maceration in suc-

no tendency to confine the bowels. In this drug, therefore," he adds, "you have a medicine which exerts its powers to restrain the discharges of the glands when they are secreting too much, without exerting any such powers over them when they are acting naturally." *Practical Treatise on the various diseases of the abdominal viscera*, p. 112, Am. Ed.

Ed.

cesive waters, or in a weak alkaline ley, as recommended by Westring, will be found to answer the intended purpose. **OFFICIAL PREPARATION.** *Decoct. Lichen. Island. E.D.* Sir Alexander Crichton has offered some observations upon the genuineness of this article which deserve attention. He says that there are two varieties in the market; the best of which has a horny texture, and yields a bitter* mucilage. It is that which comes from Iceland, Norway, Sweden, and Finland. The inferior kind has a membranous texture, and yields little bitter or mucilage in comparison with the former. Where it comes from he knows not, but he suspects it to be British, as it is much cheaper than the other.

LIMONES. L.E.D. (*Citrus Medica. Baccæ.*)

Lemons.

SUCCUS—THE JUICE consists of *Citric acid*, mucilage, extractive matter, and small portions of sugar and water. *Specific gravity*, 1.0384. It may be preserved for a considerable length of time, by covering its surface with fixed oil.

Its use in making saline draughts has been already noticed, see *Acid. Citric*. Its principal medicinal value consists in its anti-scorbutic* virtues; indeed it may be fairly asserted that this disease, so peculiarly incident to a sea life, has been nearly eradicated by the juice of lemons. Sir Gilbert Blane, in speaking of its efficacy, asserts that "those only who have made themselves acquainted with the early part of the Naval history of this country, or those who have perused the interesting, popular, and eloquent narrative of Commodore Anson's voyage, can duly appreciate the value of this simple remedy. Lemonade, as a beverage in putrid disease, was first introduced by the French physicians in the beginning of the 17th century, and about the year 1660, an Italian from Florence, having learnt a process of freezing confectionary, conceived the happy idea of converting such beverage into ice. This found a ready sale, and was the occasion of so great an increase in the number of sellers of Lemonade, that in the year 1676, the *Lemonadiers* of Paris were formed into a company, and received a patent from the government.

CORTEX—THE RIND or PEEL is composed of two distinct parts; the exterior, which contains glands, filled with a fragrant volatile oil, upon which all its properties depend, and the *interior coat*, which is tasteless and indigestible. The flavour may be obtained by rubbing lump sugar upon it, which will imbibe the oil, and if it be then dried by a very gentle heat, may be preserved unimpaired for any length of time, and will be preferable to the volatile oil obtained by distillation, for the fire generally imparts an unpleasant or empyreumatic flavour.†

It has been already stated, that "the different parts of the same plant have frequently very different properties." The Lemon offers a good example of this fact, for its juice is *acid*, its seeds *bitter*, and its peel *aromatic*.

* It was known to be a remedy for this disorder at least two hundred years ago; for in a work entitled, "The Surgeon's Mate, or Military and Domestic Medicine," by John Woodall, master in Surgery, London, 1636, the author concludes his eulogium of lemon juice, by saying, "I dare not write how good a sauce it is at meat, lest the chief in the ship should waste it in the great cabin to save vinegar."

† **ESSENTIAL SALT OF LEMONS.** See *Potassæ Supertartras*.

LINIMENTA. L.E.D. *Liniments.*

These are external applications, having the consistence of oil or balsam. If we except the *Liniment. Æruginis*, all the officinal liniments are decomposed by the substances which are incompatible with soaps.

LINIMENTUM ÆRUGINIS.* L. *Oxymel Æruginis*. P.L. 1787. *Mel Ægyptiacum*. P.L. 1745. *Unguentum Ægyptiacum*. P.L. 1720. Diluted with water, it has been recommended as a gargle in venereal ulcerations, but its use is hazardous; it is a detergent escharotic preparation.

LINIMENTUM AMMONIÆ FORTIUS. L. *Oleum Ammoniatum*. E. *Linimentum Ammoniacæ*. D. It consists of *liquor ammoniacæ* one part, olive oil two parts, (oil eight parts, E.D.) The alkali forms with the oil a soap, which is held dissolved by the water in the *liquor ammoniacæ*. It is an excellent rubefacient, and penetrating liniment.

LINIMENTUM AMMONIÆ SUB-CARBONATIS. L. *Linimentum Ammoniacæ*. P.L. 1787. *Linimentum Volatile*. P.L. 1745. The carbonic acid prevents the perfect formation of soap in this liniment; unlike the former one, therefore, it deposits the soapy matter on standing. It is much less stimulating than the preceding one.

LINIMENTUM CALCIS. E.D. *Oil and lime water equal parts*. This is an earthy soap, formed by the combination of lime and oil: the soapy matter separates on standing, it should therefore be *extemporaneous*. In cases of burns and scalds where the cuticle has been destroyed, it is an advantageous application.

LINIMENTUM CAMPHORÆ. L. *Oleum Camphoratum*. E.D. Camphor one, olive oil four parts. It is a simple solution of camphor in fixed oil, and forms a very useful embrocation to sprains, bruises, glandular swellings, and in rheumatic affections.

LINIMENTUM CAMPHORÆ COMPOSITUM. L. *Camphor two, liquor ammoniacæ six, spirits of lavender sixteen parts*. It is highly stimulating.*

LINIMENTUM HYDRARGYRI. L. A pound of liniment contains nearly 3iv of mercury; it affects the mouth more rapidly than strong mercurial ointment, although it will be seen by the *Medicinal Dynameter* to contain less Mercury. This effect is to be attributed to the stimulating properties of its adjuncts, viz. Camphor and Ammonia.

LINIMENTUM SAPONIS COMPOSITUM. L. *Hard soap iij, camphor j, spirit of rosemary xvj parts*. It is a stimulant and anodyne application, and in local pains opium may be advantageously added to it. It is commonly used under the name of *Opodeldoc*.† See *Sapo*.

LINIMENTUM TEREBINTHINÆ. This liniment was introduced by Mr. Kentish of Newcastle, as a dressing to recent burns, which he continued until the eschars became loose.

* WARD'S ESSENCE FOR THE HEAD-ACHE.—Nothing more than Liniment Camph. Comp.

† STEER'S OPODELDOC.—Castile Soap 3j, Rectified Spirit f3viiij, Camphor 3iiiss, Oil of Rosemary f3ss, Oil of Origanum f3j. Solution of Ammonia f3vj.

BATES' ANODYNE BALSAM.—It consists of one part of Tincture of Opium, and two of Opodeldoc, i. e. Liniment. Sapon. comp.

FREEMAN'S BATHING SPIRITS.—Liniment. Saponis comp. coloured with Daffy's Elixir. JACKSON'S BATHING SPIRITS differs from the former in the addition of some essential oils.

LYNCH'S EMBROCATION.—Olive oil impregnated with Bergamot and some other essences, and coloured with Alkanet root.

LINUM CATHARTICUM. L.D. *Purging Flax.*

The qualities of this plant reside in extractive matter, hence water extracts, but long decoction injures them. **MEDICINAL USES.** It is strongly purgative. **FORMS OF EXHIBITION.** ʒij of the dried herb infused in oj of boiling water. **Dose.** fʒij.

LINI USITATISSIMI SEMINA. L.E.D.

Linseed, or Common Flax Seed.

These seeds contain a large proportion of mucilage, and one sixth of their weight of fixed oil; the former of which resides principally in the cuticle, the latter, in the parenchymatous portion of the seed; by infusion in boiling water, a clear, colourless, inodorous, and nearly insipid mucilage is obtained; ʒss of the unbruised seed is sufficient for oj of water; cold water does not extract any mucilage from them when unbruised; the farina of the seeds is well adapted for cataplasms. **OFFICINAL PREP.** *Infus. Lini comp: L. Oleum Lini.* L.E.D.

LIQUOR ALUMINIS COMPOSITUS. L.

Aqua Aluminosa Bateana. P. L. 1745.

This is a compound solution of *alum* and *sulphate of zinc*: a fluid-ounce containing about seven grains of each ingredient. It is powerfully astringent, and is successfully used as a detergent lotion to old ulcers; as a collyrium, or as an injection in gleet and fluor albus; it will also often answer in removing chilblains, and in curing light excoriations.

LIQUOR AMMONIÆ. L. AQUA AMMONIÆ. E.

AQUA AMMONIÆ CAUSTICÆ. D.

Solution of Ammonia.

QUALITIES. *Form,* a limpid, colourless fluid; *specific gravity,* '960, or fʒj weighs about 438 grs. *Odour,* strong and pungent; *Taste,* extremely caustic. **CHEMICAL COMPOSITION.** A solution of ammoniacal gas in water, which varies considerably in strength in the different pharmacopœias. When prepared according to the London and Edinburgh Colleges, it contains nearly 25 per cent. of ammonia, whereas the Dublin preparation does not contain more than 16. **SOLVENT POWERS.** It is an active solvent of many vegetable principles, e. g. *oils, resins, &c.* With alcohol it unites in every proportion; it assists the oxidizement of copper and zinc, and dissolves many of the metallic oxides. **MED. USES.** Stimulant, rubefacient, and ant-acid. **FORMS OF EXHIBITION.** In milk, or any liquid vehicle; if in decoctions, or infusions, they must be previously cooled; for at 130° the ammonia will escape in the form of gas. **DOSE,** ℥x to xxx. **OFFICINAL PREP.** *Linimentum Ammoniac.* L.D. *Oleus Ammon.* E. *Spir. Ammoniac.* L. *Spir. Ammoniac comp.* L. *Spir. Ammon. succinat* L. *Liniment. Camphor. comp.* L. **ADULTERATIONS.** The presence of other salts in the solution may be discovered by saturating a portion with pure nitric acid, and applying the test for sulphuric acid, (*Barytes*) and that for muriatic acid, (*Nitrate of silver.*) Carbonic acid is detected by its effervescing with acids, or by its forming with lime water a precipitate, soluble with effervescence in nitric acid; it ought to be

free from all fœtor; its strength can only be determined by taking its specific gravity. It should be preserved in well closed bottles, and their dimensions should be small, for when in large vessels it often becomes carbonated before it is half used.

LIQUOR AMMONIÆ ACETATIS. L. AQUA ACETATIS.

AMMONIÆ E.D.

Solution of Acetate of Ammonia.

olim, Spirit of Mindererus.

This preparation is a solution of the neutral *acetate of ammonia*, with a proportion of carbonic acid diffused through it; it is made by saturating the sub-carbonate of ammonia with distilled vinegar, for which purpose it will generally be found that 3ij of the alkali will saturate oiss of the vinegar; since, however, the quantity of acid in distilled vinegar, as well as the strength of the ammonia, are liable to constant variation, the exact point of neutralization should be ascertained by the alternate application of litmus and turmeric papers; for if the proportions be not accurately adjusted, some of the metallic salts, especially those of *antimony*, which are often prescribed in conjunction with it, are decomposed, and thus rendered inefficacious; and on this account an excess of alkali is to be feared more than that of acid. This preparation is also not unfrequently employed as a collyrium, when much serious mischief may arise from the carbonate of ammonia predominating. It has been already stated that a very minute proportion of extractive matter is rendered sensible on the addition of an alkali; hence this preparation frequently derives from the vinegar a brown hue, which may be removed by filtering the solution through a little well burnt charcoal. It also deserves notice that the presence of a trace of copper, derived from the copper cocks through which the vinegar has passed, will impart a *brown* tinge, whilst in larger quantities this metal yields a *blue* colour with ammonia. **INCOMPATIBLE SUBSTANCES.** *Acids; fixed alkalies; alum; lime water; sulphate of magnesia; corrosive sublimate; nitrate of silver; and the sulphates of zinc, copper, and iron.* *Acetate of lead* produces also a copious precipitation, but this depends upon the presence of the carbonic acid diffused through the solution, which decomposes the salt and forms an insoluble carbonate of lead. *Magnesia*, likewise, contrary to what might be supposed, decomposes the solution and renders it pungent, from the extrication of ammoniacal gas; this phenomenon depends upon the *magnesia* forming a triple acetate with one part of the ammonia, and setting the remainder at liberty. **MED. USES.** When assisted by warmth and plentiful dilution, it is an excellent diaphoretic, and produces its effects without quickening the circulation: (*Form*: 117, 126,) by keeping the surface of the body cool, its action is determined to the kidneys, and it proves diuretic, especially when combined with remedies of a similar tendency. (*Form*. 111.) **DOSE**, f3iv to f3xij. Externally it furnishes a lotion, valuable as a refrigerant, especially, when combined with some spirituous preparation. See *Form*: 148.

LIQUOR AMMONIÆ SUB-CARBONATIS. L.

SOLUTIO SUB-CARBONATIS AMMONIÆ. E.

AQUA CARBONATIS AMMONIÆ. D.

This is merely a solution of the *solid* sub-carbonate in distilled water, see *Ammoniæ Sub-carbonas*, **DOSE**, f3ss to f3j in any bland liquid.

ADULTERATIONS. There is frequently a deficient quantity of the sub-carbanote in solution, its pungency being kept up by the addition of *liquor ammonie*; this may be discovered by shaking it with twice its bulk of alcohol, when a coagulum of considerable density should occur, the absence of which will denote the sophistication of the article. Its *specific gravity* should be 1.150. The *Incompatibles* are those enumerated under the history of *Ammonie Sub-carbonas*.

LIQUOR ARSENICALIS. L.

SOLUTIO ARSENICALIS. E.

This is a solution of the *Arsenic of Potass*, coloured and flavoured by the *Compound Spirit of Lavender*, f3j of which contains gr $\frac{1}{2}$ of *arsenious acid*. It was introduced into practice by Dr. Fowler, of Stafford, as a substitute for the empirical remedy known by the name of "*The Tasteless Ague Drop*." It is a powerful tonic, and has been very successfully administered in the cure of intermittent and remittent fevers, periodical head-aches, and as an alterative in many anomalous diseases of the skin. It has been also given, with decided effect, in certain visceral obstructions; its use however is to a great degree empirical, although we may observe, generally, that wherever strong arterial action exists, arsenic will do harm. The addition of a few drops of *Vinum Opii* is said to render its operation safer and more efficacious. **INCOMPATIBLE SUBSTANCES.** *Lime water*; *nitrate of silver*; *the salts of copper*; *hydro-sulphuret of potass*, and *the infusions and decoctions of bark*. Dose, ℥iv, gradually increased to ℥xxx, twice a day. See *Arsenicum Album*.

LIQUOR CALCIS. L. AQUA CALCIS. E.D.

Lime Water.

It is a saturated solution of lime in water; f3j of which contains $\frac{3}{4}$ of a grain.* **INCOMPATIBLE SUBSTANCES.** *All alkaline and metallic salts; borates; tartrates; citrates; acids; sulphur; spirituous preparations, and the infusions of all astringent vegetables.* It should be kept in close vessels, for if exposed to the air, the lime will attract carbonic acid, and become an insoluble carbonate; the addition of an *alkaline carbonate* produces the same effect instantaneously.† If animal charcoal be boiled with

* Since the last edition of this work, Mr. Dalton has discovered the very curious fact, that lime is more soluble in cold than in hot water, and has given a table of quantities from which he concludes that the quantity held in solution by water at 32° Fab. is nearly double that retained by water at 212°. Mr. Phillips has lately taken up the subject, and confirmed the statement of Mr. Dalton.

thus 10,000 gr. of water, at 212°, dissolve 7.8 of lime

10,000 gr. of water, at 32° ————— 15.2 ————

Mr. Phillips attempts to account for this apparent anomaly "from the effect which heat sometimes produces of increasing instead of diminishing the attraction of cohesion. In the present case, he continues, the affinities which are brought into play are the attractions of aggregation of the particles of the lime upon each other, the attraction of the lime to form a hydrate with a small portion of the water, and the mutual affinity existing between that hydrate and the water of solution." And at the high temperature he thinks that the former affinities may be so heightened as to overpower the latter.

† Upon this fact Dr. Alton founded his ingenious process for preserving water from putrefaction; in the first place he impregnated the water with lime, which from its antiseptic property answered the purpose of keeping it most completely, and then, in order to get rid of the lime, he merely added the carbonate of magnesia, which by

lime water, it will precipitate the whole of the lime, an effect which is not produced by charcoal of vegetable origin. **MED. USES.** It is an antacid, and is therefore useful in dyspepsia attended with acidity; *Form.* 149. Mixed with an equal quantity of milk, it furnishes an excellent remedy in infantile complaints connected with bowel affections; it is likewise astringent in leucorrhœa, in the last stages of dysentery, and in protracted diarrhœa. It dissolves also the slimy mucus with which disordered bowels are so generally infested; on account of this latter property, it has been exhibited in calculous affections,* with a view of dissolving the cementing ingredient of the concretion, and thereby of destroying its cohesion: (*See* page 127.) Not being very nauseous, it is easily given under any circumstances, and it is not liable to produce that irritability of stomach which frequently attends the long continued use of the fixed alkalies. It also frequently forms the basis of astringent gargles. Lime water moreover affords a successful remedy in certain cutaneous affections, particularly those affecting the face, as *Gutta Rosea*. Sir G. Blane has also seen some remarkable cures of herpetic complaints of the legs by large doses; he has also employed it with effect as a lotion. **FORMS OF EXHIBITION.** Milk disguises its flavour, without impairing its virtues. **DOSE,** fʒj to fʒvj. Sugar has the curious property of rendering lime more soluble in water. See *Saccharum*.

LIQUOR CALCIS MURIATIS. L.D.

Solution of Muriate of Lime.

This solution is said to be tonic and deobstruent, and to have been advantageously given in scrofula. It has also been found useful in Urticaria, and several other forms of cutaneous disease. **IMCOMPATIBLES.** Sulphuric acid, and the Sulphates; the fixed alkalies and their carbonates; ammonia produces no change in the solution, but its carbonate decomposes it, and precipitates carbonate of lime. **DOSE,** ℥xx to fʒij.

LIQUOR CUPRI AMMONIATI. L.

Solution of Ammoniated Copper.

This is a simple solution of the salt in distilled water. The preparation, although perfectly transparent when first formed, soon becomes tur-

transferring its carbonic acid, rendered the lime insoluble, and consequently the water tasteless and fit for economical purposes. Mr. Henry, however, proposed the introduction of a current of carbonic acid into the cask, and this expedient has been found equally effective, and far more economical.

* **MRS. STEPHEN'S REMEDY FOR THE STONE** consisted of lime, which was produced by calcining the shells of eggs and snails, and made into pills with Soap. A decoction was also administered, consisting also of Chamomile, Fennel, Parsley, and Burdock, together with a portion of Alicant Soap. This is a very rational practice, and is very much what the practitioners of the present day depend upon: the observations of Mrs. Stephens respecting their administration, are equally judicious. "If," says she, "these medicines produce pain, it will be necessary to give an opiate with them, and it must be at all times a principal care to prevent a looseness, for if this should happen it would carry off the medicines: under such circumstances the quantity of the Decoction, since it is laxative, must be diminished, and other suitable means must be taken by the advice of a Physician." The credit of introducing alkaline medicines for the cure of calculous disorders, does not however rest with **MRS. STEPHENS**. It has been before stated in this work, that Basil Valentine employed a fixed alkaline salt in such cases; and I may here add, that **SENNERTUS**, in his *Praxis Medica*, mentions a lithonthryptic that was in great esteem and general use in his time, which consisted of one ounce of Salt of Tartar dissolved in a pint of parsley water, and afterwards tinged yellow with orange peel.

bid and deposits oxide of copper ; this arises from the escape of ammonia, and may be prevented by the occasional addition of a small quantity of the volatile alkali. See *Cuprum Ammoniatum*. The Medicinal Dynameter will shew the proportion of salt in any given quantity of the solution.

LIQUOR FERRI ALKALINI. L.

Solution of Alkaline Iron.

This preparation is nearly the same as Stahl's *Tinctura Martis Alkalina*. **CHEMICAL COMPOSITION.** It is by no means ascertained. **INCOMPATIBLE SUBSTANCES.** It is a most injudicious preparation, for it cannot be exhibited in any form without decomposition ; *water*, especially if not distilled, and *vegetable infusions* and *decoctions*, produce dense precipitates ; *pure acids*, *alkalies*, and *spirit*, also decompose it. I must confess my regret at the College having retained this preparation in their Pharmacopœia ; the committee agreed to reject it, but their judgment was reversed by the votes of the *Comitia Majora*. Should any practitioner be unable to procure this preparation, I will give him an easy receipt for producing it, viz. *Let him keep the Mistura Ferri composita in an open vessel, until it is entirely spoilt !*

LIQUOR HYDRARGYRI OXY-MURIATIS. L.

This solution of corrosive sublimate is intended to facilitate the exhibition of minute doses of the salt ; f3j contains gr. $\frac{1}{2}$; when long kept, or exposed to light, the oxy-muriate is decomposed, and *calomel* is precipitated ; (see *Hydrarg : Oxy-muriatis :*) or, what is more dangerous, it is sometimes deposited in crystals, without decomposition ; a small portion of muriatic acid, or muriate of ammonia in the solution, prevents this precipitation. Dose, f3ss to f3ij, in an infusion of linseed.

LIQUOR PLUMBI SUB-ACETATIS. L.

LIQUOR SUB-ACETATIS LYTHARGYRI. D.

Aqua Lithargyri Acetati. P.L. 1767.

Solution of Sub-acetate of Lead : *olim, Extract of Saturn.*

This preparation was introduced by M. Goulard of Montpellier, hence it has been commonly known by the name of *Goulard's Extract*. **QUALITIES.** It is of a greenish straw colour, and has an austere, sweetish taste ; when kept it deposits a quantity of oxide, and becomes lighter coloured. **CHEMICAL COMPOSITION.** It is a saturated solution of the sub-acetate of lead, consisting, according to Berzelius, of one proportional of acid, and three proportionals of oxide of lead ; hence its name is correct. It is the only instance with which we are acquainted of a real sub-salt being soluble in water. **INCOMPATIBLE SUBSTANCES.** *Alkalies* and their *carbonates* precipitate a white sub-salt, *alkaline sulphates* and *sulphurets* ; *mucilage*. *Spring Water*, from the salts which it contains, produces with it a very milky and turbid appearance ; and even when *distilled*, in consequence of the carbonic acid diffused through it, it occasions precipitation. The Surgeon will remember that the *Linimentum Saponis* cannot be mixed with it without mutual decomposition. See *Sapo*. **MED. USES.** It is only used externally, in superficial and phlegmonic inflammations of the skin, and in herpetic affections. It has been a question whether

Lead, in any form, should ever be applied to an open wound, or to an abraded surface;* as a general rule, it should not certainly be applied to such as are recent, nor to those whose character indicates a diminished state of vitality in the parts, and exhibits a disposition to gangrene. The abuse of Saturnine lotions has been frequently descanted upon by foreign writers, and, among the evils which are supposed to be thus induced, impotence is mentioned as one of not unfrequent occurrence. See *Institutioni di Medicina Forens: di Tortosa*, vol. 1. p. 58. also *Fritze Compend: sopra le Malat: Vener:* p. 189. and *Monteggia Annotat: sopra i Mali Venerei*, p. 36. There is a paper in the third volume of the *Medical Transactions*, by Dr. Reynolds, in which the case of a gentleman is detailed, who brought on a temporary paralysis of the *Sphincter Ani*, by freely using Goulard's lotion for the cure of the Piles. The value of Saturnine applications in common inflammation most probably arises from a partial paralysis of the nerves of the part, produced by the sedative agency of the lead.

LIQUOR PLUMBI SUB-ACETATIS DILUTUS. L.

As the former preparation is very rarely employed in its concentrated form, the College has directed its dilution, and added a portion of spirit, with a view to accelerate its evaporation, and thus to produce a refrigerating effect: but for such a purpose the quantity of spirit is far too small, and should therefore be increased by extemporaneous addition.

LIQUOR POTASSÆ. L. AQUA POTASSÆ. E. AQUA KALI CAUSTICA. D,

Aqua kali puri. P. L. 1787. *Lixivium Saponarium*, 1745.

QUALITIES. A limpid, dense, colourless solution; a pint* should weigh 3xvj; when rubbed between the fingers it feels soapy, in consequence of a partial solution of the cuticle. The solution, as usually prepared, contains small portions of muriate and sulphate of potass, silica, and lime; but these incidental impurities do not invalidate its virtues; it ought not to effervesce with acids. **MED. USES.** Antacid, diuretic, alterative, and lithonthryptic; and externally, when diluted, it acts as a stimulating lotion,† and if concentrated, as a caustic; see *Potassa Fusa*. The operation of this and other alkaline remedies, have at different periods been celebrated as powerful lithonthryptics, and whilst experience has in some cases confirmed the value of the practice, it has in others proved no less decidedly its mischievous agency; these contradictory results are at length capable of explanation, for Chemistry has drawn aside the veil that has so long obscured the history, origin, and cure of calculous diseases, and has demonstrated that these extraneous bodies vary in composition, and are consequently very differently affected by the same chemical solvents; but this subject has already been so fully discussed in the first part of this work, under the chapter on "*Antilithics and Lithonthryptics*," that it is unnecessary to dwell upon it in this place.

* VIRGIN'S MILK. A preparation is sold under this name, which is a Sulphate of Lead, and is prepared as follows: To a saturated solution of alum, add of Goulard's extract one third part. Shake them together;—see Benzonium for a very different cosmetic bearing the same name.

† HANNAY'S LOTION, or PREVENTIVE WASH. This famous nostrum for the prevention of venereal infection, was nothing more than a solution of caustic potass.

It has also been found highly useful in the cure of several species of cutaneous affections ; as in Lepra, Psoriasis, &c. which diseases generally appear to have some connection with a morbid state of the digestive functions ; see *Form* : 149. DOSE of the solution of potass, $\mathfrak{m}\text{x}$ to $\mathfrak{f}\text{3ss}$, in veal broth* or table beer ; this latter vehicle disguises its nauseous flavour completely. In many cases, the infusion of some bitter tonic will be the most eligible liquor in which it can be exhibited, especially where our object is to promote its absorption : the theory of such a combination has been already explained in the first part of this work, p. 157. OFFICIAL PREP. *Potassa fusa*, L.E.D. *Potassa cum calce*, L.E.D. *Liquor Sulphureti Kali*. D. *Antimonii Sulphuretum præcipitatum*. L.E.

LIQUOR POTASSÆ SUB-CARBONATIS. L.

AQUA SUB-CARBONATIS KALI. D.

Aqua Kali præparati, P.L. 1787.

Lixivium Tartari, 1745.

Oleum Tartari per deliquium, P.L. 1720.

QUALITIES. It is a clear, colourless, and inodorous solution ; *Spec. grav.* 1.446. DOSE, $\mathfrak{m}\text{x}$ to $\mathfrak{f}\text{3j}$. See *Potassæ Sub-carbonas*, and *Form* : 39, 41. The proportion of the salt contained in any quantity of the solution may be learnt by referring to the *Dynameter*.

LOBELIA INFLATA.

Indian Tobacco. Herba.

[This is a plant very common in the United States. It has an acrid taste, very similar to that of green tobacco. By analysis it is found to contain an acrid principle, caoutchouc, and extractive. It is soluble both in water and alcohol. In its medicinal effects, the lobelia is analogous to common tobacco, and varies very much according to the dose in which it is given. It may thus be made to act either as an emetic, antispasmodic, expectorant, or diaphoretic. The diseases in which it has been found useful are asthma, croup, hooping cough, and catarrh. The tincture is the best preparation, and is prepared by digesting, for ten days, $\mathfrak{3}\text{ij}$ of the plant in a pint of diluted alcohol. The dose is from $\mathfrak{3}\text{j}$ to $\mathfrak{3}\text{iv}$ —of the powder ; the dose to prove emetic is from 10 to 20 grs.]

MAGNESIA. L. MAGNESIA USTA, D.

Calcined Magnesia.

QUALITIES. *Form*, a white, very light, soft powder ; *Specific gravity*, 2.3 ; it turns to green the more delicate vegetable blues. SOLUBILITY. Although it requires 2000 times its weight of water to hold it in solution, yet it has the property of considerably increasing the solubility of camphor, opium, and resins in the same fluid ; it is soluble in solutions of the alkaline carbonates, but not in those of caustic alkalies. CHEMICAL COMPOSITION. It is an oxide of a peculiar metal. MEDICINAL USES. Antacid, and when acidity prevails, purgative ; it is preferable to the car-

* DR. CHITTICK'S REMEDY FOR THE STONE. This celebrated nostrum consisted of a fixed alkali in veal broth ; the broth was usually made by his patients, and sent to him fresh every day, in order to be medicated. A. D. 1766.

bonate whenever the bowels are distended with flatus, (*Form*: 150); in other respects, its virtues are the same. See *Magnes. Carb.* The Medicinal Dynameter will shew the equivalent doses of the pure earth and its carbonate; it will be seen for instance that 12 grains of the former will be as efficient, as an antacid, as 25 grains of the latter. **INCIDENTAL IMPURITIES.** It ought not to effervesce with acids, and if magnesia and muriatic acid be placed at one time in separate cups, in a scale of a balance, no diminution of weight should take place on mixing them. Lime is detected by its solution in dilute sulphuric acid affording a precipitate with oxalate of ammonia; the *sulphuret of lime* betrays itself by yielding, when moistened, the smell of sulphuretted hydrogen.*

MAGNESIÆ SUB-CARBONAS. L.

CARBONAS MAGNESIÆ. E. MAGNESIA. D.

Olim, Magnesia Alba.

Carbonate of Magnesia, vulgo Common Magnesia.

This preparation was formerly considered by Mr. Phillips to be a mixture of Carbonate and sub-carbonate of magnesia, an opinion which he has lately retracted; it is, says he, evidently a *carbonate*, i. e. magnesia combined with one proportion of carbonic acid, or forty-eight of carbonic acid to forty-three of magnesia. Dr. Thomson entertains a different opinion, he observes that it seems to be a mechanical mixture of carbonate of magnesia, caustic magnesia, and perhaps of hydrated magnesia; he found too great a diversity in its composition to permit the conclusion that it was a definite chemical compound; in a specimen purchased at Glasgow, he also found six per cent. of *sulphate of lime*. I take this opportunity of stating that in some specimens which I have examined, I have also detected portions of *gypsum*; and from the experiments of Dr. Percival, it appears that if *hard water* be employed for its preparation it will be less light, and will contain a portion of lime. Magnesia will be also liable to contain traces of siliceous earth, derived from the alkali used in producing it. **INCOMPATIBLE SUBSTANCES.** *Acids, and acidulous salts; alkalies and neutral salts; alum; cream of tartar; nitrate of silver; acetate of mercury; oxy-muriate of mercury; acetate of lead; sulphates of zinc, copper, and iron.* **MEDICINAL USES.** Antacid, and purgative. In cases of lithic calculi, carbonate of magnesia, in doses of $\mathfrak{z}\text{j}$ to $\mathfrak{z}\text{j}$, has been proposed by Mr. Hatchett, as a valuable substitute for alkaline remedies. Its insolubility must render its absorption equivocal; its beneficial operation must therefore principally depend upon its neutralizing any excess of acid in the primæ viæ, and in this way there can be no doubt of its lithontrypic agency; "but," says Dr. Marcet, "such is the tendency which the public has to over-rate the utility of a new practice, or to take a mistaken view of its proper application, that there is every reason to believe that the use of magnesia has of late years become a frequent source of evil in calculous complaints. See page 127. **OFFICINAL PREP.** *Hydrag, cum Magnesia. D. Magnesia. L.E.D.* **ADULTERATIONS.** Chalk may be de-

* Magnesia was originally a general term, expressive of any substance which had the power of attracting some principle from the air, from *Magnes*, the Loadstone. The peculiar body which we now denominate Magnesia, was first sold as a panacea, by a canon at Rome, in the beginning of the seventeenth century, under the title of *Magnesia alba*, or Count Palma's Powder.

ected by adding dilute sulphuric acid to a suspected portion, when, should any be present, the solution will be loaded with a white and insoluble precipitate; *gypsum*, by boiling a sample in distilled water, and assaying the solution by a barytic and oxalic test.*

MAGNESIÆ SULPHAS. L. SULPHAS MAGNESIÆ. E.D.

Magnesia Vitriolata. Sal catharticum amarum.

Bitter purging Salt. Epsom Salt.

QUALITIES. *Form*, small needle-like crystals. *Taste*, bitter and nauseous; when pure, it effloresces. **CHEMICAL COMPOSITION.** In its crystallized state, it may be considered as composed of 1 proportional of dry sulphate (*Magnesia* 18·5, and sulphuric acid 37·5) and 7 proportionals of water. **SOLUBILITY.** f3j of water dissolves 3j, and the solution measures f3xj $\frac{1}{4}$; it is insoluble in alcohol. **INCOMPATIBLE SUBSTANCES** *Muriates of ammonia, baryta, and lime; nitrate of silver; sub-acetate, and acetate of lead.* The fixed alkalies and their carbonates, precipitate from it *magnesia* and its carbonate. *Phosphate of soda* occasions no immediate precipitate, unless ammonia be present, in which case the triple *ammoniaco-magnesian phosphate* will be produced. The addition of ammonia, which in the form of *Spiritus ammoniæ aromat* is not unfrequently prescribed in conjunction with a solution of this sulphate, forms also a triple salt, and a portion of *Magnesia* is precipitated: whenever therefore this ammoniacal stimulant is ordered with a purgative salt, the scientific physician will prefer a solution of the sulphate of soda. **FORMS OF EXHIBITION.** Dissolved in the *Infusum Rosæ*, or in a suitable quantity of beef tea, gruel, or any aqueous vehicle, its cathartic powers are increased by dilution, as well as by the addition of a little common salt; *magnesia* renders the taste of its solution less nauseous; and tartarized antimony quickens its operation. **DOSE**, 3ss to 3ij, taken either at once, or in divided doses. *Form.* 37, 69, 72, 76. **OFFICIAL PREP.** *Enema Catharticum. Enema Fœtid.* **D. ADULTERATIONS.** *Sulphate of Soda* is often substituted for this salt, which it may be made to resemble by stirring it briskly at the moment when it is about to crystallize; the fraud may be detected by a precipitation not ensuing on adding carbonate of potass; if only a part of the salt be sulphate of soda, the degree of sophistication can be learnt by the quantity of the precipitate formed; 100 parts of sulphate of *magnesia*, if pure, will yield between 30 and 40 of the dry carbonate. *Epsom salt*, as it commonly occurs, contains *muriate of magnesia*, which disposes it to deliquesce, but lately this salt has appeared in the market in a state of great purity and beauty; the mode of purification is founded upon the well known chemical law, that a saturated solution of one salt is

* **DALBY'S CARMINATIVE.** This consists of Carbonate of *magnesia* ʒij, oils of *Peppermint* ℥j, of *Nutmeg* ℥ij, of *Aniseed* ℥ij, of the tinctures of *Castor* ℥xxx, of *Assafœtida* ℥xv. Tincture of *Opium* ℥v, Spirit of *Pennyroyal* ℥xv, of the Compound Tincture of *Cardamoms* ℥xxx, *Peppermint water* f3ij. There are cheaper compositions sold under the same name. In examining the pretensions of this combination, it must be allowed that it is constructed upon philosophical principles; this however is no reason why the physician should recommend it; the mischievous tendency of a quack medicine does not depend upon its composition, but upon its application; we ought to remember, says an eminent physician, that in recommending this nostrum we foster the dangerous prejudices of mothers and nurses, who are unable to ascertain the circumstances under which it should be given, or even the proper doses; if its composition is judicious, why do not physicians order the same in a regular prescription, rather than in a form in which the most valuable remedy will be abused?

still capable of dissolving another ; in the present instance, therefore, the impure crystals are washed in a saturated solution of the same sulphate, which, although unable to act upon its kindred salt, can dissolve with facility the muriate, and any other saline contamination. I confess, however, that I am induced to regard this process as rather chemically ingenious than as medicinally useful, for the usual saline impurities of Epsom salt are not only harmless, but capable of increasing its purgative powers ; the *double refined* sulphate is certainly less efficient as a cathartic. The presence of the *muriate* may be at once detected by dropping upon the suspected sample some sulphuric acid, by which the disengagement of muriatic acid vapour will be produced. Since the publication of the fourth edition of the present work, I have received samples of the Sulphate of Magnesia prepared by Mr. West of Lymington, and I can confidently recommend the article to the profession ; he contrives to obtain them in large and beautiful crystals, which cannot be so easily mistaken for those of oxalic acid, a circumstance of no small importance to the drug vender ; the form of these crystals is that of a square prism, having its edges replaced, and commonly terminated by a pyramid of four planes ; the only cleavage is parallel to one of the diagonals of the prism. The numerous accidents which so frequently occur from mistaking Oxalic acid for Epsom salts has given rise to many suggestions for obtaining an easy and popular test which may at once distinguish these bodies ; it is evident that no test can be so simple as that afforded by the taste : but if such accidents are in future to be prevented, it must be done by imparting to the acid some external character by which it may be at once recognized ; if a test were even discovered a hundred times more sensible than any which we possess, what would it avail ?

MANNA.* L.E.D.

(Fraxinus Ornus. Succus Concretus.)

Manna.

QUALITIES. *Form*, flakes of a granular texture ; *Colour*, whitish, or pale yellow ; *Odour*, slight, but peculiar ; *Taste*, nauseous sweet, with some degree of bitterness. CHEMICAL COMPOSITION. This concrete vegetable juice, besides sugar, appears to contain mucilage and extractive, to which its taste and other peculiar properties are owing. SOLUBILITY. It is entirely soluble in water and alcohol. MED. USES. It is now merely regarded as a laxative for children, or for weak persons. It generally requires some laxative adjunct, as castor oil, with which it may be combined by the medium of mucilage. DOSE, for children from ʒj to ʒiij, in warm milk. OFFICINAL PREP. *Confectio Cassiæ*. L.E.D. *Enema Cathart.* D. *Enema Fœtid.* D. *Syrup. Sennæ*. D. ADULTERATIONS. There are several varieties in the market, the best of which is flake manna, *manna canulata*, in a stalactitic form. An article, entirely factitious, consisting of honey or sugar, mixed with scammony, is sometimes sold for genuine manna, but its colour, weight, transparency, and taste, must instantly lead to its detection.

MASTICHE. L.

(Pistachia Lentiscus. Resina.)

Mastich.

The use of this resinous substance is to fill the cavities of carious

* "Manna, vox chaldaica est, admirantis interjectio, deducta ab Hebraico Manhu, sive quid est hoc?" Chrystom. Magneni Exercitat. de Manno.

teeth; a solution of it in oil of turpentine is sold as an odontalgic. The Turkish and Armenian women use it as a masticatory for cleaning the teeth, emulging the salivary glands, and imparting an agreeable odour to the breath. It forms a constituent of the *Dinner Pills*. See *Aloes*. Sonnini tells us that, in Egypt, the smoke of Mastich is supposed to kill any sick person that inhales it.

MEL. L.E.D. Honey.

This well known substance appears to be merely collected from the flowers, and not elaborated by the internal economy of the insect; when properly diluted it undergoes vinous fermentation, the product of which is the beverage well known by the name of *Mead*. The English honey is more waxy than that from the south of Europe. *Virgin honey* is that wrought by young bees which have never swarmed, and permitted to run from the comb without heat or pressure. **CHEMICAL COMPOSITION.** Sugar, mucilage, wax, an acid, and occasionally some essential oil. *Clarified Honey* (*Mel Despumatum*. L.D.) has not the agreeable smell of crude honey; it does not, however, ferment so readily, nor is it so apt to gripe. **USES.** It is principally employed for forming officinal preparations, i. e. *Mellita*, viz. *Mel Boracis*, L. *Mel Ros.* L.D. *Oxymel.* L.D. *Oxymel Colchici.* E. *Oxymel Scyllæ.* L.D.* Sir John Pringle considered it as useful in nephritic disorders; it possesses also a laxative property, which renders it on many occasions preferable to Syrup. **ADULTERATIONS.** *Flour* may be detected by diffusing the honey in tepid water, by which it will be separated, and, by subsequent boiling, converted into a thick paste.

MENTHA PIPERITA. L.E.D.

MENTHA PIPERITIS. D. *Peppermint.*†

All the qualities of this plant depend upon an essential oil and camphor; it readily and strongly impregnates either water or spirit, by infusion; its infusion, and the water distilled from the plant, are carminative and antispasmodic; they also serve as vehicles for other medicines, to correct their operation, or to disguise their flavour. **OFFICINAL PREPARATIONS.** *Aq. Menth. Piperit.* L.E.D. *Spir. Menth. Pip.* L.D. *Ol. Menth. Pip.* L.D. If this plant be cut in wet weather, it turns black, and is worthless.

MENTHA VIRIDIS. L. MENTHA SATIVA. D. *Spearmint.*

Cold water extracts the more agreeable and active parts of mint in a few hours; a longer maceration extracts the grosser and less agreeable portions; hot water more quickly extracts its virtues, but if it be boiling it dissipates the aroma. **OFFICINAL PREPARATIONS.** *Aq. Menth. virid.* L.D. *Infus. Menth. comp.* D. *Ol. Menth. virid.* L.D. *Spir. Menth. virid.* L.

MEZEREI CORTEX. L.E.D.

(*Daphne Mezereum. Radicis Cortex.*)

Mezereon.

The inner bark of this plant, when fresh, is corrosive and even vesica-

* **HONEY WATER.**—The article usually sold under this name is a mixture of Essences coloured with Saffron; some add a small quantity of Honey, the effect of which is to communicate a clamminess which retains the scent longer.

† **ESSENCE OF PEPPERMINT.**—A spirituous solution of the Essential Oil, coloured green by Spinach leaves.

tory; the fruit is equally so, but neither have any smell; its virulence is counteracted by camphor. It contains, besides extractive matter, an acrid resinous substance, which, according to Plaff, bears a strong resemblance to the active principle of Cantharides. It is now seldom used except as an antivenereal remedy, or in cases of chronic cutaneous disease. **FORMS OF EXHIBITION.** In a decoction, made by boiling ʒss of the bark, with an equal quantity of Liquorice root, in oij of water down to oij; of which fʒss may be given twice a day. From its pungency it is one of the substances used by fraudulent brewers to communicate a strong flavour to their beer. Where a discharge from issues cannot be kept up by the common means, it is said that the introduction of a little of this bark, instead of the pea, will in a few hours produce the desired effect. **OFFICIAL PREPARATIONS.** *Decoct. Sarsaparill comp. L. Decoct. Daphnes. Mezerei. E.* The *Daphne Laureola* is very generally sold for Mezereon.

MISTURÆ. L.E.D. *Mixtures.*

The principles upon which this form of preparation is to be constructed, are fully detailed in the first part of this work, page 204.

Officinal Mixtures.

MISTURA AMMONIACI. L. This mixture is expectorant, and may be exhibited with tincture of squills, &c. (*Form. 115. 136*). It is slightly curdled by *vinegar, oxymel, æther, and oxy-muriate of mercury.*

MISTURA AMYGDALARUM. L. *Emulsio Amygdali communis. E. Lac Amygdalæ. D.* It is a useful demulcent and diluent, and forms an elegant vehicle for more active medicines. *Incompatibles—Acids, Oxymel, Syrup of Squill, Spirit, and Tinctures,* unless added in very small quantities, decompose this mixture; *tartaric acid, super-tartrate of potass, and oxy-muriate of mercury,* also disturb it. *Form. 137.*

MISTURA ASSAFÆTIDÆ. L. A nauseous preparation; and where its use is indicated, it will be more judicious to prescribe it as an extemporaneous mixture. See *Assafætida.*

MISTURA CAMPHORÆ. L. This solution of camphor forms an elegant vehicle for more active stimulants. The camphor is separated from the water by a solution of pure potass, by sulphate of magnesia, and by several saline bodies. See *Form. 7, 24, 25, 32, 47, 72, 116, 117, 123.*

MISTURA CORNU USTI. L. *Decoctum Cornu Cervini. D.* This is nothing more than a simple diffusion of phosphate of lime in a thin mucilage—*Cui bono?* It was retained in the Pharmacopœia in deference to the opinion of some experienced practitioners.

MISTURA CRETÆ. L.D. A common and useful remedy in diarrhœa, and may be combined with opium, catechu, or any other astringent. *Form. 52.* It is of course incompatible with acids, and acidulous salts.

MISTURA FERRI COMPOSITA. L. This is nearly the same as the celebrated anti- hectic mixture of Dr Griffith; to the result of the decompositions which took place from the mixture of its ingredients, it is wholly indebted for its medicinal energies; thus, a *proto-carbonate of iron* is formed, i. e. the iron combined with carbonic acid is at its *minimum* of oxidation, which renders it more active than the common carbonate, and probably less stimulant than the sulphate; this product, by means of the saponaceous compound formed by the union of the myrrh with the excess of alkali, is *partly* diffused and suspended in the mixture, and *partly* dissolved, whilst at the same time a *sulphate of potass* is formed, which

serves to correct the astringent influence which iron is apt to exert upon the bowels. The iron in this preparation is disposed to combine with an additional proportion of oxygen, hence its ingredients should be quickly mixed together, and it ought to be considered as an extemporaneous preparation, and be preserved in a closely-stopt vessel. Its change of colour will generally indicate its loss of efficacy. This preparation must be regarded as permanently serviceable in Chlorosis, and the numerous sympathetic affections connected with it. In the painful swellings which infest the breasts of chlorotic young women, I have found it almost a specific. Dose, $f\bar{3}j$ — $f\bar{3}ij$. The proportion of *Proto-carbonate of iron*, contained in any given quantity of this mixture, may be found by referring to the Medicinal Dynameter; for instance, bring the preparation to 12, and we shall perceive that this number of fluid-drachms contain 1 grain of *Protoxide*, or rather more than gr. iss of *Proto-carbonate of iron*; and we shall at the same time, perceive that to give an equivalent quantity in the form of *Pil. Ferri comp.* we must prescribe $\mathfrak{D}j$. See *Form.* 96.

MISTURA MOSCHI. This is an eligible form for the administration of Musk. Dose, $f\bar{3}j$ — $f\bar{3}ij$, to which may be added extemporaneously, ammonia, æther, and other diffusible stimulants.

The Dose of the above mixtures is $f\bar{3}j$ to $f\bar{3}ij$ twice or thrice a day.

MOSCHUS. L.E.D. *Musk.*

QUALITIES. *Form*, grains concreted together, dry, yet slightly unctuous. *Colour*, deep brown with a shade of red; *Odour*, aromatic, peculiar, diffusive, and durable: and it has the curious property, when added in a minute quantity, to augment the odour of other perfumes without imparting its own; this renders it a valuable article in perfumery, on which account it is a usual ingredient in lavender water. *Taste*, bitterish and heavy. **CHEMICAL COMPOSITION.** Resin combined with volatile oil, and a mucilaginous extractive matter, with small portions of albumen, gelatine, muriate of ammonia, and phosphate of soda. **SOLUBILITY.** Boiling water dissolves it perfectly; rectified spirit takes up most of its active parts, although the odour is only discovered upon dilution; sulphuric æther is its most complete menstruum. **INCOMPATIBLE SUBSTANCES.** The solutions are decomposed by *Oxymuriate of Mercury*; *Sulphate of Iron*; *Nitrate of Silver*; and the *Infusion of Yellow Bark*. **MED. USES.** Stimulant and antispasmodic. As early as the time of Meade it was employed in typhus fever; Pringle administered it in gout of the stomach, a practice which received the concurrence of Cullen; conjoined with ammonia it has been celebrated for its powers in arresting the progress of gangrene, and of imparting fresh excitement to the nervous system. It has been also administered with success in epilepsy, hooping-cough, and other spasmodic affections. **FORMS OF EXHIBITION.** The best form is that of bolus, combined with ammonia and camphor, or some other similar remedy, (*Form.* 21); it may be also administered in a mixture, for which purpose it requires five times its weight of mucilage, consequently the London College has not directed a sufficient quantity to retain the musk in suspension: by previously triturating it with sugar, its minute division is much facilitated. Dose, grs. x to xxx. See *Form.* 22, 30. **OFFICIAL PREP.** *Mist. Mosch.* L. *Tinct. Mosch.* D. **ADULTERATIONS.** The bag containing the musk should have no appearance of having been opened: the presence of dried blood may be suspected, by its emitting, as it in-

flames, a fetid smoke; *Asphaltum* is discovered by its melting and running before it inflames: the artificial bags are known from the deficiency of the membrane which lines the real musk bags. To increase the weight of the musk, fine particles of lead are frequently added; this is easily detected, for by rubbing it with water, the metallic particles will subside.

MOSCHUS FACTITIUS. *Artificial Musk*, strongly resembling the real, may be formed by digesting f3ss of *Nitric Acid*, for ten days, upon 3j of fetid animal oil, obtained by distillation; to this is to be next gradually added oj of *rectified spirit*, and the whole is then to be left to digest for one month: or—

2. Drop f3iiss of nitric acid upon f3j of rectified oil of amber; after standing twenty-four hours, a black, resinous pellicle, exhaling the odour of musk, will be formed.

MUCILAGO ACACIÆ. L.E.

MUCILAGO GUMMI ARABICI. D.

This preparation consists of one part of gum and two of water; in preparing it, the dispenser is particularly recommended to pulverize the gum, and never to employ that which is purchased in the state of powder, as it is always impure and incapable of forming a pellucid and elegant solution.* **INCOMPATIBLE SUBSTANCES.** Neither the *strong acids* nor *alcohol*, when considerably diluted, occasion any disturbance in it; but *sulphuric æther* and its *compound spirit*, the *tincture of muriated iron*, and *subacetate of lead*, produce very dense precipitates: the *acetate of lead* only occasions decomposition, when an alkaline salt is present in the formula; the *volatile alkali* curdles the mucilage, and *hard calcareous waters* render the mixture difficult and often impracticable. In the pharmaceutical application of this mucilage, it should be remembered that it contains in its composition an astringent principle, which is perhaps of but trifling consequence except in the exhibition of some very few active metallic salts, which are certainly decomposed by it (e. g. grs. x of *nitrate of mercury* are decomposed by 3ij of gum arabic.)† It contains also lime in combination with some vegetable acid. **USES.** Diluted with four times its bulk of water, this mucilage forms a demulcent mixture of appropriate tenacity, which affords a convenient vehicle for several efficient remedies; the pharmaceutical use of this mucilage depends upon the fact of its rendering expressed and essential oils, balsams, resins, gum-resins, resinous tinctures, and fatty bodies, miscible with water, but if a syrup be added, the union will be more perfect; the proportions necessary for this purpose vary according to the nature of the substances; thus, *oils* will require about three-fourths their weight, *Balsams* and *Spermaceti* an equal part, *Resins* a double quantity, and *Musk* five times its weight; the following *Formulæ* illustrate this property, 9, 19, 22, 135.

MUCILAGO AMYLI. L.E.D.

Mucilage of Starch.

This is a strong, insipid, inodorous mucilage, which is principally employed as a vehicle for exhibiting Opium in the form of Enema, see *Amylum*.

* If the Gum Arabic be adulterated with that of the Cherry-tree, the solution will be ropy, in consequence of the presence of CERASIN. See *Mucilago Tragacanth*. (Note.)

† The mucilage is at the same time converted by this salt into a beautiful peach-blossom colour.

MUCILAGO ASTRAGALI TRAGACANTHÆ. E.D.

Tragacanth Mucilage.

Tragacanth is, strictly speaking, not soluble in water, but imbibes a large portion of it, and swells into a considerable bulk, forming a soft but not a liquid mucilage; on the farther addition of water, a fluid solution may be obtained by agitation, and the liquor is turbid; but on standing, the mucilage subsides, the limpid water on the surface retaining a little of the gum;* it differs from all gums in giving a thick consistence to a larger quantity of water, its power in this respect being to that of gum arabic as twenty to one; one part converts twenty of hot water into a stiff mucilage. Tragacanth is not increased, but actually diminished in solubility by the addition of any other gum, it accordingly separates from water with much greater facility when gum arabic is present. This preparation, according to the Edinburgh college, consists of one part of gum and eight of water; the resulting mucilage is stiff, and is principally employed for making *troches*. The Dublin preparation contains four times that quantity of water.

MYRISTICÆ NUCLEI. L E.

NUX MOSCHATA. D. *Nutmeg.*

All the properties of this well-known substance depend upon an essential oil, filling the dark coloured veins which run through its substance, and which is dissipated by decoction; the other components are starch, gum, wax, and a fixed oil. The oil obtained by expression is improperly called *oil of mace*, for it would appear to be a triple compound of fixed oil, volatile oil, and wax, and which, although limpid when first drawn, soon acquires on cooling the consistence of spermaceti. *Muce* is the involucre of the nut. MED. USES. Stimulant, and in large doses, as from ʒij to ʒiij, narcotic, frequently producing delirium. See *Cullen Mat. Med. ii.* 201. OFFICINAL PREP: *Spir: Myristicæ.* L.E.D. FRAUDS. Nutmegs are frequently despoiled of their essential oil, by being punctured and submitted to the operation of decoction, the orifices being subsequently closed by powdered Sassafras; the imposition is detected by the comparative lightness of the nutmeg, and by its extreme fragility; the holes may also be discovered by carefully examining the surface of the nut, after having steeped it in hot water.

MYRRHA. L.E.D.

(*Arboris nondum descriptæ, Gummi resina.*)

Myrrh.

QUALITIES. *Form*, irregularly shaped pieces, translucent, of a reddish yellow colour; *Odour*, peculiar and fragrant; *Taste*, bitter and aromatic. CHEMICAL COMPOSITION. Resin, gum, essential oil, and some extractive. SOLUBILITY. When triturated with soft, or distilled water, nearly the

* This variety of gum, which is characterised by its gelatinizing, but not dissolving, in water, occurs in several vegetable substances; and as it predominates in the Cherry-tree, Dr. John has distinguished it by the name of CERASIN; but as Tragacanth consists almost entirely of this substance, the term TRAGACANTHIN would have been much more appropriate. Although Cerasin will not dissolve in pure water, it undergoes solution in that menstruum, at the temperature of ebullition, provided a portion of a mineral acid be added.

whole appears to be dissolved, forming an opaque, yellowish solution, but by rest the greater part is deposited, and not more than one-third is actually dissolved; its solubility, however, in water may be increased by trituration with camphor or an alkali; rectified spirit dissolves it, and the resulting tincture, when diluted, becomes turbid, although no precipitate occurs. **MED. USES.** Stimulant, as in *Form.* 103. Expectorant, 132, 133, 138. Emmenagogue, 95, 98, 99. It is also tonic, and agrees with some constitutions better than any of the bitters. **FORMS OF EXHIBITION.** No form is so eligible as that of substance. **DOS.**, grs. x to 3j. The alkalies, in their crystalline state, when triturated with myrrh, reduce it to the form of a tenacious fluid. **OFFICINAL PREPARATIONS.** *Tinct. Myrrh. L.E.D. Tinct. Aloes et Myrrh. E. Tinct. Aloës Ætherea. E. Mist. Ferri comp. L. (GL) Pil. Aloes cum Myrrha. L.E.D. Pil. Ferri cum Myrrha. L. Pil. Galb. comp. L.D. (B) Pil. Assafætid. comp. E. (B) Pil. Rhei. comp. E. (G)* **ADULTERATIONS.** It is subject to a variety of frauds, being frequently mixed with adventitious gums, which are to be detected by their foreign odour, their white or dark colour, and by their opacity.

NUX VOMICA. (Strychnus Nux Vomica.)

Nux Vomica.

This seed has not at present a place in the British pharmacopœiæ; it presents however several points of interest to the physiologist, the physician, and the chemist. Its virulent action upon animals has been long known; and it has been administered in combination with gentian in intermittents.* (*Ludovic Phor.* p. 113,) and as a narcotic in mania; it also constituted an ingredient in the famous *Electuarium de ovo.* (*Ph. Angl.* p. 263.) *Nux vomica* has been said to produce benefit in the plague; the German writers have strongly commended it in mania, epilepsy, and hydrophobia; as well as in chronic rheumatism, gout, scrophula, lues venerea, and cutaneous eruptions; in Sweden it is said to have displayed very beneficial effects in Dysentery. Dr. Fourquier has lately introduced its use in the Hospital de la Charité, in cases of partial paralysis, and it is said, with very great success.† The value of the practice has been since confirmed by the experiments of Dumeril, Majendie, Hebreard, Husson, and Asselin. The dose is four or five grains of the powder in pills, during the day. The French codex contains two alcoholic extracts of this substance; the one prepared with a strong spirit (22, 32, Beaumé, i. e. from sp. gr. .915 to .856,) is much more active and powerful than that made with a weak spirit. (12, 22, Beaumé, i. e. from sp. gr. .985 to .915.)

M. M. Pelletier and Caventou have discovered in this substance, a peculiar proximate principle, to which its virulence is owing; it was named *Vauqueline*, in honour of the celebrated French philosopher, but in deference to the opinion of the French Academy of Sciences, the discoverers have substituted the name *Strychnia*, because "a name dearly loved, ought not to be applied to a noxious principle!"‡

* Sir Hans Sloane published a Paper in the Philosophical Transactions, No. 249, Vol. xxi. p. 44, entitled "An account of the *Nux Pepita*, or St. Ignatius's Bean (*Ignatia Amara*, Lin.) A Simple in common use in the Philippine Islands, as a Tonic medicine."

† That the active principle of the *Nux Vomica* expends its virulence upon the spinal marrow has been already noticed. (See page 136.)

‡ M. Henry has given us the most simple formula for the preparation of this substance. It consists in boiling *Nux Vomica* in water, and evaporating the decoction

(*Annales de Chimie*, vol. 8 to 10.) Strychnia is highly alkaline, and crystallizes in very small four-sided prisms, terminated by four-sided pyramids; its taste is insupportably bitter, leaving a slight metallic flavour, and is so powerful as even to be perceptible when a grain is dissolved in eighty pounds of water;* it has no smell; is not changed by exposure to the air, nor is it either fusible or volatile, for when submitted to the action of heat, it only fuses at the moment of its decomposition which takes place at a temperature inferior to that which destroys most vegetable substances; it is so extremely active and violent, that in doses of half a grain it occasions serious effects, and in larger ones convulsions and death; it is perhaps the most powerful,† and next to hydro-cyanic acid, the most rapid of poisons; notwithstanding its strong taste, it is very sparingly soluble in water, requiring 6·67 parts of that fluid for its solution at 50, and 2500 at 212°. It is very soluble in alcohol, but unlike most of the other vegetable alkalies, is nearly insoluble in æther; with acids it forms neutral and crystallizable salts; these salts, as well as their base, have the singular property of becoming blood-red by the action of concentrated nitric acid. The alcoholic solution of Strychnia has the property of precipitating the greater number of metallic oxides from their acid solutions. It is precipitated by alkalies and alkaline earths. Strychnia exists in native combination in the *Strychnus* with an acid which has some analogy with the malic, and which Pelletier and Caventou propose to call the *Igasuric acid*, from the Malay name for the bean of St. Ignatius,‡ (*Strychnus Ignatius*), in which its properties were first examined. In conformity with such views, the active principle of the tribe of *Strychni* is an *Igasurate of Strychnia*;—a fact which suggests the existence of a most singular and striking analogy between the chemical constitution of these narcotico-acrid bodies§ and that of opium. The recent experiments of Pelletier have shewn, moreover, that besides Strychnia, the *Nux Vomica* contains *Brucia*, an alkaline body which had been previously discovered in spurious *Angustura*. Its properties are similar to those of Strychnia, but it is less active. Being much more soluble in alcohol than *Strychnia*, if care be taken to crystallize the latter several times in alcohol, it will be separated, the *Brucia* remaining in the *mother waters*. Strychnia has been given in doses of one-twelfth of a grain, but it is a most dangerous remedy, and is liable to occasion tetanic convulsions. It has been said, however, to prove serviceable in cases of Epilepsy that had resisted every other method of cure. Dr Fleming informs us that the Hindoos of upper India are in the habit of adding *Nux Vomica* in the

until it acquires the consistence of Syrup; lime is then added, which unites with the acid, and liberates the Strychnia; which may then be separated by means of alcohol, from which it may be obtained by crystallization.

* Ann : de Chimie et de Phys. x. 153.

† M. Majendie has killed a dog with one eighth of a grain, and the editor of the *Edinburgh Med : and Surg : journ :* has seen one die in two minutes after the injection of one sixth of a grain into the cavity of the pleura. The celebrated Java poison owes its activity to Strychnia.

‡ Strychnia was obtained from the beans of St. Ignatius by the following process : a portion of the beans being grated was heated in a close vessel, under pressure, with sulphuric æther, by which an oily matter was dissolved; the residuum then yielded by the action of alcohol, a yellowish brown, very bitter substance, which being boiled in pure magnesia and filtered, the colouring matter was washed out, and the Strychnia and magnesia, in a state of mixture, remained on the filtre. The strychnia was then separated by alcohol, and thus obtained in a state of great purity.

§ See note under the article Opium.

process of distilling Arrack, for the purpose of rendering the spirit more intoxicating. The London Porter brewers have been accused of the same pernicious practice.

OLEA DESTILLATA. L. OL VOLATILIA. E.

OL. ESSENTIALIA. D.

Distilled, Volatile, or Essential Oils.

The British pharmacopœiæ direct them to be obtained by distillation only; the French codex orders several of them to be prepared by expression. **QUALITIES.** *Form*, liquid, sometimes viscid; *specific grav.* various; oil of turpentine, which is the lightest, being only 0.792, whilst the oil of cloves, cinnamon, and allspice, exceed 1.030, and that of sassafras, which is the heaviest, amounts to 1.094: these latter oils hold resin in solution, and of course sink in water. *Odour*, penetrating and fragrant; *Taste*, acrid; they are volatilized at a temperature somewhat below that of boiling water; they are very inflammable. **SOLUBILITY.** Very soluble in alcohol, forming what are termed in perfumery *Essences*; in water they are very sparingly soluble: the solutions are known in pharmacy under the title of *distilled water*; they are also dissolved by æther, and the *fixed* oils; when digested with ammonia, some of the less odorous acquire a considerable degree of fragrance, whilst on the contrary, fixed alkalies universally impair their odour; they are rapidly decomposed by nitric and sulphuric acids, and their action is sometimes attended with instant inflammation. Volatile oils, from continued exposure to the air, absorb oxygen, and become resinous, by which they lose their volatility, fragrance, and pungency, hence they should be preserved in small opaque phials, completely full and well stopped. **MED. USES.** They act as powerful stimulants and aromatics; they remove nausea and flatulence, correct the griping of certain purgatives, and cover the offensive taste of various remedies. See *Aquæ destillatæ*. They, moreover, have the property of defending certain animal and vegetable preparations from mouldiness. This curious fact has been already noticed, see page 181. The following is a list of the species admitted into our British pharmacopœiæ; those designated in *italics* are principally for internal use. OLEA *Anisi*, *Anthemidis*, *Carui*, *Juniperi*. Lavandulæ, *Menthæ Piperitæ*, *Menthæ viridis*, *Origan*, *Pimentæ*, *Pulegii*, *Rosmarini*, L. OLEA VOLATILIA, *Juniperi communis*, *Juniperi Sabinæ*, Lavandulæ Spicæ, Lauri Sassafras, *Menthæ Piperitæ Myrtæ*, *Pimentæ*, *Pimpinellæ Anisi*. Rorismarini Officinalis. E. OLEA *Juniperi*, *Pimento*, Cortices et Ligni Sassafras, e *Seminibus Anisi*, *Carui*, et *Fœniculi dulcis*, Florum Lavendulæ, Foliorum Sabinæ, *Herbæ florentis Menthæ Sativæ*, *Origan*, *Pulegii*, Rorismarini, *Rutæ*, D. **ADULTERATIONS.** *Fixed Oils* may be detected by moistening writing paper with the suspected article and holding it before the fire: if the oil be entirely essential, no stain of grease will remain; as castor oil is more soluble in spirit than the others, it is the one generally selected for this fraudulent purpose, and the addition of alcohol restores the sophisticated oil to its proper degree of consistency. Alcohol is discovered by adding water, which, if it be present, occasions a milkiness, and at the same time, an increase of temperature; a decrease of bulk also takes place, which may easily be ascertained by measuring the oil and water separately, and then transferring them, in a state of mix-

ture, into a tube of small diameter. *Cheaper oils*, as that of turpentine, are recognized by their peculiar odour, which may be developed by rubbing a drop upon the hand and holding it to the fire, or, by the dense black smoke with which they burn. The oil of aniseed, as it crystallizes at 50° , is frequently sophisticated with wax, spermaceti, or camphor; the fraud is detected by warming the oil, when the crystals, if genuine, will dissolve.* In some cases the refractive power of the oil affords a test of its purity. See my work on *Chemistry in its relations to Medicine*, § 318.

OLEA EXPRESSA. L.D.

OLEA FIXA, SIVE EXPRESSA. E.

Expressed or Fixed Oils.

These are obtained from animal matter by fusion, and from vegetable by expression, or decoction with water. **QUALITIES.** *Odour*, none; *Taste*, mild; they boil at 600° , but undergo decomposition, becoming acrid and empyreumatic; the oil, in this state, was formerly used in medicine under the name of *philosopher's oil*.† By exposure to air they absorb oxygen and become rancid; they congeal at a temperature of 32° , and some even above that. When the oil is expressed by heating the plates of the press, or by previously roasting the seeds, it is more disposed to become rancid; *cold drawn* oils are on this account to be preferred for the purposes of pharmacy. **SOLUBILITY.** They are insoluble in water, and, except castor oil, nearly so in alcohol and æther; with caustic alkalies they combine and form soaps; when aided by heat they readily unite with oxide of lead, forming the solid compound well known by the term *plaister*. They unite also very readily with each other, and with volatile oils. **SOLVENT POWERS.** They dissolve sulphur, and form a kind of balsam with it; they also possess the power of extracting and dissolving the narcotic and acrid principles of several vegetable and animal substances, in consequence of which, the French pharmacopœia directs a series of preparations under the term "*Olea Medicata*;" thus there are olea Cicutæ, Hyoscyami, Solani, Stramonii, Nicotianæ;‡ which are made by digesting with a gentle heat, one part of the subject in two parts of olive oil.§

OLEUM AMYGDALARUM. L.E.D.

Oil of Almonds.

This fixed oil, whether procured from the *sweet* or *bitter* almond, has the same properties, for the bitter principle resides exclusively in combi-

* **HUILES ANTIQUES.** The basis of the best of these oils, is the oil of Ben, from the nuts of the *Guilangia Moringa*; or oil of hazel, which is a very good substitute, since it is inodorous, colourless, and may be kept for a considerable period without becoming rancid: it is therefore well adapted to receive and retain the odour of those vegetables that yield but a small proportion of essential oil.

† **OIL OF BRICKS.** So called because this empyreumatic oil was sometimes obtained by steeping hot brick in oil, and submitting it to distillation.

‡ **ROCHE'S EMBROCATION FOR THE HOOPING COUGH.** Olive oil mixed with about half its quantity of the oils of cloves and amber.

STRUVE'S LOTION FOR THE HOOPING COUGH. This once famous nostrum consisted of 3j of Tartarized Antimony, dissolved in f3ij of water, to which was added f3j of Tincture of Cantharides.

§ The editors have also unaccountably retained the *Oleum de Lumbricis*!

nation with a peculiar volatile oil attached to the mucilage;* that from the latter keeps longer without rancidity. It is sometimes made from old Jordan almonds, *by heat*, in which case it very soon grows fetid. Nut Oil, *Oleum nucum Coryli*, has been proposed as a substitute for that of almonds; in China it is drunk with tea, instead of cream. **MEDICAL USES.** For forming emulsions, in coughs, and other pulmonary complaints. **FORMS OF EXHIBITION.** It may be formed into an *emulsion* by the intermedium of *mucilage*, the *yelk of an egg*, or by that of an *alkali*.

1. **BY MUCILAGE.** This is in general a more convenient medium than the yelk of an egg; one part of gum, made into mucilage, will be sufficient for the diffusion of four parts of oil, (see *Mucilago Acaciæ*) the oil and mucilage must be carefully triturated together, and the water then gradually added; the emulsion thus formed is permanent, and the addition of a moderate quantity of acid, spirit, or tincture, will not produce decomposition. See *Form.* 73.

2. **BY ALKALIES.** This oil, by uniting with alkalies and water, forms an elegant and grateful mixture, for which purpose the following proportions are to be observed, every f3j of oil requires ℥viij of liquor potassæ, and f3iss of distilled water. **INCOMPATIBLE SUBSTANCES.** *Acids; oxymel; syrups of poppies and squills; tartrate and super-tartrate of potass; super-sulphate of potass; oxy-muriate of mercury; resins; hard water.* See *Form.* 166, 167.

OLEUM AMYGDALÆ AMARÆ VOLATILE.

QUALITIES. Colour, pale yellow; Odour, fragrant and pungent, having the characteristic smell of prussic acid. Taste, pungent, bitter, and peculiar. **SOLUBILITY.** Like other essential oils, its sensible properties and medicinal effects are imparted to water; in alcohol it is very soluble.† **CHEMICAL COMPOSITION.** A peculiar oil, combined with hydro-cyanic acid. M. Vogel of Munich has lately succeeded in separating these constituents, by agitating the whole in a concentrated solution of potass, and distilling to dryness; the oil volatilized together with water, while the residuum in the retort was found to contain *Cyanide of Potassium*. The volatile oil, thus purified, is without odour, and heavier than water. Its taste is extremely acrid and burning; by contact with air it crystallizes rapidly; it dissolves easily in alcohol and æther, but only in a very small proportion in water. The flame of its combustion is very brilliant, and accompanied with much smoke. In order to discover whether this oil, when freed from its hydro-cyanic acid, is still poisonous, M. Vogel put a drop of it on the tongue of a sparrow, when it died, after violent convulsions, in a few seconds; he also poisoned a dog two months old, with four drops of it; whence he concludes that the volatile oil, divested of its hydro-cyanic acid, is still a poison, although less energetic than the oil that has not undergone such a change. **MED: USES.** It has all the characteristic effects of prussic acid, but is so powerful and dangerous as to preclude its application. It is principally sold to perfumers and confectioners.

* If the plates of the press be heated, the fixed oil from the bitter almond will be odorous.

† **ESSENCE OF BITTER ALMONDS.** The preparation sold under this name, for the purposes of perfumery, &c. consists of one part of this essential oil, and seven parts of Rectified spirit.

It is generally obtained by distilling the expressed cake of bitter almonds ; the operation however requires considerable pharmaceutical address, and is moreover attended with unpleasant consequences.*

OLEUM OLIVÆ. L.E.D. *Olive Oil.*

QUALITIES. *Colour*, pale yellow, somewhat inclining to green ; *Taste*, bland ; *Odour*, none ; it ought to congeal at 38° *Fah.* With the exception of the oil of Almonds, it is the lightest of the fat oils, its specific gravity being only .915. According to the recent observations of Dr. Clarke of Cambridge, this oil crystallizes in rectangular four-sided prisms with square bases. **USES.** Although much less laxative than Castor oil, it is a useful aperient. . It was long regarded, but erroneously ; as possessing antidotal powers against the bites of venomous snakes and insects ; and it has been confidently recommended in the form of liniment, as a remedy against the Plague. **OFFICINAL PREPARATIONS.** *Linimentum Ammoniac Fortius. L.* **ADULTERATIONS.** It is not unfrequently mixed with the oil of poppy seeds, (see *Papaveris Capsulæ*) a fraud which may be easily discovered by exposing a sample to the freezing temperature, when the olive oil will congeal, while that of poppies will remain fluid ; and since those oils which freeze with most difficulty are most susceptible of rancidity, the admixture of poppy oil must be regarded as injurious : it also deserves notice that the peculiar habitudes of *Oil of Olives*, with the *Pernitrate of Mercury*, offer a distinguishing character, by which the adulteration of the oil may be satisfactorily detected ; for if the *pernitrate*, made by dissolving 6 parts of the metal in 7.5 of nitric acid, of sp. grav. 1.36, at a common temperature, be mixed with olive oil, the mixture, if kept cold, will in the course of a few hours become solid, whereas if it has any admixture of the oil of grains, it will not undergo such a change. The contamination derived from lead, which is frequently immersed in the oil for the purpose of removing its rancidity, may be detected by shaking one part of the suspected sample with three parts of water, impregnated with sulphuretted hydrogen, in a stopped phial.

OLIBANUM. L.D.

Juniperus Lycia. Gummi-resina.

Olibanum.†

QUALITIES. *Form*, fragments of a translucent, whitish yellow, and generally powdered with a whitish dust, occasioned by the friction of the

* For such reasons there are but few wholesale houses who profess to distil it. I have, however, through the civility and attention of Mr. Johnsen, chemist in Oxford-street, who frequently conducts the process on a large scale, had several opportunities of witnessing the interesting phenomena to which it gives rise. So powerful is the odour developed upon these occasions that it fills the premises with an almost insupportable atmosphere, occasioning head-ache, sickness, and cough ; so that we may safely observe, that whatever miracles the prussic acid may perform, when applied to the coats of the stomach, its application in the form of vapour to the lungs proves highly irritating to those organs.

The concentrated vapour of this essential oil is almost instantly destructive to animal life. I have seen flies drop lifeless to the floor as they have passed over the still ; thus, as it were, realizing in miniature the fabled powers of Avernus.

“ Quam super haud ullæ poterant impune volantes

Tendere iter pennis ; talis sese halitus atris

Faucibus effundens supera ad convexa ferebat.” *Æn. VI. v. 239.*

† Some authors have considered the olibanum as the *Αϊκάριος* quasiam Oleum Libani.

pieces against each other : *Odour*, when burning is fragrant ; *Taste*, bitterish and acrid. *SOLUBILITY*. When triturated with water, a milky solution results, which after some time deposits the resinous part, and retains not more than three eighths dissolved. Alcohol dissolves three fourths of it, and forms a solution perfectly transparent. *Æther* dissolves more than half, leaving a white opaque residuum soluble in water. *CHEMICAL COMPOSITION*. The latest analysis of this substance is by *Braconnot*, who found in 100 parts of it, of volatile oil 8, resin 56, gum 39, and of an anomalous principle resembling gum, but insoluble in water and alcohol, 5.2 parts. The oil, in colour and smell, very strongly resembled that of lemons. *MED. USES*. It is now less used than formerly ; it is, however, stimulant and diaphoretic. Pulverized it enters into several popular electuaries for gleet, fluor albus, &c. and very probably acts by finding a passage into the urine, without undergoing any change or decomposition.

OPIUM. L. E. D. (*Papaver Somniferum.*) *Capsularum immaturarum Succus concretus.* (Turcicus.)

*Turkey Opium.**

Two kinds are found in commerce, distinguished by the names of *Turkey* and *East India* Opium.

QUALITIES. Form. Turkey opium occurs in flat pieces, of a solid compact texture, and possessing considerable tenacity ; *Sp. gr.* 1.336, so that, when compared with the condensed juices of other plants, it is heavy, being exceeded only in this respect by opoponax and gum-arabic. By long exposure to the air it becomes hard, breaks with a glimmering fracture, owing to the presence of a few saline particles, and affords a yellowish powder. It is opaque, tenacious, plastic, adherent to the fingers. *Colour.* a reddish-brown or fawn. *Odour*, peculiar, heavy, and narcotic. *Taste*, at first a nauseous bitter, which soon becomes acrid with some degree of warmth. It is inflammable, but yields no narcotic odour on burning. *SOLUBILITY*. It is partially soluble in water, alcohol, æther, wine, vinegar, and lemon juice ; when triturated with hot water, five parts in twelve are dissolved, six suspended, and one part remains perfectly insoluble and resembles *gluten*. By long boiling, its soporific powers are impaired and ultimately destroyed : the alcoholic is more highly charged with its narcotic principle than the aqueous solution ; but spirit, rather below proof, is its best menstruum. The watery solution when filtered is transparent, and reddens the colour of litmus ; it undergoes no change on the addition of alcohol, but precipitates occur from *pure ammonia* and from the *carbonates of fixed alkalies* ; from the solutions of *oxy-muriate of mercury*, *nitrate of silver*, *sub-acetate and acetate of lead*, the *sulphates of copper*, *zinc*, and *iron*, and from an *infusion of galls*. *CHEMICAL COMPOSITION*. Resin, gum, bitter extractive, sulphate of lime, gluten, *Narcotine* (see note) and a peculiar alkaline body, to which the soporific vir-

(Thus) of the ancients, but Dr. Maton has observed that he cannot find any passage in the ancient authors sufficiently precise to corroborate this conjecture. See *Abietis Resina*.

* The Greeks and Romans attached a very different meaning to the terms *Opium* and *Meconium*. The former signified the pure juice (*σποος succus*) that flowed from the scarified poppies, the latter, the juice obtained by bruising and pressing the poppy heads.

tues of opium are owing, and to which the appropriate name of *Morphia* has been assigned; and it appears moreover that this new alkaline body exists in combination with an unknown acid, which has therefore been denominated the *Meconic Acid*; so that the narcotic principle of opium is *Morphia* in the state of a *meconiate*, or perhaps of a *super-meconiate*.

For these important facts we are indebted to the successive labours of Derosne,* Seguin,† Sertuerner,‡ and Robiquet. And the French codex contains, in its appendix, formulæ for the preparation of morphia§ according

* *Annales de Chimie*, vol. 45. Derosne first obtained a crystalline substance from Opium in the year 1803, which dissolved in acids; but he did not determine its nature or properties; in 1804 Seguin (*Ann. de Chim.* vol. 92) discovered another crystalline body in opium, and although he described most of its properties he never hinted at its alkaline nature. † Sertuerner at Eimbeck, in Hanover, had at the same time as Derosne and Seguin, obtained these crystalline bodies, (*Ann. de Chim. et de Phy.* T. v.) but it was not until the year 1817, that he first unequivocally proclaimed the existence of a vegetable alkali, and assigned to it the narcotic powers which distinguish the operation of opium; to this body he gave the name of *Morphia*, and it appears to be the same as the essential salt noticed by Seguin. The salt of Derosne, now more usually denominated *Narcotine*, is quite a different principle, although it was constantly mistaken for one of the salts of *Morphia*, till M. Robiquet (*Ann. de Chim. et de Phy.* T. v.) pointed out its distinctive properties. It is an azotized substance, crystallizing in beautiful pearly prisms or tables; soluble in fixed oil, and still more so in æther and the acids; insoluble in water, and little soluble in alcohol; destitute of action on the vegetable colours, and incapable of neutralizing acids. There still exists, however, very considerable confusion with respect to this salt, and farther experiments are required to ascertain its chemical nature, as well as its physiological action.

‡ The discovery of an alkaline body in opium induced the French and German chemists to examine the composition of other active vegetables, with a view to detect the existence of an analogous principle; and their labours have been rewarded with unexampled success. They have accordingly obtained *STRYCHNIA* from the nut of the *Strychnos nux vomica*;—*BRUCIA* from the bark of the *BRUCEA Anti-dysenterica* (False *Angustura* Bark);—*VERATRIA* from the *Veratrum album*, *V. Sabadilla* and *Colchicum Autumnale*;—*CINCHONIA* from the bark of the *Cinchona Oblongifolia* (Red Bark);—*QUINA* (or *KINA*) from that of the *Cinchona Cordifolia* (Yellow Bark);—*EMETA* from the *Callicocca Ipecacuanha*;—*DELPHIA*, from the *Delphinium Staphisagria*; *PICROTOXA* from the *Menispermum Coccus*;—*SOLANA* from the *Solanum Nigrum*, and *S. Dulcamara*;—*GENTIA*, from *Gentiana lutea*;—*ATROPIA* from the *Atropa Belladonna*; *HYOSCYAMA*, from *Hyoscyamus Niger*. Besides which, *Capsicum*, *Piper nigrum*, and *Senna*, have been said to yield analogous principles of a salifiable character. With respect to most of these alkaline bodies farther experiments are required to establish our confidence; it is more than probable that several of them will turn out to be disguised modifications of each other; it has already been questioned whether *QUINA* and *CINCHONIA* be not varieties of one alkali; indeed it is possible that all these bodies may have the same alkaline base, and that they differ from each other in consequence of their combination with other principles, derived from the vegetable in question, and impressing upon the salt its characteristic virtues; and this idea receives material support from the fact, that they are neutralized by a very small proportion of acid. (See a paper on this subject in the 70th number of the *Edinburgh Med. and Surg. Journ.*)

They have all many properties in common, such as a degree of bitterness varying in intensity in different species; they are inodorous; are not altered by air or light, but are decomposed by a moderate heat; most of them enter into fusion, but at different temperatures, some for instance at below 212° Fahr. others not until they are about to be decomposed; *HYOSCYAMA* will even resist a low red heat. They are very sparingly soluble in water, but they are in general rendered more so by the presence of resinous matter. They are nearly all highly soluble in alcohol. Æther readily dissolves *DELPHIA*, *VERATRIA*, *EMETA*, *QUINA*, and *GENTIA*; but *MORPHIA*, *CINCHONIA*, and *PICROTOXA*, are very sparingly soluble; and *STRYCHNIA* and *BRUCIA* are nearly insoluble in it; they combine with the acids; and, in general, form neutral salts; but it appears that *VERATRIA* and *EMETA* always unite with an excess

to the directions of these two latter chemists: viz. *Robiquet's* process. Three hundred parts of pure opium are to be macerated during 5 days, in 1000 parts of common water; to the filtered solution, 15 parts of perfectly pure magnesia (carefully avoiding the *carbonate*;) are to be added; boil this mixture for ten minutes, and separate the sediment by a filter, washing it with cold water until the water passes off clear; after which treat it alternately with hot and cold alcohol, (12, 22, B .) as long as the menstruum takes up any colouring matter; the residue is then to be treated with boiling alcohol (22, 32, B .) for a few minutes. The solution, on cooling, will deposit crystals of *Morphia*.

Rationale of the Process. A soluble *Meconiate of Magnesia* is formed, whilst the sediment consists of *Morphia* in the state of mixture, with the excess of magnesia; the boiling alcohol with which this residuum is treated, exerts no action upon the magnesia, but dissolves the *Morphia*, and on cooling surrenders it in a crystalline form. A repetition of the treatment with boiling alcohol will procure a fresh crop of crystals, and the process should be continued until they cease to appear.

Sertuerner's method. It differs from the preceding, in substituting ammonia for magnesia, and in adding to the sediment, separated as before mentioned, as much sulphuric acid as is sufficient to convert the *Morphia* into a sulphate, which is subsequently decomposed by a farther addition of ammonia; the precipitate thus produced is then dissolved in boiling alcohol, which on cooling surrenders the *Morphia* in a state of crystalline purity. It appears, however, that the *Morphia* produced by this latter method, is less abundant and more impure and coloured, than that which is furnished by the process of Robiquet.

Characters of Morphia. When pure, it crystallizes in very fine, transparent, truncated pyramids, the bases of which are either squares or rectangles, occasionally united base to base, and thereby forming octohedra. It is sparingly soluble in boiling water, but dissolves abundantly in heated alcohol; and the solution is intensely bitter; in æther it is far less soluble of acid. All the combinations with the mineral acids, excepting the salts of *Picrotoxa*, are exceedingly soluble in water; and, with the exception of *Nitrate of Cinchonia*, and all the salts of *Veratria*, they are crystallizable. The acetates too, with a few exceptions, are also soluble, and they are disposed to form super-salts. All the oxalates, except that of *Picrotoxa*, which is the most soluble of its salts, and all tartrates, are rather insoluble, and have likewise a tendency to unite with an excess of acid. The action of concentrated nitric acid on these alkaline bodies is very peculiar, converting the greater number of them into artificial tannin; but it appears to peroxidate *Morphia*, *Strychnia*, and *Brucia*, rendering them less powerful as salifiable bases, and diminishing or destroying their action on the animal body. See *Edinburgh Med. & Surg. Journ.* supra citat.

By analysis, with the deutoxide of copper, these alkalies yield carbon, hydrogen, and oxygen; but no azote, unless they have been obtained by precipitation with ammonia, as in the process of Sertuerner.

It would appear that these bodies exist in their native plants, in combination with peculiar acids; some of them are found in the state of Malates.

With respect to their physiological action it may be stated, that they would appear to concentrate in themselves the characteristic properties of the vegetables to which they belong, and yet, although their effects are much greater than those of the undecomposed vegetables, the same quantity of alkali is not so powerful in its pure form as in its natural state of combination. Thus one grain of morphia produces no more effect than two grains of Turkey opium, which do not contain more than a sixteenth part of the alkali. To explain this loss of efficacy which usually attends our attempts at concentration, the reader is referred to the observations which have been already offered upon this subject in the first part of this work, page 157.

ble. It has all the characters of an alkali ; affecting test papers, tinged with turmeric or violets ; uniting with acids, and forming neutral salts, and decomposing the compounds of acids with metallic oxides. It unites with sulphur by means of heat, but the combination is decomposed at the same instant : it is incapable of forming soap with an oxidized oil. It fuses at a moderate temperature, when it resembles melted sulphur, and like that substance, crystallizes on cooling ; it is decomposed by distillation, yielding carbonate of ammonia, oil, and a black resinous residue, with a peculiar smell ; when heated in contact with air, it inflames rapidly ; the voltaic pile exerts but little action upon it, yet, when mixed with a globule of mercury, the latter appears to become increased in bulk, and to change consistence. When analyzed by means of the deutoxide of copper, it yields carbon, hydrogen, and oxygen ; and if ammonia has been employed, as a precipitant in its preparation, we shall also obtain some nitrogen, but not if prepared according to the improved process of Robiquet. Its habitudes with different bodies have not hitherto been sufficiently investigated, but they are highly important, in as much as they will explain the operation of those medicinal compounds, into which opium enters as a principal ingredient. *Sertuerner* has given us an account of the effect of the alcoholic solution of Morphia on himself and three of his pupils ; he found, that repeated small doses of half a grain produced at first decided excitation ; then weakness, numbness, and tendency to fainting : after swallowing vinegar while in this condition, violent vomiting was excited, profound sleep intervened in one delicate individual, and next day he suffered from nausea, vomiting, head-ache, anorexia, constipation, and heaviness (*Ann. de Chim. et de Phys.* T. v.) This case is sufficient to show that although Morphia possesses the characteristic powers of opium, its strength is by no means commensurate with its supposed concentration. When uncombined it exerts little or no action in consequence of its insolubility. The following history of its saline compounds may be useful.

The *Carbonate* crystallizes in short prisms.

The *Acetate* in needles, very soluble, and extremely active.

The *Sulphate*, in arborescent crystals, very soluble.

The *Muriate*, in plumose crystals, much less soluble ; when evaporated, it concretes into a shining white plumose mass on cooling.

The *Nitrates*, in prisms grouped together.

The *Meconiate*, in oblique prisms, sparingly soluble.

The *Tartrate*, in prisms.

Morphia is separated from the above combinations by ammonia.

Morphia is very soluble in olive oil, and according to the experiments of *M. Majendie*, the compound acts with great intensity ; with extractive matter, it forms a compound which is almost insoluble in water, but very soluble in acids.

The solubility of Morphia in acids explains why the administration of vinegar increases the powers of opium, (*See page 139.*) *M. Majendie* considers Morphia to produce a more purely soporose effect than opium, and that it is moreover exempt from the consecutive operation which so generally renders opium objectionable. This opinion, however, has not been confirmed by the trials made in this country : equally gratuitous is the assertion of the same physiologist, that by ringing changes on the salts of Morphia, its hypnotic effects may be kept up without increasing its dose.

As *M. Majendie* considers the *after* effects of opium to be independent of Morphia, it was necessary for him to point out the particular principle from which these noxious consequences arose, and he accordingly ascribed them to the *Salt of Derosne*, now more usually denominated *Narcotine*, and which may be entirely removed from the extract of opium by macerating it in sulphuric æther; and in this way, it is said, a preparation is obtained, which, like Morphia, is exempt from the occasional bad consequences of the common drug; but no satisfactory trials have as yet been made with it.

The *Meconic Acid*, when separated from the residuum of the magnesian salt, as described above, does not appear to possess any medicinal activity. Its distinguishing *chemical* character is, that it produces an intensely red colour in solutions of iron oxidized *ad maximum*.

EAST INDIA OPIUM is an inferior species;* it differs from *Turkey Opium*, in its *texture* being less compact, and much softer; its *colour* darker; its narcotic *odour* fainter, but combined with a strong empyreuma, and in its *taste* being more bitter, but less acrimonious. According to the experiments of Mr. A. T. Thomson, *Turkey Opium* contains three times more morphia than the *East Indian* variety. This latter, when triturated with water, is taken up without any residuum; hence it contains no gluten, but the sulphate of lime is more abundant, as appears from the relative proportion of precipitate produced by oxalic acid. The solution of the acetate of barytes, whilst it occasions no disturbance in the solutions of the *Turkey* variety, produces a copious precipitate with the *East Indian*. MED. USES. Are so well known that a few practical remarks will suffice.†

Chemistry, it appears, has developed the principle of its activity, and accumulated experience has established the value and importance of its medicinal applications, but Physiology is still unable to demonstrate the manner in which it produces its effects. It must be admitted that its primary operation is that of a powerful and diffusible stimulant, but it is immediately followed by narcotic and sedative effects, which are far greater than could have been inferred from the degree of previous excitement, and hence much keen controversy has arisen in the schools concerning its *modus operandi*, (see page 78.) In large doses, the primary excitement is scarcely apparent, but the powers of life are instantly depressed, drowsiness and stupor succeed, and when the dose is excessive, these are followed by delirium, stertorous breathing, cold sweats, convulsions, and apoplectic death. Its stimulant effects are apparent only in small doses, by which the energy of the mind,‡ the strength of

* The manufacture, however, of Indian Opium has been of late years greatly improved by Dr. Fleming, under whose superintendence that important department was placed by the Marquis Wellesley.

† Forty thousand pounds weight of opium are annually imported into the port of London.

‡ It has been stated in the Historical Introduction to this work, (page 8.) that the nepenthe, which Helen mixed with wine, and gave to the guests of Menelaus, was probably opium; such was the opinion of Sprengel, expressed in his History of Botany. Other authors have entertained a different belief. Delile, in his "Flora Egyptiaca," considers it to have been a preparation of *hyoscyamus albus*. Dr. Christen, in his late elaborate dissertation on Opium, agrees with Forbes, who states, in his Oriental Memoirs, that in Hindostan, Bendsch, i. e. nepenthe is prepared from the *cannabis sativa* of Linnæus. Lindner informs us that bangue is prepared from the dried leaves

the pulse, and the heat of the body, are considerably increased, but all the secretions and excretions, except the cuticular* discharge, are diminished; for example, the fæces of persons, after the use of opium, are not unfrequently clay-coloured, from the suspension of the biliary secretion; this circumstance suggests some important precautions with respect to its exhibition. Opium, when properly directed, is capable of fulfilling two great indications; 1st, of supporting the powers of life, and 2nd, of allaying spasm, pain, and irritation, and of blunting that morbid susceptibility of impression, which so frequently attends fever. Its use is contra-indicated in all cases where inflammatory action prevails, as in pulmonary affections, attended with an accelerated circulation and a dry hard cough.† It is employed by some of the oriental nations for the same purposes that we take spirituous potations: by the Turks especially, to whom our more generous beverages are prohibited by religious prejudice, opium is solicited to inspire courage, or to invigorate fortitude;—to soothe sorrow;—or to dissipate the remembrance of misfortune;—to awaken the fancy to more brilliant exertions; or to create that mild composure and serenity of feeling, which is desirable after the cares and solitudes of an active, perplexing, and arduous scene: like spirituous liquors among other people, it is, in short, the support of the coward,—the solace of the wretched,—and the daily source of intoxication to the debauchee. Notwithstanding all this, spirit and opium are by no means parallel medicines; on the contrary, the latter substance offers the best remedy for the *Mania a Potu*, and in cases of habitual drunkenness from alcohol, where our wish is to abstract the spirit, but are for obvious reasons unable so to do, we may frequently alternate its use with that of opium with considerable advantage. Many of the beneficial effects of this remedy are to be referred to its power of allaying irritability; Sir G. Blane has remarked, that in ill conditioned ulcers in the West Indies, opium was found superior to all other internal medicines for producing a disposition to heal. Under the free use of it, such ulcers would in place of a sanious discharge produce a healthy pus succeeded by granulations and cicatrization. It appears to do this by suspending irritation, and perhaps by promoting absorption.

of the wild cannabis, the smoke of which is said to be more narcotic than even that of opium. There seems, however, to be good reason for supposing that Indian bangué is a compound of several ingredients. Ray says that he learned from Sir Hans Sloane, that the principal ingredient was not hemp, but a plant somewhat like it.

* The operation of Opium is not unfrequently attended with an itching, or sense of pricking of the skin, which is sometimes terminated by a species of miliary eruption.

† Opium is the Quack's sheet anchor. The various nostrums advertised as "Cough Drops, for the cure of colds, asthmas, catarrhs, &c." are preparations of Opium very similar to pægoric elixir. PECTORAL BALSAM OF LIQUORICE, and ESSENCE OF COLTSFOOT, are combinations of this kind. GRINDLE'S COUGH DROPS, are a preparation of the same description, only made with Rectified, instead of Proof Spirit, and consequently more highly charged with stimulant materials. "The mischief," says Dr. Fothergill, "that has proceeded from the healing anodynes of quacks can be scarcely imagined; for in coughs, arising from suppressed perspiration, or in inflammatory diathesis, Opiates generally do harm.

SQUIRE'S ELIXIR. Opium, camphor, serpentaria, sub-carbonate of potass, anise and fennel seeds, made into a tincture, and coloured with cochineal.

FORD'S BALSAM OF HOREHOUND. This nostrum may very properly be classed under the present head. It consists of an aqueous infusion of horehound and liquorice root, with double the proportion of proof spirit or brandy; to which is then added, opium, camphor, benzoin, squills, oil of aniseed, and honey.

In combination, the medical powers of opium are wonderfully extended, so that there is scarcely a disease in which it may not, during some of its stages, be rendered useful. By diminishing the sensibility of the stomach and bowels, it becomes a valuable and efficacious *corrigent* to many important medicines, and thus frequently favours their absorption and introduction into the system, as for instance, in the exhibition of mercurial alteratives, (*Form.* 141), and in certain diuretic combinations, (*Form.* 100, 106, 107, 110.) in combination with antimonials, and with ipecacuan, its narcotic powers are obviated, and sudorific results are obtained. See *Pulv. Ipecac. co.* (*Form.* 117, 119, 124, 125, 127, 130.) **FORMS OF EXHIBITION.** In substance, or under the form of tincture. When we wish to continue the operation of opium, and not to obtain its full effect at once, it may be advantageously combined with some substance capable of retarding its solution in the stomach. as *gum resins*. See *Pilulæ* and *Form.* 10, 11, 12, 13. A watery infusion, made by infusing powdered opium in boiling water, will often operate without producing that distressing nausea and head-ache which so frequently follow the use of this substance. With respect, however, to the best modes of correcting the operation of this remedy, see page 165 and 166. Dr. Porter of Bristol has introduced to our notice a solution of opium in citric acid; his formula* for its preparation is subjoined, because I am of opinion that it merits the attention of the practitioner; I have lately submitted it to the test of experience, and it certainly possesses the merit of a powerful anodyne, operating with less disturbance than the more ordinary forms of this substance. I also take this opportunity of stating, that the *pyro-ligneous acid* manufactured by Beaufoy was used as a menstruum, and the effect of the solution was similar to that of Dr. Porter. When the stomach rejects altogether the internal exhibition of opium it may be successfully applied along the spine, by friction, with the camphor liniment; a piece of solid opium introduced into the rectum, or dissolved in some appropriate solvent, and injected as an enema, affords also considerable relief in spasmodic affections of the bowels, and in painful diseases of the prostate gland. or bladder, (*Form.* 9). When thus introduced into the rectum, it cannot undergo that change which the digestive organs produce upon it, and consequently it is more uniform in its action than when presented to the stomach. Opium appears to be readily absorbed into the system, when applied to the surfaces of sores; considerable relief has been thus afforded to irritable stumps, after amputation, on which occasions, all the characteristic effects of opium have been produced upon the system, such as costiveness, head-ache, nausea, &c. **INCOMPATIBLE SUBSTANCES.** *Oxymuriate of mercury; acetate of lead; alkalis; infusions of galls, and of yellow cinchona.* Orfila states that the decoction of *Coffee* is less energetic as an antidote, than the infusion. When we intend the opium to act as a sedative, we should not combine it with stimulants. The Edinburgh College certainly erred in this respect, when they made pepper an ingredient in their *Pilulæ Opiatæ*. In combination with vegetable acids, its narcotic powers are increased, in consequence of the formation of

* **LIQUOR MORPHII CITRATIS.** *R* Opii Crudi Optimi \mathfrak{z} iv; Acidi Citrici (Cryst:) \mathfrak{z} ij: semel in mortario lapideo contunde, dein aquæ distillatæ bullientis oj affunde; et intime misceantur: macera per horas viginti quatuor; per chartam bibulosam cola.

soluble salts with *morphia*.* When the opium however has passed out of the *primæ viæ*, vinegar and acids are then the best remedies for

* **THE BLACK DROP**, or The Lancaster, or Quaker's Black Drop. This preparation, which has been long known and esteemed, as being more powerful in its operation and less distressing in its effects than any tincture of opium, has until lately been involved in much obscurity; the papers however of the late Edward Walton, of Sunderland, one of the near relations of the original proprietor, having fallen into the hands of Dr. Armstrong, that gentleman has obliged the profession by publishing the manner in which it is prepared, and is as follows:—"Take half a pound of opium sliced; three pints of good verjuice (juice of the wild crab,) and one and a half ounce of nutmegs, and half an ounce of saffron. Boil them to a proper thickness, then add a quarter of a pound of sugar, and two spoonfuls of yeast. Set the whole in a warm place near the fire, for six or eight weeks, then place it in the open air until it becomes a syrup; lastly, decant, filter, and bottle it up, adding a little sugar to each bottle." One drop of this preparation is considered equal to about three of the Tincture of Opium. P. L. It would appear that an Acetate of Morphia, is formed, which is more active, and less distressing in its effects, than any other narcotic combination.

The French Codex contains directions for preparing a compound very similar to the Black Drop; viz.

VINUM OPIATUM FERMENTATIONE PARATUM, or Guttæ seu Landanum Abbatis Rousseau. Take of white honey twelve ounces; warm water, three pounds; dissolve the honey in the water, pour it into a matrass, and set it aside in a warm place; as soon as fermentation has commenced, add four ounces of good opium, having previously dissolved, or rather diffused it in twelve ounces of water; allow them to ferment together for a month, then evaporate until ten ounces only remain, filter, and add four ounces and a half of alcohol.

LIQUOR OPI SEDATIVUS. Under this name, Mr. Battley, a manufacturing druggist, of Fore-street, London, has offered for sale a narcotic preparation, which it is generally supposed owes its efficacy to the acetate of morphia; on being kept, however, I found that it underwent some important change, during which so much air was disengaged as to blow out the cork from the bottle with violence. This is an objection to its admission into practice, unless we can ensure recently prepared portions as often as they may be required.

In publishing the above statement, I have unfortunately been the cause of much unnecessary **INK-SHED**. A letter, by Mr. Battley, has been industriously circulated through the different ranks of the profession, purporting to be an apology for his preparation, but after a careful perusal of it, instead of being able to discover any argument in its favour, we receive a full acknowledgment of the validity of the objection above stated. "I explained to Dr. Paris, that the liability of the solution to undergo change, WAS A DEFECT in the preparation, but that the addition of a little spirit would prevent decomposition," and yet in the next sentence he tells us that in those cases in which it is most beneficial, "the addition of spirit would be highly improper." See Medical Repository, vol. xiii. p. 273.

But the circumstance which has excited the greatest indignation in the mind of Mr. Battley, is my having applied the term **NOSTRUM** to his preparation. Every medicine that is prepared by a secret process, and sold for the private advantage of an individual, is properly designated a **NOSTRUM**. And I am at a loss to discover any features in the present case that can entitle it to be considered as an exception to this general rule; but perhaps Mr. Battley is inclined to be hypercritical, and as the preparation is not indebted to him, but to Wedelius or Le Mort, for its origin, is prepared to exclaim with the Roman poet:

"Quæ non fecimus ipsi vix ea **NOSTRA** voco."

Mr. Battley also complains bitterly of my having inserted his preparation under so odious a motto as "*Arcana Revelata fætent*;" for my own part I cannot conceive any thing more appropriate to the case, viz. *Arcana, these secret preparations, revelata, exposed to the air, fætent, grow fætid*. But, notwithstanding the objections which I have thus felt it my duty to offer, I am disposed to speak favourably of its mild and uniform effects, and in justice to Mr. Battley, I will further state that the same opinion has been formed by a great number of respectable practitioners. The late Mr. Haden, who during his protracted illness took a large quantity of this preparation, states, in his Translation of the Formulary of Dr. Majendie, that it is devoid of exciting,

counteracting its effects ; (see page 139). Dose, must be varied according to the intention of the prescriber, the constitution of the patient, and the nature of the disease. A quarter of a grain, frequently repeated, will keep up its exhilarating influence ; (*Form.* 15.) from gr. j to ij acts as a narcotic ; its power on the system soon becomes weaker ; and from habitual use it is so much impaired that very large doses are required to produce its usual effects. Russel observes that the effects of opium on those addicted to its use, are at first obstinate costiveness, succeeded by diarrhoea and flatulence, with loss of appetite and a sottish appearance ; the teeth decay, the memory fails, and the unhappy sufferer prematurely sinks into the grave. OFFICINAL PREP. Gr. j of opium is contained in *Confect. Opii*. L. grs 36. *Elect. Opii*. E. grs. 43. *Elect. Catechu*. E. grs. 193. (F.) *Elect. Catechu. comp.* D. grs. 199. (F.) *Pil. saponis cum opio*. L. grs. 5. *Pil. Opiat.* E. grs. 10. *Pil. e Styrace*. D. grs. 5. *Pulv. Corn. ust. cum Opio*. L. grs. 10. *Pulv. Cret. comp. cum Opio*. L. grs. 40. *Pulv. Ipecac. comp.* L. E. grs. 10. (H.) *Pulv. Kino. comp.* L. grs. 20. (F.) *Tinct. Opii*. L. ℥ 19. *Tinct. Camphor. comp.* L. f3ss. *Tinct. Opii ammon.* E. f3j. *Troch. Glycyrr. cum Opio*. E. 3j. *Vinum Opii* L. ℥ 17. The Medicinal Dynameter will at once shew the quantity of opium in any proportion of the above preparations. ADULTERATIONS. The *Turkey Opium*, when good, is covered with leaves, and the reddish capsules of some species of *rumex* ; the inferior kinds have none of these capsules adhering to them. It is frequently adulterated with the extract of liquorice ; it should be regarded as bad when it is very soft and friable, of an intensely black colour, or mixed with many impurities, when it has a sweetish taste, or marks paper with a brown continuous streak when drawn across it, or when it melts like wax, and makes a yellow solution in water. It frequently happens that in cutting a mass of opium, bullets, and stones have been found imbedded in it, a fraud which is committed by the Turks, from which the retailer alone suffers. It is also adulterated with the extract of poppy capsules, or of the whole plant ; with that of *chelidonium majus*, with gum arabic or tragacanth, with the oil of linseed, and even with the dung of oxen.

OVUM. L. (Phasianus Gallus. *Ovum.*)

The Egg of the Domestic Fowl.

VITELLUS. The *Yolk* or *Yelk*, is principally employed in pharmaceutical operations, for rendering oils and balsams miscible with water. It is gently laxative.

Oleum e vitellis, Oil of Eggs. Obtained by boiling the yelks, and then submitting them to pressure ; fifty eggs yield about 5 oz. of oil. It is introduced into the Paris Pharmacopœia, being much employed on the Continent for killing mercury.

ALBUMEN. Used principally for clarifying turbid liquors.

TESTA. Similar to other absorbents.

and almost of constipating, properties. He made a very good substitute, "by macerating the dregs, remaining after making tincture of opium, in a solution of Tartaric acid." The preparation formed a tolerably deep tincture, and 40 drops acted, he thought, in all respects, like 20 of the liquor opii sedativus. It neither stimulated, nor produced costiveness.

OXYMEL SIMPLEX. L.D. MEL ACETATUM. P.L. 1787.

*Simple Oxymel.**

This composition of honey and acetic acid has been long valued on account of its detergent qualities, and has accordingly been much used as the basis of gargles, and expectorant remedies.

OXYMEL SCILLÆ. L.D. OXYMEL SCILLITICUM. P.L. 1720. 1745.

Oxymel of Squills.

This preparation certainly possesses considerable powers as an expectorant; especially if allowed to pass slowly over the fauces, as when applied in the form of a linctus, (*Form*: 135,) which by stimulating the top of the trachea may possibly act, by a kind of "*contiguous sympathy*," upon the pulmonary structure,† and thereby increase the activity of the exhalant vessels, and so dilute the mucus contained in the follicles as to cause it to be poured out in a less viscid form, and consequently in a state to be more easily brought up by expectoration. Its action will also admit of another explanation, but for this see page 105. Dose from f3ss to f3ij. In larger doses it is given for the purpose of exciting vomiting, especially in whooping cough.

PAPAVERIS CAPSULÆ. L.E.D.

(Papaver Somniferum. *Capsulæ Maturæ.*)

Poppy Capsules, or Poppy heads.

These capsules are employed in medicine for the purpose of affording a decoction, to be applied as an anodyne fomentation, see *Decoctum Papaveris*, and as a syrup of hypnotic qualities, see *Syrupus Papaveris*.

The seeds of the poppy capsules are not directly used for any medicinal purposes, but they yield a fixed oil which is daily met with in the market, and is frequently used to adulterate *Olive Oil*, which see. As an article of trade it is considered very inferior to the other fixed oils; it burns very badly, and yields a great quantity of smoke. To the pharmaceutical chemist it is an article of interest from the controversies to which it has given origin.‡

* GODBOLD'S VEGETABLE BALSAM. In the specification of the patent for this nostrum forty-two different vegetables are directed to be distilled "for the purpose of extracting their essences, which are to be preserved separately and apart from each other, in syrups, and are to be mixed with the following gums and drugs, viz. Gum Dragon, Gum Guaiacum, Gum Arabic, and Gum Canada, these being dissolved in double distilled vinegar, with a quantity of Storax dissolved in Spirits of Wine and Oil of Cinnamon. It is to be bottled off, and kept three years before it is fit to be administered for the CURE of Consumption, or any Asthmatic Complaint." It is hardly necessary to observe, that no such directions ever are, or indeed ever could be followed; in short the "BALSAM," is little else than simple oxymel. It is, however, not a little curious that amongst the forty-two plants enumerated, there should be several that would on distillation yield Prussic acid, such as the Bays. We wonder that this accidental circumstance has not been noticed, and turned to account, by some of those worthy disciples of Esculapius who live by the credulity of mankind, and as Falstaff expresses it, "Turn diseases to a commodity."

† It is in this manner, I apprehend, that stimulating syrups will frequently remove hoarseness.

‡ Although it has been long known that the seeds of the poppy, and the oil obtained from them by expression, do not possess any of the narcotic properties of the plant, and that they were even baked into cakes and used as an article of food by

PILULÆ. L.E.D. Pills.

For general instructions respecting the formation and administration of pills, the practitioner must refer to page 198 of this work.

OFFICIAL PILLS.

PILULÆ ALOES COMPOSITÆ. L. Extract of Aloes, *two parts*, extract of gentian, (**G**) *one part*, with oil of carraway ; (**E**) to which syrup is unnecessarily added. It is a useful pill in habitual costiveness. Dose, grs. x to ʒj.

PILULÆ ALOES ET ASSAFÆTIDÆ. L. Powdered aloes, assafœtida (**G**) and soap, (**L**) *equal parts*. Anodyne and cathartic ; a very useful combination in dyspepsia attended with flatulence. Dose, grs. x.

PILULÆ ALOES CUM MYRRHÆ. L. *Pilula Rufi. P.L. 1745.* Extract of Aloe, *two parts*, saffron and myrrh, (**E**) *one part*, syrup q. s. This is a very ancient form of preparation, and is described by Rhazes. It is stimulant and cathartic. (Form : 11, 81, 98, 99.) Dose, grs. x to ʒj.*

PILULÆ ALOES CUM COLOCYNTHIDÆ. E. This pill is known by the popular name of *Pil. Coccia. κοκκίον*, signifies a seed, and the term was first applied to this preparation by Rhazes. It consists of *eight parts* of aloes and scammony ; *four* of colocynth ; and *one part* of oil of cloves, (**E**) and of sulphate of potass with sulphur, olim *Sal Polycrest*. It is more powerful in its operation than the simple aloetic pills.

PILULÆ CAMBOGIÆ COMPOSITÆ. L. Gamboge, extract of aloe, and compound powder of cinnamon *one part* ; soap *two parts* ; see page 177, and Form : 88.

PILULÆ FERRI COMPOSITA. L. This combination is analogous to that of Griffith's mixture. Dose, gr. x to ʒj Form : 99 They become extremely hard by keeping. If the practitioner consult the **MEDICINAL DYNAMETER**, he will observe that in order to give the same quantity of Proto-carbonate of Iron as is contained in fʒiiss of *Mist : Ferri comp* : he must direct ʒj of this pill mass ; which quantities will be seen to con-

the ancients, yet has there been in later times very considerable contention respecting the propriety and safety of using such oil. The cultivation of the poppy for the sake of the oil of its seeds, as an article of food, has been long carried on in France, Brabant, and Germany ; and more recently in Holland. At about the beginning of the 17th century, the opposition to this use of the poppy manifested itself in France, and became so violent, that the Lieutenant General of the Police of Paris ordered the medical faculty of that city to make the strictest examination concerning this point, and they accordingly reported that, as there is nothing narcotic or prejudicial to health in the oil, the use of it might be permitted. But this decision was unsatisfactory ; and popular clamour determined the Court to pass a decree in 1718, prohibiting the sale of Poppy Oil, whether mixed or unmixed ! The sale of the article, however, notwithstanding this most singular decree, was clandestinely encouraged, and it gradually increased until the year 1735, when the Court issued a severe decree, enjoining the superintendant to mix a certain quantity of the extract of Turpentine with every cask containing 1100lbs of this oil, of which no less than 2000 casks were consumed in Paris alone. But the secret demand for it increased until 1773, when a Society of Agriculture undertook to examine the question, and the result of their labours had the effect of reversing the prohibition, and of convincing the multitude that their fears were entirely unfounded, and that there was really no narcotic power, nor any secret mischief in the article.

* As these pills are liable to become hard and insoluble by being kept, it is better to keep the ingredients in powder, and to form them extemporaneously with a little syrup.

tain, respectively, a grain and seven tenths of this of the proto-carbonate, or one grain of Protoxide, which is equivalent. It is doubtful whether the former preparation will not prove active, in consequence of the saponaceous vehicle formed by the Myrrh and alkali in a state of solution.

PILULÆ GALBANI COMPOSITÆ. L. *Pil. Gummosæ*, P.L. 1745. We are here presented with a combination of foetid gums, in which assafœtida is the most potent article. Antispasmodic, and emmenagogue. *Dose*, grs. x to ʒj. See *Form* : 10, 27, 98.

PILULÆ HYDRARGYRI. L.E.D. *Pil. Mercuriales*. P.L. 1745, vulgo, *The Blue Pill*. The mercury in this preparation, is not, as it was formerly considered, in a state of mere mechanical division, but in that of a black oxide, upon which its activity as a remedy undoubtedly depends; for mercury in its metallic state is entirely inert with regard to the living system. Various substances have at different times been triturated with the mercury, for the purpose of *extinguishing* or *killing* it, by effecting the mechanical division and subsequent oxidation of its particles, as manna, molasses, &c. *Conserve of Roses* is now generally preferred for this purpose, although Swediaur suspects that the astringent principle of this conserve invalidates the effects of the mercury, "I have," says he, "given these pills to several patients for a long time, without any symptom of salivation." Mr. Abernethy observes in his surgical works that the *Pilulæ Hydrargyri* are uncertain in their effects; and that some of the students at the hospital on examining them, and different parcels of the conserve of roses, say, that the sulphuric acid may be discovered in each. Nor is it improbable that in making the conserve for sale, some of this acid may be added to brighten the colour; and if so, the mercurial pill which is made from it may contain in varying proportions, some of that highly deleterious compound, the *sub-sulphate of mercury*. When any of the gums are employed for *killing* the metal, the pills soon become hard and brittle, and after some time the mercury is liable to run into its metallic state. The pill-mass, when rendered thinner by the addition of a little water, and extended on a piece of paper, ought not to exhibit any metallic globules; in this examination, however, we must be careful not to be betrayed by the fallacious appearance which is frequently presented by small crystals of saccharine matter. The relative proportion of mercury contained in the mass can be ascertained only by its weight. The *blue pill* is made at Apothecaries' Hall by a very ingenious machine actuated by steam, and which rubs as well as rolls the materials, and it is said the pill thus made is more active than that produced in the ordinary way. **MED. USES.** It is by far the best form for the internal exhibition of mercury; where it is intended to act upon the system as an alterative, it should be administered in doses of from grs. iv to vj; if it occasion any action on the bowels, it may be conjoined with opium; sometimes a few grains of rhubarb, exhibited every morning, will impart such a tone to the intestines, as to enable them to resist the mercurial irritation. In cases where the form of pill is objectionable, it may be readily suspended by the aid of mucilage in some aqueous vehicle; when exhibited in doses of grs. x to ʒj, it acts as a mild but efficient purgative. *Form* : 79, 106. One grain of mercury is contained in *three* grains of the mass; the proportion of metal or oxide, in any other given quantity, is shewn at once by the Dynameter, For the specific effects of mercury, see *Ung. Hydrarg.*

PILULÆ HYDRARGYRI SUB-MURIATIS COMPOSITÆ. L.E. Olim *Plummer's Pills*. They consist of *one part* of calomel and precipitated sulphuret of antimony (**H**) and *two parts* of guaiac (**E**) made into form with spirit. It is a very useful alterative, especially in cutaneous eruptions and in secondary syphilitic symptoms, particularly when affecting the skin. *Dose*, grs. v to x. Should their exhibition affect the bowels, the addition of a small proportion of Opium may be added.

PILULÆ OPIATÆ. E. Opium *one part*; extract of liquorice *seven parts*; Jamaica pepper *two parts*. It is however a compound of questionable propriety.

PILULÆ RHEI COMPOSITÆ. E. Rhubarb, aloes, and myrrh, with oil of peppermint. When such a combination is indicated, it is better to prescribe it extemporaneously: for the mass, by being kept, will become less efficacious.

PILULÆ SAPONIS CUM OPIO. L. *Pil. Opii. P.L. 1787.* By substituting soap for extract of liquorice, these pills are now rendered more soluble in the stomach, and are consequently more efficient. Five grains contain one of opium.

PILULÆ SCILLÆ COMPOSITÆ. L. A stimulating expectorant: but as squill is always impaired by keeping, it ought to be considered as an extemporaneous combination. It is surely injudicious thus to multiply our officinal formulæ, but it is difficult, on such occasions, to run counter to popular opinion. *Form: 104.*

PIMENTÆ BACCÆ. L.E. Pimento. D.

Myrtus Pimenta. Baccæ.

Pimenta Berries. Jamaica Pepper. All-spice.

QUALITIES. *Odour*, aromatic and agreeable, combining that of cinnamon, cloves, and nutmegs; hence the term *all-spice*. *Taste*, warm and pungent, resembling that of cloves. These qualities reside principally in the cortical part of the berry. **CHEMICAL COMP:** It contains a volatile oil, very like that of cloves, resin, extractive, tannin, and gallic acid. **SOLUBILITY.** Water, alcohol, and æther, extract its virtues. **MED. Uses.** Principally to cover the disagreeable taste of other remedies; it is also a very useful adjunct to dyspeptic medicines. **OFFICINAL PREP.** *Aq. Piment. L.E.D. Ol. Piment. L.E.D. Pil. Opiat. E. Syrup. Rhamni. L. (E)*

PIPERIS LONGI BACCÆ L.E.D.

Long Pepper.

The chemical and medical properties of this substance are similar to those of black pepper; *which see*. The varieties in the market are distinguished by the names *short long pepper*, and *long long pepper*. The native practitioners of India prescribe it in infusion, mixed with a little honey, as a remedy in catarrhal affections, when the chest is loaded with phlegm.

PIPERIS NIGRI BACCÆ. L.E.D.

Black Pepper.

CHEMICAL COMPOSITION. An oily matter, fecula, and extractive; the acrid principle of Pepper has been separated by Oersted in an alkaline form. The pepper having been digested in alcohol, muriatic acid, and afterwards water, were added to the tincture, by which the resin was precipitated, while a *muriate of Piperæ* remained in solution. The solution was then, after having been submitted to a certain evaporation, decomposed by pure potass, when a precipitation of *Piperæ* took place. This salifiable base is nearly insoluble in cold, and only very slightly soluble in boiling water. It dissolves in alcohol, and the solution has a greenish-yellow colour, which by the addition of nitric acid is rendered green. The capacity of the base for saturation appears very small. **SOLUBILITY.** The virtues of pepper are entirely extracted by æther and alcohol; and partially by water, 550 pints being required to extract all the sapidity of lbj of pepper. **MED. USES.** It appears to be a more general and permanent stimulus than other species of equal pungency on the palate; it may be combined with bitters, and exhibited in nausea, dyspepsia, retrocedent gout, or as a stimulant in paralysis; it is also a valuable coadjutor to bark, in obstinate intermittents. An infusion made with black pepper that has been toasted, is often prescribed by the natives of India in cases of cholera morbus; and I have known it, says Dr. Ainslie, put a stop to the vomiting when many other remedies had failed. **Dose,** grs. v to ʒj, or more. **OFFICIAL PREPARATIONS.** *Emplast. Meloes vesicat. comp. E. Unguent. piper. nig. D.* White pepper is made by separating the first skin of the berry, by soaking it in salt and water. **ADULTERATIONS.** The powdered husk of the mustard seed is universally mixed with powdered pepper, and is regularly sold for this purpose by the mustard manufacturer, under the technical title of P.D. (*Pepper Dust*;) there are besides other admixtures less innocent. *Whole Pepper* is also frequently factitious; artificial pepper-corns, composed of peas-meal, both white and black, are mixed with real pepper-corns, and sold as genuine pepper; the method of detecting the fraud is very simple; throw a suspected sample into water; those that are artificial will fall to powder, or be partially dissolved, while the true pepper-corns will remain whole.

PIX ABIETINA.* L. (*Pinus Abies. Resina Præparata.*)

PIX BURGUNDICA. E.D. *Burgundy Pitch.*

This substance is procured by making incisions through the bark of the Norway Spruce fir, and afterwards boiling the flakes so obtained in water, and then straining the resin through coarse cloths under a press; whereas *frankincense* (*Abietis resina*) is a spontaneous exudation from it. It is now entirely confined to external use, as a rubefacient spread on leather; it is very adhesive. *Emplast: Picis comp. L. Emplast: Picis Burgund. D.* **ADULTERATIONS.** A factitious sort, manufactured in England, is often met with; it is to be distinguished by its friability, and its want of visciditv and unctuousity, and by the absence of that peculiar odour which characterises the genuine specimens.

* The Pix Arida of the late Pharmacopœia.

PIX LIQUIDA. L.E.D. (Pinus Sylvestris.) Tar.

This fluid is formed from the decomposition of the resinous juice of the pine, during the slow and smothered combustion of its branches, and as a summary definition of the substance, that by Pliny cannot be surpassed, "*Pix nihil aliud quam combustæ resinæ fluxus.*" Lib. 23 c. 1. CHEMICAL COMPOSITION. It is found to consist of empyreumatic oil, resin, acetic acid, and some salts. SOLUBILITY. Water readily dissolves a portion of Tar, and forms a solution of the colour of Madeira wine, with a sharp empyreumatic taste. MED. USES. Tar water, under the auspices of Bishop Berkley, was formerly considered a remedy of extraordinary powers;* this opinion however has at length passed away, (see page 27,) and Tar is now particularly indebted for a place in the Materia Medica, to an essay by Sir Alexander Crichton, entitled, "*An Account of some Experiments made with the Vapour of boiling Tar,† in the cure of Pulmonary Consumption.*" At the request of Sir Alexander, I was induced to make a trial of its effects, and I do not feel any hesitation in stating that the result has led me to believe that it may, in some cases, be attended with benefit. In the application of the remedy several precautions are necessary for its success. The Tar employed should be that used in the cordage of ships; to every pound of which half an ounce of sub-carbonate of potass must be added, in order to neutralize the pyroligneous acid generally found mixed with the tar, the presence of which will necessarily excite coughing; the tar thus prepared is to be placed in a suitable vessel over a lamp, and to be kept *slowly* boiling in the chamber during the night as well as the day; the vessel however ought to be cleaned and replenished every twenty-four hours, otherwise the residuum may be burnt and decomposed, a circumstance which will occasion increased cough and oppression on the chest. The ancients entertained a high opinion of the efficacy of Tar in pulmonary diseases, when internally administered; supposing it to promote expectoration, relieve dyspnœa, and check spitting of blood; Dioscorides particularly speaks of its utility in such cases; he also recommends it to be applied to ulcers, which he says it fills up and heals, whether they be situated on the surface of the body, or in the ears, throat, and other internal parts. See the chapter on "*Inhalations,*" page 208. OFFICIAL PREP. *Unguent. Picis Liquidæ. L.*

* Tar water was also at one period celebrated as an antisyphilitic remedy. M. Acharius, in his work "On the use and advantages of Tar Water in venereal Complaints," enumerates the cases of a number of patients cured by this remedy alone in the hospital of Stockholm, without any Mercury.

† Dr. Mudge in the year 1782 had recommended the fumigation of balsams, in a pamphlet on the subject of his Inhaler; little or no notice however was taken of this recommendation, a circumstance which cannot excite our surprise when we consider the extravagant terms in which the pretensions of the remedy were supported. "I believe," says he, "that much of the benefit which consumptive persons experience from sea voyages is derived from the tar vapour constantly present on board a ship!"

A Radical and Expeditious Cure for a recent Catarrhus Cough. By J. Mudge, Plymouth, 1783.

PLUMBI SUB-CARBONAS. L.

CARBONAS PLUMBI, vulgo *Cerussa*. E.CERUSSA, *Sub-acetas Plumbi*. D.*Cerusse*, or *White Lead*.

CHEMICAL COMPOSITION. The composition of this substance has not until lately been well understood, and hence the different appellations bestowed upon it by the different colleges. **SOLUBILITY.** It is insoluble in water, but soluble in pure potass. **USES.** It is only employed externally, by sprinkling on excoriated parts; the safety of such a practice however is questionable. **OFFICINAL PREP.** *Unguent. Ceruss.* D. *Plumbi Acetas.* L.E.D. (**K**) **ADULTERATIONS.** *Chalk* may be detected by assaying its solution in cold acetic acid with oxalate of ammonia; *Carbonate of barytes*, by adding to a portion of the same solution, sulphate of soda very largely diluted with distilled water; and *Sulphate of barytes*, or *Sulphate of lead*, by the insolubility of the white lead in boiling distilled vinegar.

PLUMBI OXYDUM SEMI-VITREUM. L.E.

LITHARGYRUM. D. *Litharge*.*

It is a yellow protoxide of lead, which has been melted and left to crystallize by cooling. It is only employed in pharmacy for forming other preparations of lead, and the following officinal plasters, *Emplast. Plumbi.* L.E.D. *Ceratum Saponis.* L. It is added to wines to remove their acidity; for the detection of which, evaporate the suspected liquor to a thick fluid, add charcoal, and calcine in a crucible: in the space of an hour metallic points will be obtained, consisting of lead surrounded by a quantity of yellow protoxide.

PLUMBI ACETAS. L.

Cerussa Acetata. P.L. 1787. *Saccharum Saturni.* 1745.ACETAS PLUMBI. E. *Acetas Plumbi.* D.vulgo, *Sugar of Lead*.

QUALITIES. *Form*, irregular masses resembling lumps of sugar, being an aggregation of acicular four-sided prisms, terminated by dihedral summits, which are slightly efflorescent; by careful crystallization, it may be obtained in quadrangular prisms. *Taste*, sweet and astringent. **CHEMICAL COMPOSITION.** Although it has been termed a *Super-acetate*, it appears to be a neutral salt, and that its power of reddening vegetable blues is attributable to a partial decomposition; for when dissolved in water containing the least portion of carbonic acid, a white carbonate of lead is precipitated, and a corresponding portion of acetic acid is necessarily disengaged. The College have therefore now designated it as an *acetate*. According to the experiments of Berzelius, this salt, in its anhydrous state consists of one proportional of oxide of lead; so that the proportion of the metallic base is one third of that in the *sub-acetate*. **SOLUBILITY.** It is dissolved in 25 parts of water, hot or cold; it is also soluble in alcohol. When common water is employed the solution is quite turbid,

* *Litharge*. The word is derived from λίθος, *Lapis*, a stone, and ἀργυρος *Argentum*, silver; from the fact of the lead being thrown off in this state during its application for the refinement of silver.

unless a small proportion of acetic acid be previously added. **INCOMPATIBLE SUBSTANCES.** *The alkalies, alkaline earths and their carbonates; most of the acids; alum; borax; the sulphates, and muriates; soaps; all sulphurets; ammoniated, and tartarized iron; tartarized antimony: undistilled water.* The solution of acetate of ammonia decomposes that of this salt, in consequence of the carbonic acid which is generally diffused through it. It has lately been discovered that *Gallic acid* and *Tannin* are capable of combining with lead in solution, and of forming a perfectly insoluble substance, which falls to the bottom of the vessel; hence all vegetable astringents must be considered as incompatible with this medicine. On this account, liquors which have been kept in oak casks,* for a certain time, must be freed from lead. This explains a fact, with respect to the effect of new rum in the West Indies, of some importance. This spirit, when newly distilled, is found to contain traces of lead, derived from the leaden rims of the coppers, and the leaden worm, used for its condensation; but, by being kept about twelve months in oaken casks, it loses its deleterious properties, and no longer exhibits any traces of this metal.† Certain bodies appear likewise to be incompatible with the compounds of lead, not from the *chemical* changes they induce, but from the contrary effects they produce upon the body; thus mercury appears to invalidate their powers and to counteract their effects, as we may have observed in treating saturnine cholic. I suspect also that antimony operates in the same manner; M. Merat relates the case of an apothecary who was cured of a desperate saturnine cholic, after having taken, in the course of eight days, eighty grains of tartarized antimony. **MED. USES.** I feel no hesitation in pronouncing this salt of lead to be one of the most valuable resources of physic; from the results of numerous cases, I state with confidence that it is more efficient in stopping pulmonary and uterine hemorrhage, than any other known remedy—"nil simile, nec secundum,"—and that its application is equally safe and manageable; but it must not be combined with substances capable of decomposing it, nor must it be simultaneously administered with the medicines which are frequently prescribed in conjunction with it, as an *Infusion of Roses, Sulphate of Magnesia, &c.* Alum has also been in some cases added to it, with the intention of increasing its astringency. It is evident that under such circumstances an insoluble and inert *Sulphate of Lead* will be produced. The experiments of Orfila confirm the truth of these views, and show that such substances act as counter-poisons for the salts of lead. According to my experience, those vegetable acids which decompose the acetate of lead, and form insoluble salts with its base, are not *medically* incompatible, when administered simultaneously with it, although no scientific physician would prescribe such a mixture; this fact is shown by the circumstance of potations, containing malic and tartaric ‡ acids, not having been found to invalidate the efficacy of this salt. Whether the stomach in the first instance prevents the decomposition, and its necessary results, or allows the operation of the usual affinities, and then subsequently decomposes the insolu-

* That the oak cask imparts astringent matter to the contained spirit, is shewn by the facts enumerated under the history of Brandy, see *Spiritus Tenuior*.

† Sir George Baker considered the dry-belly-ache, which is common to drinkers of New Rum, in the West Indies, entirely referable to its contamination with Lead.

‡ See Note at foot of next page.

ble compound which results from them, by the abstraction and *digestion* of its vegetable constituent, are questions for future inquiry, when the laws of gastric chemistry shall be better understood and more justly appreciated. I have also seen much benefit accrue from this medicine in protracted diarrhoea, when it has checked the bowels more effectually even than opium. M. Gaspard has communicated to the public, through the medium of Majendie's *Journal de Physiologie*, (3 numéro Juillet, 1821,) a paper upon the operation of *Acetate of Lead*, entitled "*Expériences Physiologiques et Médicales sur L'Acetate de Plomb*," in which he asserts that this metallic salt cannot be administered without risk in any dose, unless indeed it be given in vehicles which decompose it, and which, he adds, appears generally to have happened in the prescriptions of those who have given it extensively. He observes, that "it produces a slow and peculiar inflammation of the bowels, as well as of the lungs; and that it, moreover, occasions *Cholica Pictonum*." No one, I apprehend, will deny the poisonous quality of acetate of lead, any more than that of arsenic; and yet both may, by proper management, be rendered therapeutical agents of value and safety. **FORMS OF EXHIBITION.** In that of pill, guarded by opium; it will be prudent to recommend an abstinence from all potation, except that of cold water, or draughts, composed of diluted acetic acid, for at least an hour after the ingestion of the pill.* **DOSE**, gr. $\frac{1}{2}$ to gr. j. **Form.** 57. **OFFICIAL PREP.** *Cerat. Plumb. acetat.* L.†

POTASSA CUM CALCE. L.E.

KALI CAUSTICUM CUM CALCE. D.

The addition of lime to potass renders it less deliquescent, and more manageable, as an escharotic.

POTASSA FUSA, L.

POTASSA, E. KALI CAUSTICUM. D.

Lapis infernalis. P. L. 1720.

QUALITIES. *Form*, a white brittle substance, extremely caustic and deliquescent, and possessing in an eminent degree all the properties denominated *alkaline*. **SOLUBILITY.** f3j of water dissolves 3vij: it is also soluble in alcohol. **CHEMICAL COMPOSITION.** This preparation, independent of its impurities, is the *hydrated protoxide of potassium*, although in the state in which it is cast into sticks it generally contains a little *Peroxide*,‡ and therefore evolves oxygen when dissolved in water. **MED. USES.** It is a most powerful caustic (*causticum commune acerrimum*), and is frequently employed to establish an ulcer; or, instead of incision, to open a tumour. It has the advantage of other caustics, from the circum-

* I uniformly adopt this plan; the acetic acid is the best guard that can be selected to protect the salt from decomposition; even the Tartrate of Lead, which is so insoluble in water, forms with vinegar a soluble triple salt.

† ROYAL PREVENTIVE.—This pretended prophylactic against venereal virus is a solution of Acetate of Lead.

‡ Peroxide of Potassium is produced by heating the metal in a considerable excess of oxygen. It is an orange-coloured body, which, upon being put into water effervesces, and gives off oxygen, and is thus reduced to the state of protoxide.

stance of our being able to neutralize its powers by touching it with vinegar, and thus to arrest its progress in an instant; it is however more liable to produce a large eschar than nitrate of silver, in consequence of the chemical action of the alkali upon the skin. Within the last few years, surgeons have greatly preferred the use of this caustic to that of *nitrate of silver*, in cases of organic stricture of the urethra, as acting more powerfully, and yet occasioning less irritation than the latter substance; it is also said that the part which it destroys is sooner detached and more easily eliminated. Its disposition, however, to extend its sphere of action has occasioned such a destruction of the membrane as to allow the urine to pass into the cellular substance, by which very serious effects have been produced. For this reason there are cases in which the *nitrate of silver* is still to be preferred. As an internal remedy it is only employed in solution. See *Liquor Potassæ*.*

POTASSÆ ACETAS. L. ACETAS POTASSÆ. E.

ACETAS KALI. D. *Kali Acetatum*. P. L. 1787.—*Sal diureticus*. P. L. 1745.—*Terra foliata Tartari*.—*Sal Sennerti*.—*Magisterium Purgans Tartari*.—*Sal Essentiale vini*. *Oleum Tartari Sennerti*.—*Sal digestivus Sylvii*, &c.

QUALITIES. *Form*, masses of a foliated, laminar texture, extremely deliquescent; *Odour*, slight and peculiar; *Taste*, sharp and pungent. SOLUBILITY. f3j of distilled water at 60° dissolves 404 grains, or 100 parts of it are soluble in 105 parts of water; the solution soon undergoes spontaneous decomposition; it is soluble in four times its weight of alcohol. CHEMICAL COMPOSITION. It consists of one proportional of each of its components, or 48 potass and 50 acetic acid. INCOMPATIBLE SUBSTANCES. It is decomposed by *tamarinds* and *most sub-acid fruits*: by almost every acid, as well as every variety of neutral salt, whether *alkaline*, *acid*, or *metallic*. MED. USES. In small doses, diuretic; in larger ones, mildly cathartic. DOSE, ʒj to 3j to produce the former, ʒij to ʒiij to excite the latter of these effects. FORMS OF EXHIBITION. On account of its deliquescent property it is not admissible in powders or pills, but should be always exhibited in solution. (*Form.* 108, 110, 111.) In the former editions of this work, I introduced under the present article, those views regarding the operation of saline bodies upon the kidneys, and their decomposition by the digestive organs, which I considered as capable of throwing some light upon the medicinal operation of these bodies. Having, however, in the present edition of my work devoted a chapter to the consideration of Diuretics, I have necessarily removed all my general observations upon this subject to that part of the work; I therefore entreat the reader to refer to page 95. Alibert, in speaking of the diuretic virtues of this salt, says that it is so well suited to the sensibility of the Absorbents that its administration is frequently followed by very salutary effects. (*Elémens de Thérapeutique*, vol. 1. p. 327.)

ADULTERATIONS. *Tartrate of potass* is discovered by adding a solution of tartaric acid, which will occasion with it a copious precipitate; the *sulphates*, by their forming with acetate of lead, or muriate of baryta, precipitates insoluble in acetic or muriatic acid. The brown tinge which

* Potass forms the basis of many of those preparations, sold as Depilatories; in some instances combined with Lime. COLLEY'S Depilatory appears to consist of Quick-lime, and a portion of Sulphuret of Potass.

it frequently exhibits depends upon the same cause as that which usually imparts colour to the *Liquor. Ammon. Acet.* This salt is also contaminated with *lead*, which arises from its having been prepared by decomposing the *acetate of lead* by means of *carbonate of potass*.

POTASSÆ CARBONAS. L.E.

Carbonate of Potass.

QUALITIES. *Form*, crystals which are four-sided prisms with dihedral summits, permanent in the air; *Taste*, slightly alkaline without acrimony. **CHEMICAL COMPOSITION.** It is a *bi-carbonate*, consisting of two proportionals of potass; and in its crystalline form, it also contains water equal to one proportional. **SOLUBILITY.** It is soluble in 4 parts of cold, and in 5-6ths of its weight of boiling water, in which it is partially decomposed, carbonic acid being emitted during the solution; it is quite insoluble in alcohol. **MED. USES.** In cases where an alkali is indicated, this preparation offers an agreeable and efficient remedy; and experience has shewn that its additional proportion of carbonic acid does not in the least invalidate its alkaline agency. In disordered states of the digestive functions, alkalies frequently act with surprising effect; in calculous affections their value has been already noticed (see *Liquor Potassæ*), and the stomach appears to bear the protracted exhibition of the carbonate of potass or soda, with more temper than it does that of any other alkaline combination; and on account of the increased quantity of carbonic acid which this salt contains, it is preferable for effervescing draughts. (See *Acid. Citric.* and *Form.* 123, 168.) **INCOMPATIBLE SUBSTANCES.** *Acids and acidulous salts: borax; muriate of ammonia; acetate of ammonia; alum; sulphate of magnesia; lime-water; nitrate of silver; ammoniated copper; muriate of iron; sub-muriate and oxy-muriate of mercury; acetate of lead, tartarized antimony; tartarized iron; the sulphates of zinc, copper, iron, &c.* **DOSE,** grs. x to 3ss.

POTASSÆ NITRAS. L.E. NITRUM. D.

Nitre, or Salt Petre.

QUALITIES. *Form*, crystals which are six-sided prisms usually terminated by dihedral summits. *Taste*, bitter and sharp with a sensation of cold. **CHEMICAL COMPOSITION.** It consists of one proportional of nitric acid, and one proportional of potass. **SOLUBILITY.** It dissolves in seven parts of water at 60°, and in its own weight at 212°. Its solubility is considerably increased by adding muriate of soda to the water; its solution is attended with a great reduction of temperature: it is quite insoluble in alcohol. **INCOMPATIBLE SUBSTANCES.** *Alum: sulphate of magnesia; sulphuric acid; the sulphates of zinc, copper and iron; according to the usual laws of affinity, it should be also decomposed by sulphate of soda; this however only takes place at the temperature of 32°, and then but partially.* **MED. USES.** Refrigerant, in which case, the draught should be swallowed immediately after the solution of the salt is complete, for if it be allowed to stand for some time, its effect with regard to cooling is not nearly so evident (see *Form.* 138, 144); as a diuretic, its powers are too inconsiderable to be employed, except in combination (*Form.* 102, 109, 115, 170); a solution of 3j to fʒvj of rose water forms a good detergent gargle, and a small portion allowed to dissolve slowly in

the mouth, will frequently remove an incipient inflammation of the tonsils; for its *modus operandi* as a diuretic, see *Potassæ Acetas*. Dose, grs. x to xv, as a diuretic or refrigerant; grs. xxv to xl are aperient, and in large doses it excites vomiting, bloody stools, convulsions, and even death. The best antidotes are opium and aromatics. IMPURITIES. As it occurs from the hand of nature it is far from pure, and even by art it is freed with difficulty from sea salt; the presence and quantity of which in any specimen may be learnt by adding nitrate of silver to its solution as long as any precipitate is produced.

POTASSÆ SUB-CARBONAS. L.E.

SUB-CARBONAS KALI. E.

Kali Præparatum, P.L. 1787. *Sal Absinthii*. *Sal Tartari*. 1745.

Before the nature of this salt was well understood, it received various appellations according to the different methods by which it was procured, and it was supposed to possess as many different virtues, as *Salt of Wormwood*, *Salt of Tartar*, *Salt of Bean Stalks*, &c.

QUALITIES. *Form*, coarse white grains, so deliquescent, that by exposure to air they form a dense solution, (*Oleum Tartari per deliquium*, P.L. 1720.) TASTE, alkaline and urinous.* CHEMICAL COMPOSITION. This salt, although far from being pure, is sufficiently so for every pharmaceutical purpose. It consists of one proportional of acid and one proportional of potass, with variable qualities of *sulphate of potass*, *muriate of potass*, *siliceous earth*, *alumina*, together with the *oxides of iron*, and *manganese*. SOLUBILITY. It is dissolved by twice its weight of water; the residue, if any, may be considered as impurity; it is insoluble in alcohol; with oils it combines, and forms soaps. INCOMPATIBLE SUBSTANCES. They are enumerated under *Potassæ Carbonas*. MED. USES. Antacid, and diuretic, (*Form.* 101, 107, 129), but it is far less pleasant than the carbonate; it is principally used for making saline draughts, see *Acid. Citric.* and *Form.* 107. Dose, grs. x. to 3ss. OFFICIAL PREP. *Potassæ Acetas*, L.E.D. (I) *Liquor Potassæ*. L.E.D. (K) *Potassæ Sulphuretum* (I) L.E.D. *Potassæ Tart.* L.E.D. (I) *Liquor Arsenicalis* (LL.) ADULTERATIONS. Its degree of purity may be estimated by the quantity of nitric acid, of a given density, requisite for the saturation of a given weight. The purest *sub-carbonate* is that obtained by incinerating *cream of tartar*, since most of the impurities are decomposed by the heat during the process, (*Sub-carbonas Potassæ Purissimus*. E.); it however generally contains lime.

* *Sal Prunelle*. Nitre, when coloured purple like a plum, has been long esteemed in Germany as a powerful medicine, under this name.

† M. Chevreul supposes the urinous taste attributed to fixed alkaline bases not to belong to these substances, but to the ammonia, which is set at liberty by their action on the ammoniacal salts contained in the saliva; the proofs of which, he says, may be derived from the facts that the sensation disappears upon pressing the nostrils; and that the same odour is perceived when we smell to a mixture of recent saliva and fixed alkali, made in a small glass or porcelaine capsule. (See my work on Medical Chemistry, § 8.)

POTASSÆ SULPHAS. L.E. SULPHAS KALI. D.

Kali Vitriolatum. P.L. 1787.*Tartarum Vitriolatum*, 1745, and 1720.*Sal de duobus*, &c.

QUALITIES. *Form*, crystals which are right rectangular (but not square) prisms, modified on the edges and angles; or double six-sided pyramids with short intervening prisms, which are macles, or hemitrope crystals; they are slightly efflorescent, and when heated they decrepitate. **SOLUBILITY.** f3j of water dissolves only grs. 24: the salt is insoluble in alcohol. **INCOMPATIBLE SUBSTANCES.** It is partially decomposed by the nitric and muriatic acids, in which case, a portion of the base being saturated, a corresponding portion of *bi-sulphate* results; this fact illustrates a chemical law of some importance, viz. *that a substance less weakly attracted by another than a third, will sometimes precipitate this third from its combination with the second, in cases wherein a super, or sub-salt is readily formed.** The history of tartrate of potass will furnish farther illustrations. (See page 187.) Sulphate of potass, when in solution, is entirely decomposed by lime and its compounds; by oxy-muriate of mercury; nitrate of silver; and by acetate and sub-acetate of lead. **MED. USES.** On account of its insolubility, it does not possess much activity as a purgative, but is said to be powerfully deobstruent; it should be exhibited in the form of powder, and in conjunction with rhubarb, or some other purgative medicine. **DOSE**, grs. x to ʒss. *Form*. 94. From its hardness and insolubility, it is a most eligible substance for triturating and dividing powders. **OFFICIAL PREP.** *Pulv. Ipecac. co.* L.E.D. (**M**) Under the name *Sulphas Potassæ cum Sulphure*, the Edinburgh college retains the preparation formerly known by the name *Sal Polycryst* (salt of many virtues); and as it is produced by deflagrating nitre with sulphur, the product, besides sulphate of potass, contains *bi-sulphate* and *sulphuret* of potass. It possesses no superiority over the common sulphate.

POTASSÆ SUPER-SULPHAS. L.

Sal Enixum of Commerce.

QUALITIES. *Crystals*, long hexangular prisms; *Taste*, sour and slightly bitter. **CHEMICAL COMPOSITION.** It is a *bi-sulphate*, consisting of two proportionals of acid, and one proportional of base. **SOLUBILITY.** It is soluble in twice its weight of water, as well as in alcohol. **MED. USES.** It affords a convenient mode of exhibiting sulphuric acid combined with a saline purgative, in a solid form; as it is more soluble, so is it more active than the sulphate. **DOSE**, grs. x to ʒij. It forms a grateful adjunct to rhubarb. See *Form*. 85.

POTASSÆ SULPHURETUM. L.E.

SULPHURETUM KALI. D.

Kali Sulphuretum, P.L. 1787. *Hepar Sulphuris*.

QUALITIES. *Form*, a hard brittle mass; *Colour*, liver brown, hence the old name of *hepar*; *Taste*, acrid and bitter: *Odour*, none when dry,

* See my "Elements of Medical Chemistry," page 157.

but if moistened, it yields the stench of sulphuretted hydrogen. **CHEMICAL COMPOSITION.** I consider this substance as a mixture of Sulphate of Potass, with variable quantities of Sulphuret and Bi-Sulphuret of Potassium.* **INCOMPATIBLE SUBSTANCES.** It is instantly decomposed by water, the oxygen of which forms Potass with the Potassium; while its hydrogen, combining with the sulphur, produces Sulphuretted hydrogen, part of which escapes, and another part forms, with the excess of Sulphur, Bi-Sulphuretted hydrogen; this latter body uniting with the base, produces what has been termed an *Hydroguretted Sulphuret*, but which might be more properly called an *Hydro-bi-Sulphuret*; upon adding an acid to the solution, a quantity of Sulphur is thrown down, Sulphuretted hydrogen is evolved, and a salt of Potass remains in solution. Metallic salts also decompose it, the metal falling down as a Sulphuret, or Hydro-sulphuret. **MEDICINAL USES.** It presents us with a form in which sulphur is soluble in water; it is diaphoretic, and has been found advantageous in cutaneous affections. (*Form.* 118,) and in arthritic and rheumatic complaints; while, from its known chemical action on metallic salts, it has been proposed as an antidote to such poisons. Its solution has been lately recommended as a lotion for the itch of infants, and in some cases it has been known to succeed after the sulphur ointment had failed.†

POTASSÆ SUPER-TARTRAS. L.E.

TARTARUM CRYSTALLI. E.

Super-Tartrate of Potass. Crystals of Tartar.

QUALITIES. *Form*, small irregular brittle crystals, which when reduced to powder are termed *cream of tartar*. *Taste*, harsh and acid. **CHEMICAL COMPOSITION.** It is a *bi-tartrate*, consisting of two proportionals of acid and one proportional of potass. **SOLUBILITY.** It requires 120 parts of water at 60°, and 30 parts at 212°, for its solution; it is slightly soluble in alcohol. The watery solution of this salt; was first observed by Berthollet to undergo a spontaneous decomposition by keeping, during which a mucous matter is deposited, and there remains a solution of carbonate of potass coloured with a little oil. It has long been regarded a pharmaceutical desideratum to increase the solubility of *cream of tartar*; Vogel discovered that it might be accomplished by combining it with boracic acid, and accordingly a formula has been introduced into the Codex Medicamentarius of Paris, for preparing a "*Tartras Acidulus Potassæ Solubilis, admixto Acido Boracico*" The following is the process. Let thirty parts of boracic acid, and twenty parts of distilled water be heated together in a silver dish; as soon as this has been effected, add, in divided portions, 120 parts of super-tartrate of potass, taking care to shake the mixture continually; the whole will soon liquefy, ("*mire liquescent*,") and by continuing the heat, a pulverulent mass will result. As it is extremely deliquescent it must be carefully preserved from the contact of the air; it dissolves in its own weight of water at 55°, and in half its weight at 212°. It is probable that the re-

* See my Work on Medical Chemistry, p. 605.

† I may take this opportunity to state that Sulphuretted Hydrogen, in a state of simple solution, or in combination with other bodies, possesses considerable powers as a remedy in many cutaneous disorders, of a chronic character. The "*Gas Water*," or that which remains after the gas, used for illumination, has passed through the purifier, and which consists of Hydro-Sulphuret and Hydro-bi-Sulphuret of Lime, has been used with great success in such cases.

sult is a new salt, in which the boracic and tartaric acids exist in combination,* but grant even that the chemical identity of the super-tartrate is preserved inviolate in the compound, I would ask what medical advantage can possibly attend the discovery? The peculiar value of cream of tartar depends doubtless upon its comparative insolubility, as I have already stated at page 177 of this work; modify this, and you will instantly change the medicinal effects of the salt; for, like the neutral tartrate it will act upon the bowels, and therefore cease to undergo those changes *in transitu* which are essential to its characteristic operation. Alum also has been observed by Berthollet to have in some measure the same effect in increasing the solubility of cream of tartar. **INCOMPATIBLE SUBSTANCES.** *Alkalies and alkaline earths; the mineral acids, &c.* **MED. USES.** In doses of ʒiv to ʒvj, it acts as a hydragogue cathartic, producing a considerable discharge of serous fluid into the intestines; when however it is often repeated, it is liable to occasion debility of the digestive organs, and consequent emaciation: in smaller doses it acts as a diuretic. (*Form.* 112.) ʒj in oj of boiling water, flavoured with lemon peel and sugar, forms when cool an agreeable beverage well known by the name of *Imperial*. A *Cream of Tartar Whey* may be made, by adding to a pint of milk (when it begins to boil) ʒij of *Cream of Tartar*; the pan must then be removed from the fire, the whole suffered to cool, and the whey separated from the curd by straining: this whey, diluted with warm water, furnishes an excellent drink in Dropsy. As it decomposes the carbonate of potass, the union of these salts will afford a very pleasant purgative draught. (*Form.* 82.) **OFFICIAL PREPARATIONS.** *Pulv. Jalap. comp. E. (BM) Pulv. Scammon. E. Pulv. Sennæ comp. L. Ferrum Tartarizatum, L. (I) Antimonium Tartarizatum. L.E.D. (I) Soda Tartarizata. L.E.D. (I)* **ADULTERATIONS.** Super-sulphate of potass (*Sal Enixum*), is the substance with which tartar is usually adulterated; it may be detected by its superior solubility, and by the solution affording with muriate of baryta a precipitate insoluble in muriatic acid.†

POTASSÆ TARTRAS L. TARTRAS POTASSÆ. Olim, Tartarum Solubile. E. **TARTRAS KALI. D.**

Kali Tartarizatum. P.L. 1787.

Tartarum Solubile. P.L. 1745.

QUALITIES. *Form*; this salt, although ordered to be crystallized, is generally kept in its granular form. *Taste*, bitter and cool. **CHEMICAL COMPOSITION.** It consists of one proportional of acid, and one proportional of base. **SOLUBILITY.** When in its crystalline form it is soluble in its own weight of water, but in its ordinary granular form, 4 parts are required for its solution; hence, compared with the insoluble super-tartrate, it has justly acquired the name of *soluble tartar*; when long kept in solution, its acid is decomposed, and its alkali remains in a state of a *sub-carbonate*. It is also readily soluble in alcohol. **INCOMPATIBLE SUBSTANCES.** *Magnesia, baryta, and lime; acetate and sub-acetate of lead,*

* It may be termed a Boro-tartrate.

† **ESSENTIAL SALT OF LEMONS.** The preparation sold under this name, for the purpose of removing iron moulds from linen, consists of cream of tartar, and super-oxalate of potass, or salt of sorrel, in equal proportions.

and *nitrate of silver* decompose it. All acids, even the *carbonic*,* and *acidulous salts*, *tamarinds*, and other *sub-acid vegetables*, by neutralizing a proportion of the base, convert it into the state of super-tartrate; this fact offers another illustration of the chemical law of affinity, explained under the head of *sulphate of potass*. The practitioner should bear this in his recollection, for I have frequently seen a dose of *soluble tartar* directed in the acidulated *infusion of roses*; the result was of course very different from that which the author of the prescription intended to produce. **MED. USES.** It is a mild and efficient purgative, and forms a very valuable adjunct to resinous purgatives or to senna, the griping properties of which it corrects by accelerating their operation. *Form.* 70. **Dose,** 3j to 3j, in solution.

PULVERES. L.E.D. *Powders.*

For the administration and advantages of this form of preparation, see page 195. The following Official Formulæ offer some valuable combinations.

PULVIS ALOES COMPOSITUS. L. *Pulvis Aloes cum Guaiaco. D.* It consists of aloes *three parts*, guaiacum *two* (**G**), and compound powder of cinnamon *one part* (**O**). It combines sudorific and purgative effects. *Dose,* grs. x to ʒj. See *Form.* 80.

PULVIS ALOES CUM CANELLA. D. and P.L. 1807. Aloes *four parts*, white canella (**E**) *one part*. It is known in the shops by the name of *Hiera Picra*. The compound is more adapted for the form of pills than that of powder. It is very generally used by the lower classes, infused in gin. *Dose.* grs. x to ʒj.

PULVIS ANTIMONIALIS. L.D. *Oxidum Antimonii cum phosphate Calcis, E.* This preparation was introduced into the Pharmacopœia, as the succedaneum of the celebrated *fever powder of Dr. James*, the composition of which was ascertained by Dr. George Pearson. (*Phil. Trans.* lxxxi. 317.) It consists of 43 parts of the phosphate of lime, mixed, or perhaps chemically combined, with 57 parts of oxide of antimony, of which a portion is vitrified; and it is probable, that the difference of the two remedies depends principally upon the quantity of oxide which is vitrified: the specification of the original medicine is worded with all the ambiguity of an ancient oracle, and cannot be prepared by the process as it is described.† Experience has established the fact, that *James's Powder* is less active than its imitation; it affects the bowels and stomach very slightly, and passes off more readily by perspiration; in general however the difference is so inconsiderable that we need not regret the want of the original receipt.‡ As it is quite insoluble in water, it should be given

* See page 188.

† His specification lodged in Chancery, is as follows: "Take Antimony, calcine it with a continued protracted heat, in a flat unglazed vessel, adding to it from time to time a sufficient quantity of any animal oil and salt, dephlegmated; then boil it in melted nitre for a considerable time, and separate the powder from the nitre by dissolving it in water."

JAMES'S ANALEPTIC PILLS. These consist of James's powder, gum ammoniacum, and the pill of aloes with myrrh, (*Pil. Rufi*) equal parts, with a sufficient quantity of the tincture of castor to make a mass.

‡ In consequence of the antimonial powder having proved inert in the hands of Dr. Elliotson, although exhibited to the amount of a hundred grains for a dose, Mr. Phillips was induced to examine more particularly into the nature of the oxide which

in powder or made into pills. It is diaphoretic, alterative, emetic, or purgative, according to the extent of the dose and the state of the patient ; in combination it offers several valuable resources to the intelligent practitioner. (See *Form.* 118, 121, 125, 129, 134.) But it may be fairly questioned whether this remedy has not been far too highly appreciated. Dr. James was certainly very successful in its use, but it must not be forgotten that he usually combined it with some mercurial, and always followed it up with large doses of bark.

PULVIS CINNAMOMI COMPOSITUS. L. Cinnamon bark *four*, cardamom seeds (**B**) *three*, ginger root (**B**) *two*, long pepper (**B**) *one part*. It is principally used to give warmth to other preparations, e. g. *Pulv. Aloes comp. L.D.*

PULVIS CONTRAYERVÆ COMPOSITUS. L. Contrayerva, *five*, prepared shells, *eighteen parts* (**M**). Dose, grs. x to xl. It is said to be stimulant and diaphoretic.

PULVIS CORNU USTI CUM OPIO. L. Opium *one part*, burnt hartshorn *eight*, powdered cochineal *one part*. Ten grains contain one of opium.

PULVIS CRETÆ COMPOSITUS. Prepared chalk *twelve parts*, tormentil root (**G**), acacia gum (**M**), of each *six*, cinnamon bark *eight* (**E**), long pepper (**E**) *one part*. It is antacid, astringent, and carminative. Dose, grs. v to ʒj.

PULVIS CRETÆ COMPOSITUS CUM OPIO. L. Compound powder of chalk *thirty-nine parts*, opium *one part*. *Form.* 151.

PULVIS IPECACUANHÆ COMPOSITUS. L.E.D. Ipecacuan *one part*, opium (**H**) *one part*, sulphate of potass (**M**) *eight parts*. The combination has been long established in practice, as a valuable sudorific, under the name of *Dover's Powder*. It affords one of the best examples of the power which one medicine possesses of so changing the action of another, as to produce a remedy of new properties ; in this combination the opium is so modified, that it may be given with perfect safety and advantage in inflammatory affections accompanied with increased vascular action : it would seem that whilst the opium increases the force of the circulation, the ipecacuan relaxes the exhalant vessels, and causes a copious diaphoresis : the sulphate of potass is also an important ingredient, for experience has fully proved that ipecacuan and opium, in the same proportions, have not so powerful an effect without it ; its action must be purely mechanical, dividing and mixing the active particles more intimately, and it appears that the success of the remedy depends very much upon its being finely powdered. Dose, grs. v. to ʒj, diffused in gruel, or in the form of a bolus. (See *Form.* 120, 121, 122.) The saline constituent in the original

enters into its composition. "After the well established fact," says he, "that peroxide of antimony is nearly or totally inert, it appears to me, that if proof could be obtained that the oxide of antimony is in this state, the deficiency of power in the Pulvis Antimonialis would be accounted for." He then proceeds to detail his experiments, from which he deduces the composition of this preparation to be as follows :

Peroxide of Antimony - 35

Phosphate of Lime - - 65

100

which exists together in a simple state of mixture. Until the subject be elucidated by farther experiments, it will be difficult for the chemist to persuade the physician, that he can never have derived any benefit from the exhibition of Antimonial Powder, although I am by no means inclined to concede to it that extraordinary degree of virtue which many practitioners are so eager to maintain.

Dover's Powder, was the result of the deflagration of nitre, and was therefore deliquescent; its dose was as much as from 40 to 70 grains. In the *Codex* of Paris, this compound is directed to be prepared by melting together *four parts* of sulphate of potass, with an equal proportion of nitrate of potass; to which when nearly cold is to be added, and well mixed by triture, *one part* of pulverized extract of opium; the powders of Ipecacuan and liquorice root, of each *one part*, are to be added last. It is evident that the proportions of opium and ipecacuan in this combination, are less than those in ours, and yet it is said to be more powerfully diaphoretic on account of the nitre. An arrangement, which is indebted for its medicinal virtue to a similar mode of operation is presented in *Form.* 130.

PULVIS SCAMMONIÆ COMPOSITUS. L. Scammony and hard extract of jalap, of each *four parts*, ginger root (**E**) *one part*. The Edinburgh preparation of the same name differs very materially in composition, its ingredients being scammony and cream of tartar in *equal parts*.

PULVIS TRAGACANTHÆ COMPOSITUS. L. Powdered Tragacanth, acacia gum, and starch, of each *one part*; refined sugar, *two parts*. From what has been already stated under the head of mucilage of tragacanth, it appears to be a superfluous, if not an injudicious demulcent; and since starch is insoluble in cold water, the object for introducing it is not very obvious. *Form.* 120.

Powders should be preserved in opaque green bottles, as they are materially affected by the action of light and air. Many of the compound ones should be considered as extemporaneous, and ought to be prepared only when they are required. The practitioner is also cautioned against purchasing any medicine in its powdered form, for so universal is the system of adulteration, that regular formulæ are observed in the wholesale houses for sophisticating powders, and Mr. Gray, in his "*Supplement to the Pharmacopœias*," has given several specimens, under the titles of "*Pulveres Reducti*."

PYRETHRI RADIX. L.E.D.

(*Anthemis Pyrethrum. Radix.*)

Pellitory Root.

QUALITIES. The dried root is inodorous, but upon being chewed, it soon produces a pungent and peculiar sensation. **SOLUBILITY.** Alcohol, æther, and boiling water extract its virtues. **CHEMICAL COMPOSITION.** *M. Gautier* has lately shewn that the peculiar pungency of the root depends on a fixed oil, which resides in vesicles in the bark. **MED. USES.** As a sialogogue, especially in cases of tooth-ache, and in paralysis of the tongue and muscles of the throat. (*Form.* 143). It also constitutes the bases of a very valuable gargle, in use at St. Bartholomew's Hospital, for relaxation of the uvula and soft palate, as well as in certain cases of deafness depending upon an enlarged state of the tonsils. It is made by boiling ʒss of the bruised root in oj of distilled water, until the fluid is reduced to one half; to which, when strained and cold, fʒij of *Liquor Ammoniæ* are to be added.

PYROLA UMBELLATA.* *Ground Holly.*

Although this plant has not yet found its way into the materia medica

* This plant is esteemed by the American Indians as a universal remedy, and is al-

of the Pharmacopœia, its credited virtues entitle it to some notice in the present work. It was first brought into repute in this country by Dr. Somerville (*Med: Chirug: Trans: Vol. 5.*) It is bitter, and consists of Resin, gum-resin, tannin, and bitter extractive. [Its virtues are extracted both by alcohol and water. In its effects upon the system, the pyrola is both tonic and diuretic. It is more especially, however, as a diuretic that it is celebrated. Both in Europe and in the United States, it has been administered with much success in dropsy. In nephritis and hematuria it has also been used with decided advantage, producing effects very similar to those of the Uva Ursi. Dr. Chapman represents it as being of service in cases of scrofula; and by the elder Dr. Barton it was much thought of as an antilithic. It may be given in tincture in doses of from 3j to 3ij; or in infusion made by pouring one pint of boiling water upon 3j of the plant, in doses of from 3j to 3iv.]

QUASSIA. L.E.D. (*Quassia Excelsa. Lignum.*)

Quassia.

This wood owes all its properties to a peculiar bitter principle, which has been examined by Dr. Thomson and named *Quassin*; it is solid, slightly transparent, and of a yellowish brown colour. (See *Infusum Quassiae.*) It is said to owe its name to a West Indian negro, called Quassi, who first used it in fevers.

QUERCUS CORTEX. L.E.D.

(*Quercus Pedunculata. Cortex.*)

Oak Bark.

QUALITIES. *Odour*, none; *taste*, rough and astringent. CHEMICAL COMPOSITION. We are indebted to Sir H. Davy for a knowledge of this subject; he found that an ounce of the inner cortical part of young oak bark afforded by lixivation 111 grains of solid matter, of which 77 were *tannin*; and the cellular integument, or middle-coloured part, only yielded 43 grains of solid matter, of which 19 were *tannin*; and the epidermis furnished scarcely any quantity of *tannin* or extractive; hence the bark should be selected from the smaller branches of the oak where the epidermis is still thin. Experience has, moreover, shewn that the quantity of *tannin* varies considerably, not only according to the age and size of the trees, but according to the season at which they are *barked*; thus, the bark cut in spring contains, according to *Beguin*,* four times more of the astringent principle than that which is obtained in winter. MED. USES. All its properties depend upon the presence of *tannin*, it is therefore only valuable as a powerful astringent; it is accordingly employed

ways carried about with them. The members of the profession have doubtless heard of an irregular practitioner, who has persuaded a certain number of persons in this metropolis, that he possesses remedies, obtained from the American Indians, by which he is enabled to *cure* Scrofula in its worst forms; it is to this Empiric that I alluded in the note at page 33; and it may be worthy of notice that the plant upon which he relies for success, is the *Pyrola Umbellata*.

* Philosophical Transactions, 1799.

to check inordinate discharges, see *Decoctum Quercus*. Oak bark is sometimes administered in the form of powder, combined with ginger and other aromatics, and bitters, for the cure of intermittents, and it has frequently succeeded, but see page 171. Dose, ℥j to 3ss. In the form of poultice this powder is said to have proved highly useful to gangrenous sores. Its inhalation has also been supposed to prove beneficial in consumption; a striking case is related by Dr. Eberle of a man who had laboured under the usual symptoms of confirmed Phthisis, and who, at the time he went to grind in a bark-mill, was extremely weak and emaciated; in a short time, however, the cough, night sweats, and other hectic symptoms, began to abate sensibly, and in less than three months he was perfectly restored to health.

RHEI RADIX. L.E.D. *Rhubarb*.*

Two varieties of this root are known in the shops, viz. *Turkey* or *Russian*, and *East Indian* or *Chinese*.

1. TURKEY OR RUSSIAN. (*Rheum Palmatum*.)

QUALITIES. *Form*, small round pieces, rather compact and heavy, perforated in the middle; *Colour*, lively yellow with streaks of white; it is easily pulverized, affording a powder of a bright buff yellow colour. **CHEMICAL COMPOSITION.** Gum, resin, extractive, tannin, gallic acid, and a peculiar colouring matter, with traces of alumina and silex; the white or flesh-coloured streaks pervading its substance, consist of sulphate and oxalate of lime: according to the experiments of Mr. John Henderson, there is besides a peculiar vegetable acid, to which he has given the name of *Rheumic acid*, but M. de Lassaignes has satisfactorily proved that this is no other than the oxalic acid: the purgative powers of the root appear to be intimately connected with its extractive and resinous elements, but the subject is still involved in considerable obscurity. **SOLUBILITY.** Water 212° takes up 24 parts in 60, see *Infusum Rhei*: by decoction, its purgative qualities are lost, and it becomes more bitter and astringent; alcohol extracts 2·7 from 10 parts, (see *Tinct. Rhei*.) **MED. USES.** In this substance, nature presents us with a singular and most important combination of medicinal powers, that of an astringent, with a cathartic property; the former of which never opposes or interferes with the energy of the latter, since it only takes effect when the substance is administered in small doses; or if given in larger ones, not until it has ceased to operate as a cathartic; this latter circumstance renders it particularly eligible in cases of diarrhoea, as it evacuates the offending matter before it operates as an astringent upon the bowels. It seems to act more immediately upon the stomach and small intestines, and therefore in relaxed and debilitated states of these organs, it will prove an easy and valuable resource; it may, for such an object, be exhibited in conjunction with alkalies, bitters, and other tonics. Its cathartic property is most efficient when given in substance. It was formerly supposed that by toasting rhubarb we increased its astringency, but this

* WARNER'S COLDIAL. Rhubarb bruised 3j; Sennæ 3ss; Saffron 3j; Powdered Liquorice 3iv; Raisins pounded lbj; Brandy oij; digest for a week and strain.

MOSELEY'S PILLS. The stomachic Pills which are sold under this name, consist merely of Rhubarb and Ginger.

process merely diminishes its purgative force, so that a larger dose may be taken. The colouring matter of rhubarb may be detected in the urine of persons to whom it has been exhibited; it does not however appear to possess any specific powers as a diuretic. Dose, grs. vj to x as a tonic; ℥j to 3ss as a purgative; the operation of which is considerably quickened by the addition of neutral salts; the super-sulphate of potass forms also a very useful adjunct, and its acidulous taste completely covers that of the rhubarb. *Form.* S3, 35. Its powder, when sprinkled upon ulcers, is found to promote their healthy granulation. *OFF. PREP.* *Infus. Rhei.* L.E. *Vinum Rhei Palmati.* E. *Tinct. Rhei.* L.E.D. *Tinct. Rhei comp.* L. *Tinct. Rhei cum Aloe.* E. *Tinct. Rhei cum Gentian.* E. *Pil. Rhei comp.* E.

2. EAST INDIAN, or CHINESE. (*Rheum Undulatum?*)*

QUALITIES. *Form,* long pieces, sometimes flat, as if they had been compressed; they are heavier, harder, and more compact than those of the preceding species, and are seldom perforated with holes; *Odour,* stronger; *Taste,* more nauseous; white streaks less numerous, and they afford a powder of a redder shade than those of *Turkey* rhubarb. **CHEMICAL COMPOSITION.** It differs from the *Turkey* in containing less tannin and resin, and according to the experiments of Mr. A. T. Thomson, less oxalate of lime, in the ratio of 18 to 26. It contains however more extractive and gallic acid. **SOLUBILITY.** Water takes up one half of its weight, but the infusion, although more turbid, is not so deep coloured as that of *Russian* rhubarb; alcohol extracts 4 parts in 10. Its habits with acids, alkalies, and neutral salts, differ likewise from those of the *Russian* variety, as Mr. A. T. Thomson has exhibited in a very satisfactory manner. (*London Dispensatory, Edit. 3. p. 474.*) **ADULTERATIONS.** The inferior kinds of *Russian*, *East Indian*, and even *English* rhubarb, are artfully dressed up and sold under the name of *Turkey* rhubarb. I am well informed that a number of persons in this town, known in the trade by the name of *Russifiers*, gain a regular livelihood by the art of dressing this article, by boring, rasping, and then colouring the inferior kinds; for which they charge at the rate of eighteen-pence per pound. The general indications of good rhubarb are, its whitish or clear yellow colour, and its possessing the other characteristic properties as above mentioned; it ought also to possess in an eminent degree the peculiar odour, for when this is dissipated, the powers of the medicine are nearly destroyed. In the form of powder, rhubarb is always more or less mixed with foreign matter; the detection of which can be alone effected by a trial of its efficacy.

RICINI † OLEUM. L.E.D. (*Ricinus Communis.*)

Castor ‡ Oil.

QUALITIES. *Form,* a viscid and colourless, or pale straw-coloured oil;

* Dr. Rehman asserts that it is the root of the same species as that which produces the *Turkey* variety, but that it is prepared with less care.

† The seeds of this plant, from which the oil is expressed, are variegated with black and white streaks, resembling in shape as well as colour, the insect *RICINIS* or *Tick*, whence the name. These seeds, from the acrid juice in their skins, are very drastic and emetic; they were however used by *HIPPOCRATES*. *MATHIOLUS* attempted to correct their emetic quality by torrefaction, but without success. *GULIELMUS PISO* proposed a tincture of them, but the preparation is not only uncertain, but unsafe in its operation. See *Tiglii Semina*.

‡ For the derivation of the name *Castor* oil, see page 39.

it is nearly inodorous, but on being swallowed, excites a slight sensation of acrimony in the throat. It has all the chemical aptitudes of the other expressed oils, except those which relate to its solubility in alcoholic and ethereal menstrua. **MED. USES.** It is mildly cathartic, and is particularly eligible in cases where stimulating purgatives would prove hurtful, but in obstinate constipation, where copious evacuations are required, this oil cannot be trusted, it will insinuate itself through the intestinal canal, bringing with it a small portion of the more fluid contents, but leaving behind it the collection of indurated faeces. **FORMS OF EXHIBITION.** The most efficacious mode of administering it is by floating it upon tincture of senna, or peppermint water, or some other similar vehicle; it is also sometimes given with success in coffee or mutton broth, or suspended in water by the intervention of mucilage, yolk of egg (*Form.* 75,) or by honey, which at the same time contributes to its laxative operation: alkalies, though they form an emulsion with it, convert it into a saponaceous compound, and impair its cathartic force. **DOSE,** fʒss to fʒiss. **ADULTERATIONS.** It is usually adulterated with olive oil or poppy oil, and when to a considerable extent, scammony is added to quicken its operation. There is however a peculiarity in castor oil which serves to distinguish it from every other fixed oil, viz. its great solubility in rectified spirit; for instance, fʒiv of alcohol of .820 will mix uniformly with any proportion of castor oil, whereas it will not dissolve more than fʒj of *Linseed Oil*; and a still less proportion of the expressed oils of almonds and of olives; when the spirit is diluted, its action on all these oils is equally diminished, so that the common *spirit of wine* has but little power even over castor oil; but here chemistry again interposes its aid, for by the addition of camphor in the proportion of one part to eight of spirit, spirit of .840 is enabled to dissolve castor oil, whilst it has no influence upon the other fixed oils; castor oil is also soluble in any proportion, in sulphuric æther of the specific gravity .7563, while four fluid-ounces of the same liquid will only dissolve a fluid-ounce and a quarter of the expressed oil of *Almonds*; a fluid-ounce and a half of that of *Olives*; and two fluid-ounces and a half of *Linseed* oil. Vogel introduced a composition, as a substitute for this oil, which some practitioners have greatly extolled; it consisted of nine grains of the extract of Jalap, and three grains of Venetian soap, triturated in a mortar with an ounce and a half of olive oil.

SABINÆ FOLIA. L. (*Juniperus Sabina.*)

Savine Leaves.

QUALITIES. *Odour*, heavy, and disagreeable; *Taste*, bitter, hot, and acrimonious. **CHEM. COMP.** Essential oil, which may be obtained by distillation with water; fixed oil, bitter extractive, and resin. **SOLUBILITY.** Both water and alcohol extract its active principles. **MED. USES.** It possesses highly stimulating properties, and has been used as a diaphoretic, anthelmintic and emmenagogue. Rave, a German writer of great respectability, speaks of its use in chronic rheumatism in the highest terms; Alibert commends its anthelmintic powers, but its reputation has principally rested upon its generally acknowledged influence over the uterus. The testimony of Dr. Home of Edinburgh is strong in favour of its emmenagogue powers, but the adverse opinion of Dr. Cullen brought it

into disrepute. It occasions a manifest flow of blood to the uterus, but this is probably sympathetically produced by its direct action on the large intestines; for if given in large doses it occasions great heat in the primæ viæ, hæmorrhage, and inflammation of the bowels. It is therefore inadmissible in all cases which are attended with fever, or much vascular action. When amenorrhœa depends upon a relaxed state of the general system, or on an inactive and torpid condition of the uterine system, it may often be employed with advantage. Wedekind, a German writer, extols it in the treatment of that atonic or relaxed state of the uterus, attended with an unnatural secretion and soft swelling of the uterus which is sometimes met with in women who have suffered much from repeated child-bearing, and which is so generally attended with a train of hysteric disturbances. Dr. Eberle says that he has occasionally employed it in cases of Amenorrhœa, in females of a relaxed habit of body; and although sometimes without success, he has had sufficient evidence of its powers to establish its claim to attention. In several cases, similar to those above stated, I have employed the Savine with much success, but I have found it very liable to disturb the stomach, and to produce head-ache. **FORMS OF EXHIBITION.** Some practitioners have recommended that of powder, but it is almost impossible to pulverize it without previously drying it at a temperature which will dissipate the essential oil, upon which its activity depends. The tincture affords a more convenient form, and a compound tincture formerly occupied a place in the Pharmacopœia, but has been abandoned. A decoction of an ounce of the leaves to a pint of water, with the addition of syrup, has been also recommended; an infusion, however, would be preferable. Dose, of the powdered leaves from grs. v to x; of the tincture f3j; of the decoction f3ss to f3j. As an external local stimulant, or escharotic, the dried leaves in powder are applied to warts, flabby ulcers, and carious bones; and the expressed juice diluted, or an infusion of the leaves, as a lotion to gangrenous sores, scabies, and *tinea capitis*; or mixed with lard and wax as an issue ointment. The German writers speak very highly of its effects as a poultice to old and obstinate sores. **OFFICINAL PREP.** *Oleum Volatile Juniperi Sabinæ*. E.D. (the dose of which is from one to three minims.) *Extractum Sabinæ*. D. (a very inert preparation.) *Ceratum Sabinæ*. L.

The experiments of Orfila have shewn that Savine exerts a local action, but that its effects depend principally on its absorption; through which medium it acts on the nervous system, the rectum, and the stomach. It still enjoys amongst the vulgar the reputation of being capable of producing abortion.

SACCHARUM. L.E.D. *Sugar*.*

Sugar, as a pharmaceutical agent, is employed for accelerating the pulverization of various resinous substances, and when exhibited with the most acrid of them, it prevents their adhesion to the coats of the intestines, by which they might irritate and inflame them; it is also extensively used on account of its power in preserving animal† and vegetable sub-

* The Sugar cane is called in Arabic *Lukseb*. The produce of it, *Assakur*, hence *Sugar*. Some authors have attempted to derive the word from *Succus* a juice; this is obviously an error.

† For this purpose it may be added to certain ointments to prevent their becoming

stances. (See *Conserva.*) Milk boiled with fine sugar will keep for a great length of time, and might be very conveniently employed during a long voyage. Dr. Darwin also observes that fresh meat cut into thin slices, either raw or boiled, might be preserved in coarse sugar or treacle, and would furnish a very salutary and nourishing diet to our sailors. Sugar exerts also some chemical affinities which are highly interesting to the pharmaceutic chemist. Vogel has published a paper to shew, that when sugar is boiled with various metallic oxides, and with different metalline salts, it has the property of decomposing them; sometimes reducing the oxide to the state of a metal, and at others depriving the oxide only of one of the proportionals of oxygen; thus *sulphate of copper* and *nitrate of mercury* are precipitated in a metallic form, whilst *per-oxide of mercury* and *acetate of copper* are converted into protoxides; *corrosive sublimate* is changed into *calomel*, but *calomel* is not susceptible of any further decomposition. All those metallic salts which have the power of decomposing water are not affected by sugar, as those of *iron*, *zinc*, *tin*, and *manganese*. It appears, moreover, that sugar has the property of rendering some of the Earths soluble in water. Sugar in water, at the temperature of 50°, is capable of dissolving one half of its weight in lime; the solution thus produced is of a beautiful white-wine colour, and has the smell of fresh-slacked quick-lime. It is precipitated from the solution by the *carbonic*, *citric*, *tartaric*, *sulphuric*, and *oxalic* acids; and it is decomposed, by double affinity, by *caustic* and *carbonated potass* and *soda*, and by the *citrate*, *tartrate*, and *oxalate* of potass, &c. The union of sugar with the alkalies has been long known, and in the decomposition of the solution of lime in sugar by the salts above mentioned, the acid unites with the lime, and the alkaline base forms a compound with the sugar.

SAPO. L.E.D. Soap.

I. DURUS. (*Hispanicus.*) Hard, or Spanish Soap.

CHEMICAL COMPOSITION. Oil 60·94, soda 8·56, water 30·50; the water is partially dissipated by being kept, and the soap therefore becomes lighter. Muriate of Soda is also an essential ingredient* of hard soap. **SOLUBILITY.** Water dissolves about one third of its weight of genuine soap, and forms a milky solution; alcohol also dissolves it, and affords a solution nearly transparent, although somewhat gelatinous.† **INCOMPATIBLE SUBSTANCES.** 1. All acids and acidulous salts, which combine with the alkali, and develope the oil. 2. Earthy salts, e. g. *Alum*; *muriate* and *sulphate of lime*; *sulphate of magnesia*. 3. Metallic salts. *Nitrate of silver*; *ammoniated copper*; *tincture of muriated iron*; *ammoniated iron*; *acetate*, *sub-muriate*, and *oxy-muriate of mercury*; *sub-acetate of lead*;‡ *tar-*

rancid. For the reasons, however, above stated, it must not be boiled with the ingredients, but added after they are cold.

* In those districts where Soap is generally made from wood ashes, or from Russian or American potass, unless Salt were added in large quantities, it would not have any consistence. As Kelp and common Barilla contain a sufficient quantity of it, no further addition is required.

† **TRANSPARENT SOAP** is made by carefully evaporating the alcoholic solution. The solution itself is sold under the name of **SHAVING LIQUID**, or "**ESSENCE ROYALE POUR FAIRE LA BARBE.**"

‡ When a solution of soap and sub-acetate of lead are added together, the potass of the former combines with the acetic acid of the latter, and the fat and oxyd of lead are disengaged; the one rising to the surface, while the other is precipitated; and

tarized iron; tartarized antimony; sulphates of zinc, copper, and iron. 4. All astringent vegetables. 5. Hard water. **MEDICINAL USES.** In large doses it is purgative; in smaller ones, it is decomposed *intransitu*, and its alkali is carried to the kidneys; in this way it may act as a lithontriptic; or it may produce its effects by correcting any acidity which may prevail in the *primæ viæ*, for the weakest acid is capable of decomposing soap, and of uniting with its alkaline base; a solution of soap in lime water was long regarded as one of the strongest solvents of urinary calculi that could be administered with safety, but the result of such a mixture is an insoluble soap of lime, and a solution of soda; in habitual constipation, and in biliary obstructions it is frequently prescribed in conjunction with rhubarb, or some bitter; in which cases it can only act as a laxative, or as a chemical agent, in increasing the solubility of the substance with which it is united. It has been also given in solution as an antidote to metallic poisons, and it is often successfully injected as a clyster, in unrelenting and habitual costiveness; as an external application, it is used in the form of liniment, (see *Linimenta*.) Its pharmaceutical value, in forming pill-masses has already been considered (page 200) and the following *formulæ* afford examples of such an application, viz. 14, 80, 105, 118, 165. **OFFICIAL PREPARATIONS.** *Pil. Saponis cum Opio.* L. (**L**). *Pil. Scillæ comp.* L. (**M**). *Pil. Aloet.* E. (**L**). *Pil. Aloes et Assafetidæ.* E. (**I**). *Pil. Aloes cum Zinzib.* D. (**L**). *Pil. Colocynth. comp.* D. (**L**). *Emplast. Saponis.* L. E. *Ceratum Saponis.* L. *Liniment. Saponis. comp.* L. *Liniment. Saponis cum Opio.* L. **ADULTERATIONS.** Pulverized Lime, Gypsum, or Pipe clay, are sometimes added; but the fraud is easily detected by solution in alcohol, when the earthy matters fall down.

II. SAPO MOLLIS. *Soft Soap.*

This differs from *hard soap* chiefly in its consistence, which is never greater than that of hog's lard: it is transparent, yellowish, with small seed-like lumps of tallow diffused through it: the alkali employed for its formation is a ley of potass, instead of that of soda.

SARSAPARILLA. L.E.D.

(*Smilax Sarsaparilla. Radix.*)

Sarsaparilla.

QUALITIES. *Form*, long and slender twigs, covered with a wrinkled brown bark; *Odour*, none; *Taste*, mucilaginous and slightly bitter. **CHEMICAL COMP.** Its virtues appear to reside in fecula; it also contains a very large proportion of vegetable albumen. **SOLUBILITY.** It communicates its active principle most completely to boiling water. (See *Decoct. Sarsaparillæ*.) **MED. USES.** According to Monardes, it was imported by the Spaniards into Europe in 1549, as a specific remedy for the venereal disease; but it soon fell into disrepute, and so continued until about the middle of the last century, when it was again brought into esteem by Hunter and Fordyce, as a medicine calculated to assist the operation of mercury, as well as to cure those symptoms which may be called the *sequelæ* of a mer-

yet notwithstanding this complete decomposition, some surgeons are in the habit of using an application which consists of a drachm of the *Liquor Plumbi Sub-Acetatis*, and two ounces of the *Linimentum Saponis*! We cannot have any hesitation in deciding upon the inefficacy of such a mixture.

curial course. DOSE, of the powdered root \mathfrak{z} j to \mathfrak{z} j, three times a day. In selecting the roots, it will be right to choose such as are plump, not carious, nor too dusty on breaking; but rough, and which easily split longitudinally. OFFICIAL PREP. *Decoctum Sarsaparillæ*. L.E.D. *Decoct. Sarsaparillæ comp*: L.D. *Extractum Sarsaparillæ*. L. *Syrupus Sarsaparillæ*. L. There are several species of *Carex* which are substituted for Sarsaparilla. The *C. villosa* (German Sarsaparilla) is very commonly employed for this purpose.

SASSAFRAS. L.E.D.

(*Laurus Sassafras. Lignum, Radix, et Cortex.*)

The Wood, Root, and Bark of Sassafras.

QUALITIES. Odour, fragrant: Taste, sweet and aromatic. CHEMICAL COMPOSITION. The qualities of this plant depend upon an essential oil and resin. SOLUBILITY. Its active parts are soluble in water and alcohol. MED. USES. It is said to be diaphoretic, and diuretic; and has been employed in cases of scurvy, rheumatism, and in various cutaneous affections; it also formerly enjoyed the reputation of being an antisyphilitic remedy. Its powers are very questionable. OFFICIAL PREP. *Oleum Sassafras*. L.E.D. *Decoct: Sarsaparillæ comp*. L.D. *Decoct: Guaiac*: L.E.D. *Aqua Calcis comp*: D.*

SCAMMONIA. L.E.D.

(*Convolvulus Scammonia Gummi-resina.*)

SCAMMONIUM. D. *Scammony.*

QUALITIES. Form, blackish-grey cakes; Taste, bitter and sub-acrid; Odour, heavy and peculiar; when rubbed with water, the surface lathers or lactifies. Specific gravity 1.235. CHEMICAL COMPOSITION. Resin is the principal constituent; 16 parts of good Aleppo Scammony yield 11 parts of resin, and $3\frac{1}{2}$ of watery extract. That from Smyrna contains not more than half the quantity of resin, but more extractive, and gum. SOLUBILITY. Water, by trituration, takes up one-fourth, alcohol two-thirds, and proof spirit dissolves all, except the impurities. INCOMPATIBLE SUBSTANCES. Neither acids, metallic salts, nor ammonia, produce any change in its solutions, but the fixed alkalies occasion yellow precipitates; and yet they do not appear to be medicinally incompatible with it; thus Gaubius, "*Scammoneum acidi commixtio† reddit inertius; Alkali fixum, contra, adjuvat.*" The mineral acids appear to destroy a part of the substance, without in the least altering the rest. The discrepancy which exists in authors respecting the power of this drug,

* GODFREY'S CORDIAL.—The following receipt for this nostrum was obtained from a wholesale druggist, who makes and sells many hundred dozen bottles in the course of a year. There are however several other formulæ for its preparation, but they are not essentially different. Infuse \mathfrak{z} ix of Sassafras, and of the seeds of Carraway, Coriander, and Anise, of each \mathfrak{z} j, in six pints of water, simmer the mixture until it is reduced to four pints; then add lbvj of Treacle, and boil the whole for a few minutes; when it is cold, add f \mathfrak{z} ij of the tincture of opium. The extensive and indiscriminate use of this nostrum in the nursery, is a subject of national opprobrium, and is so considered by foreign writers. See Fodéré, *Medicine Legale*, vol. iv. p. 22.

† M. Virey says, "On observe que des acides châtrent, pour ainsi parler, tout l'énergie de la Scammonee."

seems to have arisen from its operation being liable to uncertainty, in consequence of peculiar states of the alimentary canal; for instance, where the intestines are lined with an excess of mucus it passes through without producing any action, but where the natural mucus is deficient, a small dose of scammony may irritate and even inflame the bowels. In this latter case my practice has been to administer the purgative in a mucilaginous draught or emulsion. **MED. USES.** It is an efficacious and powerful cathartic, very eligible in worm cases, and in the disordered state of bowels, which so commonly occurs in children. **Dose,** grs. iij to xv, in the form of powders triturated with sulphate of potass, sugar, or almonds; when given alone, it is apt to irritate the fauces; it may be also administered as a solution, effected by triturating it with a strong decoction of liquorice, and straining. (*Form.* 78, 83.) **OFFICIAL PREPARATIONS.** *Confect : Scammon : L.D. Pulv : Scammon : co. L.E. Extract : Colocynth : co. L. (F) Pulv. Sennæ co. L.* (F).* **ADULTERATIONS.** Two kinds of Scammony are imported into this country, that from *Aleppo*, which is the best; and that from *Smyrna*, which is more compact and ponderous, but less pure; it is commonly mixed with the expressed juice of the *cynanchum monspeliacum*; it is also sophisticated with *flour, sand, and ashes*; their presence may be detected by dissolving the sample in proof spirit, when the impurities will sink, and remain undissolved; carbonate of lime is moreover frequently added to Scammony, in which case the sample will effloresce in acids; there is however a compound bearing the name of Scammony, to be met with in the market, which is altogether factitious, consisting of jalap, senna, manna, gamboge, and ivory black. Good Scammony ought to be friable, and when wetted with the finger, it should *lactify*, or become milky: and the powder should manifest its characteristic odour, which has been compared to that of old ewe milk cheese.

SCILLÆ RADIX. L.E.D. (*Scilla Maritima.*)

Squill Root. (Bulb.)

QUALITIES. *Odour*, none; *Taste*, bitter, nauseous, and acrid; when much handled, it inflames, and ulcerates the skin. By drying, the bulb loses about four fifths of its weight, and with very little diminution of its powers, provided that too great a heat has not been applied. **CHEMICAL COMPOSITION.** According to Vogel, gum 6—tannin 24—sugar 6—bitter principle (*Scillitin*, which is white, transparent, and breaks with a resinous fracture) 35—woody fibre 30. **SOLUBILITY.** Squill gives out its virtues so perfectly to any of the ordinary menstrua, as to render the form of its exhibition in that respect, a matter of indifference. **INCOMPATIBLE SUBSTANCES.** *Alkalies* diminish their acrimony and bitterness, and are probably *medicinally* inconsistent with their diuretic qualities, but farther experiments are required to decide this question: *vegetable acids* produce no effect upon their sensible qualities, but are said to increase their expectorant power. **MED. USES.** According to the dose, and circumstances under which it is administered, it proves expectorant, diure-

* **COUNT WARWICK'S POWDER.** The purgative long known and esteemed under this name, consisted of Scammony, Oxide of Antimony, and Cream of Tartar. It is much extolled by Baglivi, and by Van-Swieten, as an efficacious purgative in intermittent fevers.

tic, emetic, or purgative ; as an expectorant, it can never be employed where pulmonary inflammation exists, for in such cases, instead of promoting, it will check any excretion from the lungs ; its combination with a diaphoretic will frequently increase its powers, and generally be a measure of judicious caution. See *Form.* 133, 134, 135, 139. For the philosophy of its action, the reader must refer to the classification of Expectorants, page 105. As a diuretic, it seems to act by absorption, and we accordingly find, on the authority of Dr. Cullen, that *when the squill operates strongly on the stomach and intestines, its diuretic effects are less likely to happen* ; he therefore found that by accompanying it with an opiate, (*Form.* 100) the emetic and purgative operation may be avoided, and the squill be thereby carried more entirely to the kidneys. Experience, moreover, has taught us the value of combining this medicine with some mercurial preparation, by which its diuretic powers are very considerably augmented ; and it has been farther stated, that such a combination is particularly efficacious in Hydrothorax, especially when it produces inflammation of the gums, and of the glands about the throat, by which action it is supposed to cause a derivation from the exhalants of the pleura, and thereby to diminish the dropsical effusion. *Form.* : 102, 103, 106, 107, 109, 112, 115,) but we must take care that the remedy does not occasion purging. In the exhibition of squill, it has been often delivered as a rule, to give it to the extent necessary to induce nausea, as affording a test of the medicine being in a state of activity ; such a state of the system, moreover, may assist the absorption of the remedy. Dr. Home, in opposition to the opinion of Cullen, maintained that the powers of Squill, as a diuretic, were increased by combining it with bodies capable of promoting its full emetic operation ; after what has been observed, however, it is unnecessary to dwell upon the mischievous tendency of such a practice. By referring to our tabular arrangement of Diuretics, at page 105, the reader will find that I consider its action upon the urinary organs to depend upon its bitter principle (*Scillitin*) being developed, and carried, by the medium of the circulation, to the secreting vessels of the kidneys, which it thus stimulates by actual contact. As an emetic, it has been advised in solution, in cases of hooping cough, but its extreme uncertainty renders it unfit for exhibition, unless as an adjunct to emetic combinations, as in *Form.* : 65. *Plenck* makes mention of a child which had convulsions in consequence of taking some Squill. **DOSE.** Of the dried root gr. j to iv. **OFFICIAL PREPARATIONS.** *Acetum Scillæ*, L.E.D. *Pil : Scill : comp* : L.E.D. *Pulv : Scill* : E.D. *Syrup. Scill : maritim* : E. *Tinct : Scill* : L.D.

SECALE CORNUTUM.

(Spurred Rye, or Ergot of Rye.)

[Various opinions have been entertained in relation to the nature of Ergot. The most probable is that it is a parasitic fungus, attached to several species of the gramina, but more especially to the rye. It is generally found most abundant in moist situations and in wet seasons. Its taste, at first scarcely perceptible, becomes shortly disagreeable and sub-acrid. By the analysis of Vauquelin, the ergot has been ascertained to contain. 1. A fawn-yellow colouring matter, soluble in alcohol, and having a taste resembling that of fish oil. 2. A white oily matter, of a sweetish taste, which appears to be very abundant. 3. A violet

colouring principle, of the same shade as that of orchil, but differing from it by its solubility in alcohol, and which can be readily fixed on aluminated wool and silk. 4. A free acid, supposed to be partly phosphoric. 5. A very abundant vegeto-animal substance, much disposed to putrefaction, and which furnishes a considerable quantity of thick oil and of ammonia by distillation. 6. A small quantity of free ammonia, which can be obtained at the temperature of boiling water. As a medicinal substance, ergot exerts a specific effect upon the uterus, and is very generally used in this country for the purpose of facilitating the process of parturition. From the powerful effects produced by the ergot, it is obvious that it should be used with much caution. Dr. Stearns, to whom the profession is indebted for the first introduction of this article into practice, and who must be considered as our highest authority on this subject, has laid down the following rules by which its administration should be regulated: 1. It should never be administered where nature is competent to a safe delivery. 2. It should never be administered until the regular pains have ceased, or are ineffectual, and there is danger to be apprehended from delay. 3. It should never be administered until the rigidity of the os tincæ has subsided, and a perfect relaxation has been induced. 4. It should never be administered in the incipient stages of labour, nor until the os tincæ is dilated to the size of a dollar. 5. It should never be administered in any case of preternatural presentation that will require the fœtus to be turned. 6. It should never be administered during the continuance of one labour, in larger quantities than thirty grains by decoction in half a pint of water. A table-spoonful of this given every ten minutes, generally succeeds better than a larger dose. While this quantity produces its most favourable effects upon the uterus, it does not affect the stomach with nausea or vomiting, which sometimes interrupts its successful operation.

The ergot is indicated, and may be administered, 1. When, in lingering labours, the child has descended into the pelvis, the parts dilated and relaxed, the pains have ceased, or being too ineffectual to advance the labour, there is danger to be apprehended from delay, by exhaustion of strength and vital energy, from hemorrhage, or other alarming symptoms. 2. When the pains are transferred from the uterus to other parts of the body, or to the whole muscular system, producing general puerperal convulsions. After premising copious bleeding, the ergot concentrates all these misplaced labour-pains upon the uterus, which it soon restores to its appropriate action, and the convulsions immediately cease. 3. When in the early stages of pregnancy, abortion becomes inevitable, accompanied with profuse hemorrhage and feeble uterine contractions. 4. When the placenta is retained from a deficiency of contractions. 5. In patients liable to hemorrhage immediately after delivery. In such cases the ergot may be given as a preventive, a few minutes before the termination of the labour. 6. When the hemorrhage or lochial discharges are too profuse immediately after delivery, and the uterus continues dilated and relaxed without any ability to contract.]

SENEGÆ RADIX. L.E.D.

(*Polygala Senega*) *Radix*.

QUALITIES. *Form*, the dried root is internally white: externally it is covered with a brownish grey, corrugated, transversely cracked cuticle. *Odour*, none. *Taste*, at first sweetish, but afterwards hot and pungent,

producing a very peculiar tingling sensation in the fauces. **CHEMICAL COMPOSITION.** Its virtues reside in resin. **SOLUBILITY.** Alcohol extracts the whole of its active matter; hot water only partially. **MEDICINAL USES.** As a stimulant; but it is rarely used. In America it is used against the bite of the rattlesnake.* **OFFICINAL PREPARATIONS.** *Decoctum Senegæ.* L.E.

SENNÆ FOLIA. L.E.D. (Cassia Senna.)

Senna Leaves.

QUALITIES. *Odour*, faint and sickly; *Taste*, slightly bitter, sweetish, and nauseous. **CHEMICAL COMPOSITION.** Extractive, resin, mucilage, and saline matter; it contains within itself a purgative principle and a bitter element; and although the latter is *per se* inert, yet in combination, its presence aids and exalts the efficacy of the former. M. M. Lassaigne and Fenuelle have lately announced the fact of their having procured the purgative principle of Senna in a separate form, and to which they have given the name of *Cathartine*. It is said to be an uncrystallizable substance, of a reddish-yellow colour, and of a particular smell, and bitter nauseous taste, soluble in alcohol and water, in all proportions; but farther experiments are required upon this subject. **SOLUBILITY.** Both water and spirit extract the virtues of Senna; to water and proof spirit the leaves communicate a brownish colour, more or less deep according to the proportions employed; to rectified spirit they impart a fine green colour. The powdered leaves of Senna are very apt to undergo a change by exposure to a humid atmosphere, becoming covered with a kind of mouldiness which contains a small proportion of potass. **MEDICINAL USES.** *Soc Infus: Sennæ.* **OFFICINAL PREPARATIONS.** *Confectio Sennæ*, L.E.D. *Extract: Cassiæ Sennæ.* E. *Infus: Sennæ.* L.D. *Infus: Tamarind: cum Senna.* E.D. *Pulv. Sennæ comp: L.* *Tinct: Sennæ.* L.D. *Tinct: Sennæ comp: E.* *Syrup: Sennæ.* L.D. **ADULTERATIONS.** The leaves of Senna are imported from Alexandria in a state of adulteration, being mixed by the merchants of Cairo with the leaves of *Cynanchum Oleafolium*, (Arguel) and with those of *Colutea Arborescens*; the former are distinguished by their greater length as well as by their structure, which differs from the leaves of Senna in having a straight side, and being regular at their base, and in not displaying any lateral nerves on the under disk, the latter are so different from Senna leaves, that there is no difficulty in at once recognizing them. The *Tripoli Senna* contains a much larger proportion of *Cynanchum*, and of the other adulterations; as a general rule, those leaves which appear bright, fresh, free from stalks and spots, that are well and strongly scented, smooth and soft to the touch, thoroughly dry, sharp pointed, bitterish, and somewhat nauseous, are to be preferred.

* The English physicians do not do justice to this valuable article. In this country it enjoys a high and deserved reputation. As a remedy in Croup it has long been esteemed as one of our most efficient resources, and more recently it has been very warmly recommended as a powerful emmenagogue. In Croup, it should not be given until after the use of venesection and other evacuants. It may then be administered in the form of decoction, prepared from half an ounce of the bruised root boiled in eight ounces of water down to four. Of this a tea-spoonful is to be taken every hour or half hour as circumstances may require. When used as an emmenagogue, the decoction is to be prepared by simmering in a close vessel 3j of the bruised root in a pint of boiling water, until it is reduced about one third—of this four ounces are to be taken daily, and to be increased as far as the stomach will bear, at the menstrual period. *Ed.*

SERPENTARIÆ RADIX. L.D.

(Aristolochia Serpentaria, Radix.)

Serpentaria Root. Virginian Snake root, or Birthwort.

QUALITIES. *Odour*, of the dried root, aromatic, and somewhat resembling that of Valerian; *Taste*, pungent and warm, with a degree of bitterness, not very unlike that of camphor, or of the *pinus canadensis*. **CHEMICAL COMPOSITION.** Resin and an essential oil constitute its active ingredients. **SOLUBILITY.** Its virtues are extracted by water, as well as by alcohol. The tincture has a bright green colour, which is rendered turbid by water. It neither affects Tannin nor Gelatine, nor does it precipitate the salts of iron. **MEDICINAL USES.** It has been regarded as serviceable in cases that required the combined powers of a diaphoretic and tonic, as in some of the stages of typhus and other low fevers; it has also been found to exalt the febrifuge powers of the bark in cases of protracted intermittents. It is likewise valued on account of its efficacy in certain cases of dyspepsia, attended with a dry skin. Its stimulating properties will of course prevent its application in the inflammatory diathesis. **FORMS OF EXHIBITION.** In substance, or in an infusion, made by macerating ʒiv of the bruised root in fʒxij of boiling water in a covered vessel for two hours, and straining. Decoction will necessarily dissipate its essential oil, and impair its powers; whenever therefore it is directed in combinations which require this process, it should not be added until after the other ingredients have been boiled, as illustrated by *Form: 40*. **Dose** of the powdered root ʒj to ʒss or more; of the infusion fʒj—fʒij. **OFFICIAL PREPARATIONS.** *Tinct: Serpentariæ. L.E.D.* Tinct: Cinchonæ comp: L.D. Electuarium Opiatum. E.*

The roots of the *Collinsonia præcox* are frequently found mixed with those of *Serpentaria* in the market.

SIMAROUBÆ CORTEX. L.E.D.

(Quassia Simarouba Cortex.)

Simarouba Bark.

QUALITIES. *Form*, long pieces a few inches in breadth, and folded lengthwise; fibrous, rough, and scaly; and, when fresh, of a pale yellow colour on the inside. *Odour*, none; *Taste*, bitter, without any astringency. **CHEMICAL COMPOSITION.** Its virtues are principally connected with extractive matter; it does not contain any tannin or gallic acid. **SOLUBILITY.** Alcohol and water take up all its active matter. **MEDICINAL USES.** It has been considered tonic, and has been used with advantage as such in intermittent fevers. To *Dr. Wright* we are principally indebted for a knowledge of its powers. It has been much commended in the latter stages of dysentery, after the fever has abated, and the tenesmus continues with a sinking pulse. *Alibert* says that it has been used with much success at the hospital of St. Louis, in diarrhœa, following scurvy, and intermittent fever. **Dose**, ʒi to ʒss, but it is more conveniently given in the form of infusion, which see. **OFFICIAL PREPARATIONS.** *Infus: Simaroubæ. L.*

The Dublin college has admitted the wood of this tree into their *matéria medica*, but it is perfectly inert.

* It enters into the composition of Stoughton's Elixir, for which see *Gentianæ Radix*.

SINAPIS SEMINA.

(Sinapis Nigra. L. Alba. E.D.)

Mustard Seeds.

CHEMICAL COMPOSITION. Fecula, mucilage, an acrid volatile oil on which their virtues depend, and which on standing deposits a quantity of sulphur, a bland fixed oil, which considerably obtunds the acrimony of the former constituent;* and an ammoniacal salt. **SOLUBILITY.** Unbruised mustard seeds, when macerated in boiling water, yield only an insipid mucilage, which, like that of linseed, resides in the skin; but when bruised, water takes up all the active matter, although it is scarcely imparted to alcohol. **MEDICINAL USES.** It is a beneficial stimulant in dyspepsia; chlorosis, and paralysis; for which purpose, a tea spoonful of the bruised seeds may be administered; or a whey may be made, by boiling a table spoonful of the bruised seeds in oj of milk, and straining; of which a fourth part may be taken three times a day, (see *Form.* 46), or it may be given in infusion, (*Form.* 45). The farina made into a paste with crumbs of bread and vinegar, affords one of the most powerful external stimulants which we can apply, and is technically termed a *Sinapism*; it produces intense pain, and excites an inflammation entering much more into the true skin than that which is excited by the *Lytæ*; it is therefore worthy attention in all internal inflammations where bleeding is limited; if necessary it may be quickened by the addition of oil of turpentine. If a table spoonful of powdered mustard be added to oj of tepid water, it operates briskly as an emetic. **OFFICIAL PREPARATIONS.** *Cataplasm: Sinap.* L.D. *Emplast: Meloes com:* E. † (**B**) *Infusum Armoracæ comp:* L. (**B**) **ADULTERATIONS.** Fine powder, or flower of mustard, as it occurs in commerce, contains only one-sixth part of genuine mustard, the remainder consists of flour, coloured by turmeric, and made pungent by the addition of powdered capsicum.

SODA TARTARIZATA. L. TARTRAS SODÆ ET POTASSÆ. E. TARTARUS SODÆ ET KALI. D. olim. *Sal de Seignette. Sal Rupellensis,* or *Rochelle Salt.*

QUALITIES. *Form,* a right prism, with rhombic terminations, very slightly efflorescent. *Taste,* rather bitter and saline. **CHEMICAL COMPOSITION.** It is a triple salt, formed by neutralizing the excess of acid in super-tartrate of potass, with soda, and consisting of 2 atoms of acid + 1 of soda + 1 of potass. By a strong heat it is resolved into a mixture of carbonate of potass and carbonate of soda. **SOLUBILITY.** It is soluble in five parts of water at 50°. **INCOMPATIBLE SUBSTANCES.** Most acids and acidulous salts (except the Super-tartrate of potass) which convert the tartrate of potass into bi-tartrate, or super-tartrate. The acetate and sub-acetate of lead; barytic salts, and the salts of lime are decom-

* It is for this reason that the cake left after expression is so much more pungent than the seeds, for the fixed oil can be easily separated by pressure.

† WHITEHEAD'S ESSENCE OF MUSTARD.—This consists of oil of turpentine, camphor, and a portion of spirit of rosemary; to which is added a small quantity of flour of mustard

WHITEHEAD'S ESSENCE OF MUSTARD PILLS.—Balsam of Tolu, with resin.

READY MADE MUSTARD.—This is made up with currant wine, and sugar; formerly Must, or grape juice, was employed for this purpose, whence the name *Mustard*.

posed by it. **MED. USES.** Similar to those of *Potassæ Tartras*. See *Form.* 77 and 86, the latter of which presents a very grateful and efficacious purgative. **DOSE,** ʒij to ʒj as a purgative.

SODÆ CARBONAS. L.E. *Carbonate of Soda.*

This salt, when properly prepared, is a *bi-carbonate*, but so delicately are the affinities of its constituent parts balanced, that the application of a very moderate temperature is sufficient to subvert them, and to occasion partial decomposition. Mr. Phillips states that although he has seen what he believes to be real bi-carbonate in the state of the moist crystals, yet he has never met with any that was dry which had not lost one-fourth of its carbonic acid by exposure to heat; it is then a white gritty powder, less soluble in water than the sub-carbonate, like which it possesses an alkaline taste, and turns vegetable yellows brown, but both in a less degree. This salt, which is generally sold as the carbonate of the pharmacopœia, and the bi-carbonate of chemists, Mr. Phillips considers as a compound of an atom of carbonate, (*sub-carbonate*) and an atom of bi-carbonate, combined with four atoms of water. It is therefore, according to the phraseology of some chemists, a *Sesqui-carbonate*,* as being equal to an atom and a half of acid and one atom of base. The chemical habitudes of this salt, as connected with its medicinal applications, are similar to those of the *carbonate of potass*, which see. **MED. USES.** As it is less nauseous, so is it more eligible than the *sub-carbonate* of the same alkali; in other respects its effects are the same; *vide Sodæ Sub-carbonas*. **DOSE,** grs. x to ʒss.† **ADULTERATIONS.** If the salt, after super-saturation with dilute nitric acid, give a precipitate with nitrate of baryta, it contains some sulphuric salt; and if with nitrate of silver, we may infer the presence of a muriate.

* This term is also applied to the Sub-carbonate of Ammonia. The objection to its use depends upon the solecism which it involves; the division of an atom, which, according to chemical principles, is indivisible; but this objection may be answered by stating, that the term is one merely of convenience, and serves to express the proportions of the acid and its base. The chemical difficulty is at once solved by multiplying each by two, which will make the proportions as 3 to 2, instead of $1\frac{1}{2}$ to 1.

† **SODAIC POWDERS.**—Contained in two distinct papers, one of which is blue, the other white; that in the former consists of ʒss of the carbonate of soda, that in the latter of grs. xxv of tartaric acid. These powders require half a pint of water. It is very evident that a solution of these powders is by no means similar to "Soda Water," which it is intended to emulate; for in this latter preparation, the soda is in combination only with carbonic acid; whereas the solution of the "Sodaic Powders" is that of a neutral salt, with a portion of fixed air diffused through it.

PATENT SEIDLITZ POWDERS.—These consist of two different powders; the one contained in a white paper, consists of ʒij of Tartarized Soda, and ʒij of Carbonate of Soda; that in the blue paper, of grs. xxxv of tartaric acid. The contents of the white paper are to be dissolved in half a pint of spring water, to which those of the blue paper are to be added; the draught is to be taken in a state of effervescence. The acid being in excess renders it more grateful, and no less efficacious as a purgative. This preparation cannot be said to bear any other resemblance to the mineral waters of Seidlitz, than in being purgative. The water of this spring, which was discovered by Hoffmann about a century ago, contains Sulphate of Magnesia as its active ingredient, together with Muriate of Magnesia, and Sulphate, and Carbonate of Lime. In the *Codex Medicamentarius* of Paris there are two formulæ for the preparation of a water which may resemble that of Seidlitz, the one differing from the other merely in the proportion of its Sulphate of Magnesia.

SODÆ MURIAS. L.E.

SAL COMMUNE, Murias Sodæ. D.

Muriate of Soda. Common Salt.

QUALITIES. *Form*, that of regular cubes, which do not deliquesce unless contaminated with muriate of magnesia.* **CHEMICAL COMPOSITION.** It consists, according to Berzelius, of 46.55 of muriatic acid, and 53.45 of soda; according to the new theory, however, this salt must be considered as a true *muriate of soda*, only while it remains in aqueous solution; for when it is reduced to dryness, the muriatic acid and the soda become both decomposed, and the hydrogen of the former uniting with the oxygen of the latter, they pass off in the form of water, while the chlorine of the muriatic acid unites with the metallic base of the soda, to form *chloride of sodium*, which consists of an atom of each constituent. It is perhaps difficult to believe that the same salt should be chloride of sodium in the hand, and muriate of soda in the mouth! but it is not the less true, nor is it more incredible than the change which Sulphuret of potass undergoes by solution, the decomposition of which is rendered evident to the senses by the evolved sulphuretted hydrogen. Late researches have also detected both in *rock* and in other salt, the presence of *muriate of potass*, and *muriate of magnesia*.† **SOLUBILITY.** It is equally soluble in cold and in hot water, one part of the salt requiring rather more than $2\frac{1}{2}$ parts. **MED. USES.** The effects of salt upon the animal and vegetable kingdoms, are striking and important,‡ and have furnished objects of the most interesting enquiry to the physiologist, the chemist, the physician, and the agriculturist; it appears to be a natural stimulant to the digestive organs; and that animals are instinctively led to immense distances in pursuit of it; for proof of this fact the reader is referred to "*Parkes on the repeal of the Salt Laws*," and to an interesting work by my late lamented friend, Sir Thomas Bernard, entitled, "*Case of the Salt Duties, with Proofs and Illustrations*."§ Salt, when taken in moderate quantities, pro-

* Our English Salt is generally thus contaminated; for which reason it is unfit for the curing of several kinds of fish; this will not appear strange, says Mr. Parkes, when it is considered that merely its own weight of water is all that is necessary for the complete solution of muriate of magnesia; a circumstance which renders it impossible to preserve such salt for any length of time, in a dry state. This muriate however might be separated from common salt, on a large scale, for one shilling per cwt. By exposing the salt to a gentle heat in reverberatory furnaces, the muriatic acid of the magnesian muriate will fly off, and the magnesia (on a subsequent solution of the salt) will be precipitated. It is well known that muriate of magnesia begins to part with its acid at a temperature a little higher than that of boiling water.

† The annual quantity of salt raised from the Salt Mines and Springs in Europe, is estimated at from 25 to 30 millions of cwt.

‡ The respect paid to Salt amongst Eastern nations is very remarkable, and may be traced to the highest antiquity. Homer gives to it the epithet of *θεσιον*, Il. ix. p. 214.

§ In addition to the numerous instances cited by these authors, I may here introduce one which has been just communicated to me by my friend Mr. John Taylor, the agent of the London Company for working the Real del Monte Silver Mines in Mexico. He states that the ore, which consists of the Sulphuret of Silver, is, together with Mercury, amassed in heaps with iron pyrites and common salt; and that such is the greediness of the Mules employed in the works for the Salt, that they are constantly licking the materials; the consequence is that a portion of the Silver Amalgam is introduced into their stomachs; the animals, however, suffer no inconvenience; but, after death, on opening their stomachs, it is not unusual to find considerable masses of Silver, the mercury having escaped, or been dissolved by the gastric juice.

motes,* while in excessive ones, it prevents digestion; it is therefore tonic and anthelmintic, correcting that disordered state of the bowels which favours the propagation of worms. In Ireland, where, from the bad quality of the food, the lower classes are greatly infested with worms,† a draught of salt and water is a popular and efficacious anthelmintic. *Form*: 162, is a prescription by Rush, who says that in this manner he has administered many pounds of common salt with great success in worm cases. In the first volume of the Medical Transactions we shall find an interesting account of a cure of this disease by salt, after the failure of other remedies; I beg also to refer the practitioner to another case illustrative of its anthelmintic powers, published by Mr. Marshall (*London Medical and Physical Journal*, vol. xxxix. No. 231,) which is that of a lady who had a natural antipathy to salt, and was in consequence most dreadfully infested with worms during the whole of her life. In very large doses Salt proves purgative; it is also absorbed, and carried to the kidneys, but it undergoes no decomposition *in transitu*, nor does it appear to possess any considerable powers as a diuretic; its solution in tepid water, in the proportion of 3ss—3j in oj of water, forms the common domestic enema. *Dose*, when intended to act as a cathartic, from 3ss to 3j very largely diluted; when to answer the other intentions, from grs. x. to 3j.

SODÆ SUB-BORAS. L.D. BORAS SODÆ. E.

Borax.

QUALITIES. *Form*, irregular hexaedral prisms, slightly efflorescent. *Taste*, alkaline and styptic; when heated it loses its water of crystallization, and becomes a porous friable mass (*calcined borax*.) **CHEMICAL COMPOSITION.** Boracic acid, 34—soda, 17—water, 49. **SOLUBILITY.** It

* The celebrated Indian Tonic for Dyspepsia and Gout, called Bit laban, is prepared by fusing together muriate of soda and some other ingredients. See Dr. Fleming's Catalogue of Indian Medicinal plants and drugs, p. 54, 55.

† I have myself witnessed the bad effects of a diet of unsalted fish; and in my examination before a Committee of the house of Commons in 1818, appointed "for the purpose of inquiring into the laws respecting the Salt Duties," I stated the great injury which the poorer classes in many districts sustained in their health, from an inability to procure this essential article. Lord Somerville (in his address to the Board of Agriculture) gave an interesting account of the effects of a punishment which formerly existed in Holland. "The ancient laws of the country ordained men to be kept on bread alone, UNMIXED WITH SALT, as the SEVEREST punishment that could be inflicted upon them in their moist climate; the effect was horrible; these wretched criminals are said to have been DEVoured BY WORMS engendered in their own stomachs."

SALT was an object of taxation at a very early period in this country; Ancus Martius, 640 years before our era '*Salinarum Vectigal instituit*.' This tribute was continued on the Britons when our Isle was possessed by the Romans, who worked the Droitwich Mines, and who made salt part of their soldiers' *Salarium*, or salary. Hence the custom at the Eton Montem of asking for salt.

The great advantages which must ultimately accrue to this nation in its fisheries, agriculture, manufactures, and commerce, from a late remission of the odious and impolitic tax upon salt, are incalculable. The government of France appears to have been as impolitic with regard to this tax as the English. Buonaparte abolished the collection of turnpike dues; and imposed a tax on salt, payable at the Salt-pans, in its stead. It is not perhaps generally known, that by the aid of this tax he was enabled to complete the grand entrance into Italy, over the Simplon; so that it may be fairly observed, that if HANNIBAL was enabled to cross the Alps by the aid of VINEGAR—BUONAPARTE, by the assistance of SALT, succeeded in constructing a public road over the same mountains.

is soluble in 20 parts of water at 60°, and in 6 parts at 212°. **INCOMPATIBLE SUBSTANCES.** It is decomposed by *acids*; *potass*; by the *sulphates* and *muriates* of the *earths*, and by those of *ammonia*. **MEDICINAL USES.** It is only applied in the form of powder mixed with 8 or 10 parts of honey, as a detergent linctus in aphthæ, &c. The Chinese employ it in inflammatory sore throats; for which purpose they first reduce it to an extremely fine powder, and then blow it through a reed upon the inflamed surface. **OFFICIAL PREPARATIONS.** *Mel Boracis*. L. **ADULTERATIONS.** *Alum*, and *fused muriate of soda*, are substances with which it is sometimes sophisticated; to discover which, dissolve it in distilled water, and after saturating the excess of the base with nitric acid, assay the solution with nitrate of barytes and nitrate of silver.

SODÆ SUB-CARBONAS. L.E.D.

Sub-carbonate of Soda.

QUALITIES. *Form*, octohedrons, truncated at the summits of the pyramids; it effloresces when exposed to the air, and at 150° Fah. undergoes watery fusion, its crystals containing as much as seven proportions of water; *Taste*, mild, alkalescent. **CHEMICAL COMPOSITION.** Soda 29.5—carbonic acid 20.7. **SOLUBILITY.** It is soluble in two parts of water at 60°, and in considerably less than its weight of boiling water; it is insoluble in alcohol. **INCOMPATIBLE SUBSTANCES** are enumerated under *Potassæ Carbonas*. **MED. USES,** are similar to those of the sub-carbonate of potass, but it is preferable to it for internal use, as being more mild and less nauseous; and moreover Fourcroy states it as his opinion that soda is more eligible for medicinal purposes than potass, on account of its analogy with animal substances, which always contain it, while on the contrary, no portion of potass is found in them. Sir Gilbert Blane assumes an opposite opinion, and observes that, as far as he can judge of the comparative powers of the two fixed alkalies, he should greatly prefer Potass to Soda, as a remedy for gravel, one reason of which he thinks may be found in the fact that the Soda is an element of the animal fluids, since it enters largely into the composition of bile, so that it is more likely to be arrested in the course of the circulation and diverted from the urinary organs. A gentleman, says Sir Gilbert, who was subject to frequent fits of gravel, and in the habit of making experiments on the small concretions which he passed, found that Soda dissolved them, but that Potass did not: nevertheless he experienced sensible relief, and even temporary cure, from the internal use of the latter alkali, but no benefit from the former. Are then the absorbents more disposed to take up soda than potass? The results of experience do not appear to sanction such a conclusion. **FORMS ON EXHIBITION.** It may be administered in solution, in an electuary, or in pills; when exhibited in the latter form, it must be previously deprived of its water of crystallization, (*Sodæ Sub-carbonas exsiccata*. L.) or the pills will fall into powder as they dry; unless where the water of crystallization is essential to the formation of the pill, as to that of *Pill: Ferri comp.* **Dose**, gr. x to 3j, twice or thrice a day. See *Form* 28, 143, 144.

SODÆ SULPHAS. L.E.D.

Natron Vitriolatum. P.L. 1787. *Sal Catharticus Glauberi*. P.L. 1745.

QUALITIES. *Form*, transparent prismatic crystals, which effloresce; when exposed to heat, they undergo watery fusion, that is, they melt in

their own water of crystallization. *Taste*, saline and bitter. **CHEMICAL COMPOSITION.** Sulphuric acid 24·64,—soda 19·36—water 56. **SOLUBILITY.** f3j of water at 60° dissolves 3iiiss; in boiling water it is considerably more soluble; it is quite insoluble in alcohol. **INCOMPATIBLE SUBSTANCES.** The same as those which decompose *sulphate of magnesia*. **MED. USES.** A common and useful purgative; its nauseous taste may be in a great degree disguised by the addition of a small quantity of lemon juice, or *cream of tartar*. *Dose*, ʒss to ʒij. In an effloresced state it is just equal in efficacy to double the weight of that which is in a crystalline form. It is rendered more active by being combined with other purgative salts, especially with sulphate of magnesia, and the compound is more soluble and less nauseous; (*Form.* 69, 72.) A portion of triple salt, a *magnesian-sulphate of soda*, probably results from the combination, a salt which may be frequently detected in parcels of sulphate of magnesia, and may be known by its crystals, which are regular rhomboids; it is also contained, according to Dr. Murray, in the brine or *mother liquor* of sea-water; and it constitutes the whole of that salt which was formerly sold under the name of "*Lymington Glauber's Salts*."*

* **CHELTEMHAM SALTS.**—A factitious compound has been long vended, as a popular purgative, under this name; it is formed by triturating together the following salts. Sulphate of Soda, grs. 120. Sulphate of Magnesia, grs. 66. Muriate of Soda, 10. Sulphate of Iron, gr. ½. As a purgative it is very efficacious, and superior probably to that which is actually obtained by the evaporation of the Cheltenham water itself; for notwithstanding the high pretensions with which this latter salt has been publicly announced, it will be found to be little else than common Glauber's Salt. This fact has been confirmed by the experiments of Mr. Richard Phillips, (*Annals of Philosophy*, No. lxi.) who observes that the "**REAL CHELTEMHAM SALTS** contain no chalybeate property," but are merely sulphate of soda, mixed with a minute quantity of soda, and a very small portion of common salt." It could not be imagined that the salt should contain oxide of iron even in a state of mixture, much less in combination, for carbonate of iron is readily decomposed by ebullition, and the oxide of iron is precipitated before the salt can be crystallized. A preparation, under the name of Thomson's Cheltenham Salts, is accordingly manufactured in London, by evaporating a solution consisting of sulphate of soda and sub-carbonate of soda.

"**EFFLORESCENCE OF REAL CHELTEMHAM SALTS.**" The preceding salt deprived of its water of crystallization.

"**EFFLORESCENCE OF REAL MAGNESIAN CHELTEMHAM SALTS,**" MADE FROM THE WATERS OF THE MAGNESIAN SPA. This is asserted to be a sub-sulphate from nature, which combines both a pure and sub-sulphated magnesia in its composition; "but," says Mr. Phillips, "neither nature nor art has ever produced such a combination; in truth, it consists of Epsom Salt, with small portions of magnesia, or muriate of soda."

MURIO-SULPHATE OF MAGNESIA AND IRON. The preparation thus named by Mr. Thomson, was found by Mr. Phillips to consist of Epsom Salt, deprived of part of its water of crystallization, and discoloured by a little rust of iron, and containing a small portion of muriate of magnesia.

Thus it appears, that not one of these preparations is similar to the water which is drank at the Spa; in order to remedy this difficulty, Mr. Thomson prepared the "**ORIGINAL COMBINED CHELTEMHAM SALTS,**" by evaporating the waters to dryness; but a very small share of chemical penetration is required to satisfy us that no process of this description can remedy the defect described, for, as Mr. Phillips has observed, the chalybeate properties of the water must be essentially altered by such an operation.

SPARTIUM. L.E. GENISTA. D.

Spartii Cacumina. L. Summitates. E.

The Tops of Broom.

QUALITIES. When bruised they yield an unpleasant *odour*, and a nauseous bitter *taste*. **SOLUBILITY.** Water and alcohol alike extract their active matter. **MED. USES.** They certainly act as a powerful diuretic, and even prove so to animals that browse upon them. I have frequently exhibited them in the Westminster Hospital, with very great success in the form of decoction. By referring to my classification of diuretics, page 142, it will be seen that the *Broom* is placed under the second division of the first class; for analogy sanctions the theory, that the bitter element is separated by the powers of digestion, and carried to the kidneys by the medium of the circulation. (See Form. 113.) The ashes of this plant were extolled by Sydenham as a powerful diuretic, but the chemist has shewn that it is merely a fixed alkaline salt. **OFFICIAL PREPARATIONS.** *Extractum Cacuminum Genistæ.* D.

SPIRÆA TRIFOLIATA.

Indian Physic. Radix.

[This plant abounds in the woods of hills and mountains, in every part of the United States. The root, which is the part used in medicine, is of a bitter taste, and yields by analysis extractive matter and resin. In its medicinal properties the spiræa resembles the ipecacuanha of the shops. The full dose in powder is 30 grs.]

SPIRITUS. L. SPIRITUS STILLATITH.

Distilled Spirits.

These are solutions of the essential oils of vegetables in diluted alcohol, or proof spirit; they are obtained by distilling spirit with recent vegetables; or, according to the recent directions of the Pharmacopœia, with their essential oils; sometimes however they are extemporaneously made by at once dissolving the oils in the spirit, without distillation. (See *Spiritus Tenuior*.) **MED. USES.** Like the *distilled waters*, they serve as vehicles for the exhibition of more active medicines; they are also occasionally employed as grateful stimulants. It is unnecessary to dwell on each of these simple spirits, as their virtues are the same as those of the substances from which they are extracted, united to the stimulus of the alcohol. The following are officinal:—*Spirit: Anisi.* L. *Spir: Anisi comp:* L.D. *Armoraciæ comp:* L. *Carui.* L.E.D. *Cinnamomi.* L.E.D. (Form. 5, 40) *Juniperi comp:* L.D. *Lavandulæ.* L.E.D. *Lavandulæ comp:* L.E.D. *Menth: Pip:* L.D. *Menth: Virid:* L. *Myristic:* L.E.D. *Pimentæ.* L.D. *Pulegii.* L. *Raphani comp:* D. *Rosmarini.** L.E.D.

* **HUNGARY WATER.** *Aqua Regiæ Hungariæ.* This article, when genuine, is a pure spirit distilled from the Rosemary, and is strongly scented with the rich perfume of that aromatic plant.

SPIRITUS AMMONIÆ. L.D.

ALCOHOL AMMONIATUM. E.

Spiritus Salis Ammoniaci dulcis. P.L. 1745. *Spiritus Salis Ammoniaci.* P.L. 1720.

This is a solution of ammoniacal gas in spirit; in which a small portion of the sub-carbonate is also generally present. It is not easy to compare the strength of this preparation with that of the *Liquor Ammoniæ*, or *Liquor Ammoniæ Sub-carbonatis*, so as to give their medicinal equivalents, because the ammonia exists in a very different state of combination. The first is a mere solution of ammoniacal gas in water; in the second, as already stated, the ammonia exists as a *sesqui-carbonate*, while in the one now under consideration the alkali is in the state of a *carbonate*. This fact will explain the reason of the present preparation being superior in pungency to the *Liquor Ammoniæ Sub-carbonatis*. The Incompatibles are the same as those enumerated under the head of *Ammoniæ Sub-carbonas*. It is a powerful stimulant, but it is principally employed as the basis of the following compounds; viz. *Spiritus Ammoniæ Aromat.* L.E.D. *Spiritus Ammoniæ Succinatus.* L. *Tinctura Castorei comp.* E. *Tinctura Guaiaci comp.* E. *Tinctura Opii Ammoniat.* E.

SPIRITUS AMMONIÆ AROMATICUS. L.D.

ALCOHOL AMMONIATUM AROMATICUM. E.

Spiritus Ammoniæ Compositus. P.L. 1785. *Spiritus Volatilis Aromaticus.* P.L. 1745. *Spiritus salis volatilis oleosus.* P.L. 1720.

This is a solution of several essential oils, (*Cinnamon*, *Cloves*, and *Lemon*. L.—*Rosemary* and *Lemon*. E. *Lemon* and *Nutmeg*. D.) in the spirit of ammonia. It is a valuable stimulant, and an agreeable adjunct, and efficacious corrective to other remedies, see *Form.* 42, 45. Dose, f3ss to f3j. Incompatibles. Acids, Acidulous Salts, Earthy and Metallic Salts, and Lime Water. *Officinal Prep:* *Tinctura Guaiaci Ammoniat.* L.D. *Tinctura Valerianæ Ammoniat.* L.D. Its ammoniacal pungency is rather inferior to that of the preceding preparations.

SPIRITUS AMMONIÆ FÆTIDUS. L.D.

TINCTURA ASSAFÆTIDÆ AMMONIATA. E.

This is a solution of the fœtid volatile oil of the *Assafœtida* in the spirit of ammonia; as little else than the odour and flavour of the gum-resin is taken up by the menstruum, it cannot be expected to possess many virtues. Dose, f3ss to f3i.

SPIRITUS AMMONIÆ SUCCINATUS. L.

This preparation was probably introduced as a substitute of the *Eau de luce*. It is stimulant and antispasmodic. It will be found, if properly prepared, to retain its milkiness for a considerable time, a circumstance by which its value is appreciated. The substances enumerated under the head of *Spiritus Ammoniæ Aromat.* are also incompatible with this preparation.

SPIRITUS COLCHICI AMMONIATUS. L.

We have in this preparation the specific virtues of the colchicum, with

the stimulant property of the Ammonia; a medicinal combination, which is frequently indicated in practice. Dose f3ss to f3i, in some aqueous vehicle. The substances enumerated under the history of *Spiritus Ammoniae Aromaticus*, are likewise incompatible with this spirit.

SPIRITUS ÆTHERIS AROMATICUS. L.

ÆTHER SULPHURICUS CUM ALCOHOLE AROMATICUS. E.

Elixir Vitrioli dulce. P.L. 1745.

This preparation, which was excluded from the London Pharmacopœia of 1787, is now restored. It consists of sulphuric Ether *one part*, rectified spirit *two parts*, impregnated with aromatics; the presence of spirit is necessary in this preparation, since the volatile oils would be insoluble in the æther without it. MED. USES. A grateful stimulant.

SPIRITUS ÆTHERIS NITRICI. L.

SPIRITUS ÆTHERIS NITROSI. E.

SPIRITUS ÆTHEREUS NITROSUS. D.

Spiritus Nitri dulcis. P.L. 1745.

QUALITIES. A colourless fluid of the *specific gravity* .850. Odour, extremely fragrant; Taste, pungent and acidulous; it is very volatile and inflammable. CHEMICAL COMPOSITION. A portion of nitric æther and nitric acid, combined with alcohol. SOLUBILITY. It is soluble both in water and alcohol. INCOMPATIBLE SUBSTANCES. With a solution of *green sulphate of iron* it strikes a deep olive colour, owing probably to its holding a portion of nitrous gas in solution; with the *tinctures of guaiacum* it produces a green or blue coagulum. MED. USES. When properly diluted, it is refrigerant and diuretic; and has been long employed as a grateful draught in febrile affections; as a diuretic, it frequently proves a valuable auxiliary in dropsy, (see *Form.* 113, 116.) Dose, ℥x to xl. in any aqueous vehicle. By age and exposure to the air, it is gradually decomposed, and gives rise to the reproduction of nitrous acid.

SPIRITUS ÆTHERIS SULPHURICI. L.

ÆTHER SULPHURICUS CUM ALCOHOLE. E.

LIQUOR ÆTHEREUS SULPHURICUS. D.

Spiritus Ætheris Vitriolici. P.L. 1787.

Spirit Vitrioli dulcis. 1745.

QUALITIES. A fluid of the *specific gravity* .816, consisting of *two parts* (by measure) of rectified spirit, and *one part* of sulphuric æther. MED. USES. It has all the properties of æther, but in an inferior degree. Dose, f3j to f3ij.

SPIRITUS ÆTHERIS SULPHURICI COMPOSITUS. L.

This is intended as a substitute for the *Liquor Anodynus* of Hoffmann, although its composition was never revealed by him. In addition to its stimulating properties, it is supposed to add those of an anodyne nature. Dose, f3ss to f3ij. See *Form.* 7.

SPIRITUS CAMPHORÆ. L.

Spirit of Camphor; vulgo, Camphorated Spirits.

This preparation is principally useful as an external application. As an embrocation to chilblains it is often of essential service; and it has been found useful when thus applied to parts affected with chronic rheumatism and paralytic numbness. It is instantly decomposed by water, which precipitates the camphor. It furnishes an easy mode of forming camphor mixture extemporaneously, and if a few drops be rubbed with mucilage, we are thus enabled to form a stronger preparation than by the ordinary process.

SPIRITUS RECTIFICATUS. L.

ALCOHOL FORTIUS. E. SPIRITUS VINOSUS

RECTIFICATUS. D.

In this preparation, alcohol is nearly in the highest state of concentration, in which it can be easily prepared in the large way for the purposes of trade; its specific gravity however varies in the different pharmacopœias, viz. the London and Edinburgh preparation is stated to have that of 835, while the rectified spirit of Dublin is ordered to be only 840. The former at the temperature of 60° *Fah.* consists of 85 parts of pure alcohol and 15 of water, the latter only of 83 per cent. of alcohol. It is a most powerful stimulant, but is rarely employed except in combination; as a pharmaceutical agent, its use is highly valuable and extensive. (See *Tincturæ.*) During the evaporation of spirit, a considerable reduction of temperature takes place, which renders it a useful ingredient in refrigerating lotions. See *Form.* 147, 148. It has lately been ascertained by Mr. Ritchie of Perth, that "*the degree of cold induced by the evaporation of spirit of different degrees of strength are proportional to the strength of these spirits, reckoning from the degrees of cold induced by the evaporation of water.*" The application of this theorem will enable us to ascertain the strength of a spirit by the "DIFFERENTIA THERMOMETER" of Leslie.

SPIRITUS TENUIOR. L.

ALCOHOL DILUTUM. E.

SPIRITUS VINOSUS TENUIOR. D.

Weaker or Proof Spirit.

This is rectified spirit diluted with a certain proportion of water, and it is to be regretted that the quantity ordered for this purpose should vary in the different Pharmacopœias; thus, according to the London and Dublin Colleges, its specific gravity is 930, while the College of Edinburgh directs it to be of 935. The former consists of 44 per cent. of pure alcohol, and may be formed by mixing *four* parts, by measure, of rectified spirit, with *three* of water; the latter contains only 42 per cent. of pure alcohol, and may be made by adding together *equal parts* of rectified spirit and distilled water. Alcohol in this state of dilution, is better adapted for taking up the principles of vegetables than rectified spirit; indeed diluted alcohol acts upon bodies as a chemical compound, and will dissolve what neither the same proportion of water nor of alcohol would, if separately applied; we perceive therefore the importance of ensuring

uniformity of strength in our spirits. (See *Tincturae*.) It is necessary to remark that almost all the spirit sold under the name of "*Proof Spirit*," is contaminated with empyreumatic oil, and is unfit for the purposes of pharmacy; it ought therefore to be extemporaneously prepared by mixing together rectified spirit and water, in the proportions above stated. This however is rarely done, except the liquors are intended for the toilet, and hence it has been observed, that the cordials of the apothecary are generally less grateful than those of the distiller, the latter being extremely curious in rectifying and purifying his spirit. If common water be employed for the dilution of alcohol, the resulting spirit will be turbid, owing principally to the precipitation of sulphuric salts; this circumstance lately occasioned considerable embarrassment to the Curators of the Hunterian Museum at the College of Surgeons, who were compelled to prepare their own spirit, in consequence of an excise regulation preventing the distiller from sending out any spirit of that strength which is required for their anatomical purposes. A curious fact has just been noticed in the Laboratory of the Royal Institution, which is, that diluted spirit *becomes stronger* by being kept in vessels that are carefully closed by bladder! whence it would seem, that alcoholic vapour transpires through this animal membrane less freely than aqueous vapour; we are at present unable to offer a satisfactory explanation of this anomalous case of distillation, but it is probably connected with the different solvent powers of these two liquids, in relation to the animal membrane. **MED. USES.** Alcohol, although diluted to the degree of proof spirit, is still too strong for internal exhibition; indeed, where its use is indicated, it is more generally given in the form of wine, malt liquors, or ardent spirits, which must be regarded only as diluted alcohol, although each has a peculiarity of operation, owing to the modifying influence of the other elements of the liquid; thus *Brandy** is said to be simply cordial and stomachic; † *Rum*, ‡ heating and sudorific; *Gin* and *Whiskey*, diuretic; and *Arrack*, § styptic, heating, and narcotic; it seems also probable that a modified effect is produced by the addition of various other substances, such as sugar and acids, which latter bodies, besides their anti-narcotic powers, appear to act by favouring a more perfect combination and mutual penetration of the par-

* I apprehend that the peculiar flavour of Cogniac depends upon the presence of an æthereal spirit, formed by the action of Tartaric or perhaps Acetic acid upon Alcohol; it is on this account that Nitric Æther when added to Malt spirits, gives them the flavour of French Brandy. The same flavour is also successfully obtained by distilling British spirits over wine lees, or by distilling a spirit obtained from Raisin Wine, which has become acescent.

In new brandy there also appears to be an uncombined acid, giving to it a peculiar taste and quality, which are lost by age. This explains the reason why the addition of five or six drops of "*liquor ammoniæ*," to each bottle of new brandy, will impart to it the qualities of that of the oldest date.

† TAYLOR'S RED BOTTLE, commonly called the Whitworth Doctor. British Brandy coloured with Cochineal, and flavoured with oil of Origanum.

‡ Mr. Parkes, in his *Chemical Essays*, has the following remark: "an ingenious friend assures me that if NEW rum be exposed for a night to a severe frost, and then removed to a heated room, and thus alternately treated for a week or two, it will in that short time have acquired a flavour equal to fine *old* spirits. The mischievous effects of new rum, as drank in the West Indies, would seem to depend upon the presence of Lead; see *Plumbi Acetas*."

§ MOCK ARRACK. The author of '*Apicius Redivivus*,' directs, for the purpose of making a mock Arrack, that two scruples of Benzoic acid be added to every quart of Rum. By a receipt of this kind the celebrated Punch of Vauxhall is prepared.

ticles of spirit and water. Foreign brandy derives its colour from the oak cask, the intensity of which, therefore, affords some criterion of its age. The English have been in the habit of colouring their spirits with burnt sugar until lately, but now, since the cause of the foreign colour is discovered, the scrapings of gall-nuts are employed for that purpose, whence the sulphate of iron is no longer a test of brandy being genuine.* The effects, also, which are produced by the habitual use of fermented liquors, differ essentially according to the kind that is drunk; thus Ale and Porter, in consequence of the nutritive matter, and perhaps the invigorating bitter with which they are charged, and the comparatively small proportion of alcohol which they contain, dispose to a plethora, which is not unfrequently terminated by apoplexy; Spirits, on the other hand, induce severe dyspepsia, obstructed and hardened liver, dropsy, and more than half of all our chronical diseases; and Dr. Darwin moreover remarks that when they arise from this cause, they are liable to become hereditary, even to the third generation, gradually increasing, if the cause be continued, till the family become extinct: with regard to Wine, Rush has truly observed that its effects, like those of tyranny in a well formed government, are first felt in the extremities, while spirits, like a bold invader, seize at once upon the vitals of the constitution; the different kinds of wine, however, produce very different and even opposite effects, as stated under the history of that article, (see *Vinum*.) The excise officers frequently avail themselves of the peculiar power of the sub-acetate of lead to precipitate colouring matter, in order to remove from seized Holland Gin, the colour which it obtains by being long kept in the tubs in which it is smuggled over. This practice, however, renders the gin liable to gripe.

SPIRITUS TEREBINTHINÆ.

See *Terebinthine Oleum*.

SPONGIA USTA. L. See *Carbo Ligni*.

STANNI LIMATURA. L.E.D.

The filings of Tin.

The anthelmintic properties of Tin have been explained by three different hypotheses, viz. 1. *That it acts mechanically by dislodging the mucus from the intestines*; if this be true, it is difficult to explain the fact of its activity being increased by pulverization. 2. *That its efficacy depends upon the presence of arsenic*; if so, why should the purest specimens act with equal efficacy?† 3. *That it operates by generating hydrogen gas in the in-*

* The famous Helvetian Styptic, described in page 85, depended wholly on this accidental contamination for its colour, and it was no small mortification to our chemists, when this nostrum was first introduced amongst us, that they could not prepare it with our own spirits, but were obliged to be at the expense of true French Brandy. Our own Spirits, although equally coloured, would never produce a violet tincture; at length, however, the mystery was discovered, and the gall-nut imparted to the tincture that characteristic colour which was so long considered essential to its efficacy; but the discovery threw discredit upon the nostrum, and it fell into disuse.

† If any additional argument were necessary, we might repeat, that Arsenic in its metallic state is not poisonous. As it is almost impossible to reduce metallic arsenic to a state of powder, without its becoming oxidized, M. Renault had recourse to its alloys for deciding the question: and he found that Mispickel (an alloy of iron and arsenic,) when given to the extent of two drachms, had no apparent effect; this result

testinal canal : it has been observed that this opinion is rendered probable by the fact, that sulphur increases its powers.* Dose, 3j or 3jī, mixed with honey, treacle, or conserve, and exhibited for several successive mornings, a purgative medicine being occasionally interposed, (see *Form.* 150.) The use of this remedy however is entirely superseded by the more efficacious exhibition of oil of turpentine.

SUCCI SPISSATI. E. See *Extracta*.

SULPHUR SUBLIMATUM. L.E.D.

Sublimed Sulphur. Flowers of Sulphur.

CHEMICAL COMPOSITION. It is probably a triple compound of oxygen, hydrogen, and some unknown base. SOLUBILITY. It is insoluble in water and alcohol, but soluble in oils, especially in that of linseed, which is a powerful solvent of all sulphureous substances. In boiling oil of turpentine it is entirely soluble. MEDICINAL USES. It is laxative and diaphoretic ; it acts principally upon the large intestines, and very mildly ; whence it proves useful in hæmorrhoidal affections (*Form.* 74) ; and in consequence of the diaphoresis which it also excites, it is useful in chronic rheumatisms, catarrhs, and in some cutaneous affections.† To promote its purgative effects, *magnesia* will be found a serviceable adjunct in hæmorrhoids ; it may be given in the form of an electuary, or suspended in milk ; its solution in oil (*Oleum Sulphuratum*) is a most nauseous and acrid preparation. When sulphur is combined with metallic remedies, it generally lessens their activity. Its effects in curing psora are universally admitted, and the only objection to its use is the disgusting smell which accompanies its application ; see *Unguent : Sulphuris*. Dr. Clarke of Dublin recommends a lotion, which he says contains a sufficient impregnation of sulphur for the cure of psora in children, to be made by adding an ounce of broken sulphur to a quart of boiling water, and allowing it to infuse for twelve hours. In this process the water probably takes up a small portion of sulphurous acid ; it is difficult to explain the efficacy of the lotion in any other manner. When sulphur is internally administered, it transpires through the skin in the state of sulphuretted hydrogen, and blackens the silver in the pockets of those who take it. Dose 3j to 3iij. OFFICINAL PREP. *Sulphur Lotum. L.E.D. Sulphur Præcipitatum. L. Unguent. Sulph. L.E.D. Unguent. Sulph. comp. L.*

SULPHUR LOTUM. When sulphur is kept in loosely covered drawers its surface is soon acidified, when it is said to operate with griping, hence the common *flowers* are directed to be washed with water to get rid of any sulphurous acid ; it is however rarely performed, and would seem to be a useless subtlety.

agrees with the conclusion of Bayen in his work on Tin, and proves that the arsenic which may be contained in that metal cannot produce any medicinal effect, as it exists in its metallic state. *Recherches Chimiques sur l'Etain, par Bayen et Charlard, 1781.*

* GUY'S POWDER OF ETHIOPIA. This once celebrated remedy consisted of pure rasped Tin, Mercury, and Sublimed Sulphur, triturated together.

BLAINE'S POWDER FOR THE DISTEMPER IN DOGS. The basis of this nostrum is the Aurum Musivum, or Sulphuret of Tin, which has been said to be more efficacious in cases of Tænia than the simple metal.

MATHIEU'S VERMIFUGE was indebted to Tin for its efficacy, see *Filicis Radix*.

† SULPHUR LOZENGES. Sublimed Sulphur one part, sugar eight parts, Tragacanth mucilage q. s. used in Asthma, and in Hæmorrhoids.

SULPHUR PRÆCIPITATUM. L. *Lac Sulphuris*, P.L. 1720. This, when pure, differs in no other respect from sublimed sulphur than in its superior whiteness, which it owes to the presence of a small proportion of water; in consequence however of its mode of preparation, it always contains a small quantity of sulphate of lime, and not unfrequently other impurities; it may be assayed by pouring upon a suspected sample a sufficient quantity of *liquor potassæ* to cover it, and setting it aside in a warm place to digest, when the sulphur will be dissolved and the impurities remain; or it might be at once subjected to the operation of heat; which would volatilize the sulphur, and thus separate it from its contaminations.

SYRUPI. L.E.D. *Syrups.*

These are solutions of sugar in water, watery infusions, or in vegetable juices; the proportion of sugar is generally in *two parts* to one of the fluid; if it exceeds this, the solution will crystallize, if it be less, ferment, and become acescent.* The most certain test of the proper consistence of a syrup is its specific gravity; a bottle that holds three ounces of water at 55 *Fah.* ought to hold four ounces of syrup. Syrups are introduced into medicinal formulæ for several purposes, viz.

I. *To correct or disguise the flavour of disagreeable remedies.* Syrup: *Aurantiorum*. L.D. (*Form.* 48, 51, 107.)—*Limonum*, L.E.D.—*Simplex* 124, 145.)—*Zingiberis* (88, 95, 105.) Bitter infusions, and saline solutions are rendered more nauseous by the addition of syrups.

II. *To produce Medicinal Effects.* Syrup: *Allii*. D.—*Altheæ* L.E. (135)—*Acidi Acetosi*. E.—*Colchici*. E.—*Sennæ*. E.D. (70)—*Scillæ Maritimæ*. E.—*Rhamni*. L.—*Papaveris*. L.E.D. (5, 7, 75, 169, 170.)—*Rosæ* (74)—*Zingiberis* (47, 150.)—*Sarsaparillæ*. L.

III. *To communicate peculiar forms.*

Every syrup answers this purpose; for the necessary proportions, see *Electuaria*.

IV. *To communicate an agreeable colour.* Syrup: *Croci*. L.—*Rhæados*. L.D. (166, 168.)—*Caryophylli Rubri*. D.—*Violæ*. E. Except that of saffron, these syrups are rendered green by alkalies, and red by acids.

GENERAL REMARKS. The practitioner should never introduce syrups into those medicines which are liable to be injured by the generation of acids: I have frequently seen the *cretaceous mixture*, when charged with syrup, increase, instead of check, a diarrhœa; and the syrup of poppies, from its disposition to become acescent, will often aggravate rather than allay the cholic of infants. The syrup of Senna furnishes the practitioner with a convenient purgative for children; that of buckthorn is more violent, and is on that account but rarely used; besides which, in

* Sugar, perfectly free from the extractive matter with which it exists in combination in nature, and which constitutes that compound to which the name of Sweet Principle has been given, will not, however diluted, undergo any kind of fermentation; for it is the presence of this peculiar extractive matter, the natural leaven of fruits, that enables it to undergo that process; since, however, all clayed sugars, or modifications of sugar which are short of perfect purity, still contain a small proportion of this extractive, they are capable of fermenting, when sufficiently dilute; Dr. Macculloch, in his essay on the art of making wine, observes, that by the addition of a very small quantity of the sulphate of Potass, the fermentation of syrups and preserves may be effectually prevented; he states also, that the same object may generally be attained by the use of Oxy-muriate of Potass, a salt absolutely tasteless, and easily procured.

preparing it the chemist not unfrequently substitutes the berries of the *Cornus Sanguinea*, the Dogberry tree, or those of the *Rhamnus Frangula*, the Alder buckthorn, for the *Rhamnus Catharticus*; a circumstance which necessarily renders the efficacy of this syrup variable and uncertain; it is moreover often sophisticated with treacle and jalap. The syrup of the rose, when made with the leaves of the *Damask** rose, is gently laxative, and is well adapted for weak children; it is however not unusual, *coloris gratia*, to substitute the leaves of the red rose, in which case the syrup will possess astringent instead of laxative properties. In the preparation of the syrup of poppies,† the directions of the College are frequently not obeyed; it is sometimes made by dissolving the extract in syrup, formed with coarse sugar, or even with treacle; at others, by adding tincture of opium to a coarse syrup, in the proportion of ℥x to every fʒj. In the preparation of the syrups of violets, the juice of red cabbage is generally substituted; this is at least a harmless fraud. Note. The syrups which are printed in *Italics*, are very susceptible of decomposition, and should be kept in cool places.

TABACI FOLIA. L.E.

(*Nicotiana Tabacum. Folia Siccata. Virginiana.*)

NICOTIANÆ FOLIA. D.

Tobacco.

QUALITIES. *Odour*, strong, narcotic, and foetid; *Taste*, bitter and extremely acrid; *Colour*, yellowish green, (its brown appearance is artificial, being produced by the action of *sulphate of iron*.) **CHEMICAL COMPOSITION.** Mucilage, albumen, gluten, extractive, a bitter principle, an *essential oil*, nitrate of potass, which occasions its deflagration, muriate of potass, and a peculiar proximate principle upon which the properties of the plant are supposed to depend, and which has therefore been named *Nicotin*.‡ Vauquelin considers it as approaching the volatile oils in its properties; it is colourless, has an acrid taste, and the peculiar smell of tobacco, and occasions violent sneezing; with alcohol and water, it produces colourless solutions, from which it is thrown down by tincture of galls. **SOLUBILITY.** Tobacco yields its active matter both to water and spirit, but more perfectly to the latter: long coction weakens its powers. An oil of Tobacco of a most powerful nature, may be obtained by distilling the leaves and separating it from the water, on the top of which it will be found to float.§ **MED. USES.** Tobacco is endued with ener-

* The Damask Rose, *Rosa Centifolia*, of which this syrup is composed, was imported into this country by Linacre, on his return from Italy.

† MAJOR COCHRANE'S COUGH MEDICINE. White poppy heads without seeds are made into a decoction, which is strained, and boiled again with vinegar and brown sugar, until it assumes the consistence of syrup, which is then acidified by elixir of vitriol.

‡ It would appear that there are two principles of activity in Tobacco, an essential oil, and *nicotin*, either of which are, individually, capable of producing death, but by a very different physiological action, the former by its effects on the brain, the latter by its influence on the heart! See page 135.

§ It seems very probable, that the "juice of cursed hebenon," by which, according to Shakespeare, the king of Denmark was poisoned, was no other than the essential oil of Tobacco:—

———"Sleeping within mine orchard,
My custom always of the afternoon,

getic poisonous properties, producing generally a universal tremor, which is rarely the result of other poisons; the experiments of M. Orfila moreover demonstrate, that the action of Tobacco is much more energetic when the soluble portion is injected into the anus, than when it is applied to the cellular texture, and for a still stronger reason, than when introduced into the stomach. Mr. Brodie, from the result of a well devised experiment, has deduced the conclusion that the infusion of Tobacco acts upon the heart, occasioning syncope, through the medium of the nervous system. **USES.** As a powerful sedative, it is sometimes valuable in medical practice; the leaves, when applied in the form of a cataplasm to the pit of the stomach, produce an emetic operation; (*Form.* 67.) In cases of obstinate constipation, depending upon violent spasmodic constriction, or in *ileus*, or *incarcerated hernia*, clysters of the smoke of Tobacco, or of an infusion made according to the London College, produce almost immediate relief, (*Form.* 26); the practice is not unfrequently attended with severe vomiting, extreme debility, and cold sweat, circumstances which render its administration highly dangerous in cases wherein the patient has been already exhausted by previous suffering. I remember witnessing a lamentable instance of this truth some years ago; a medical practitioner, after repeated trials to reduce a strangulated hernia, injected an infusion of Tobacco, and shortly afterwards sent the patient in a carriage to the Westminster Hospital, for the purpose of undergoing the operation; but the unfortunate man arrived only a few minutes before he expired. Clysters of Tobacco were some years ago recommended in America, for the purpose of forwarding difficult parturition, by inducing relaxation and consequent dilatation of the *os uteri*, but the alarming symptoms which followed the single case in which Tobacco was thus employed, ought, says *Dr. Merriman*, to prevent a repetition of the experiment*. It was also formerly proposed to inject infusions of Tobacco, for the purpose of recovering persons in a state of *asphyxia* from drowning; it is difficult to explain how such an idea could have entered into the mind of the rational physiologist. Smoking or chewing Tobacco has been also advised in cases of spasmodic asthma, and as a general sedative to relieve suffering; in the process of *smoking*, the oil is separated, and being rendered empyreumatic by heat, it is thus applied to the fauces in its most active state. As a diuretic

Upon my secure hour thy uncle stole,
With juice of cursed hebenon in a vial,
And in the porches of mine ears, did pour
The leperous distilment."

In the first place, the learned commentator, Dr. Grey, observes that the word here used (hebenon), was more probably designated by a metathesis, either of the poet or transcriber, for henebon, i. e. henbane. Now it appears from Gerard, that "tobacco" was commonly called henbane of Peru, (*hyoscyamus Peruvianus*), and when we consider how high the public prejudice ran against this herb in the reign of James, it seems very likely that Shakespeare should have selected it, as an agent of very extraordinary malignity. No preparation of the *hyoscyamus*, with which we are acquainted, would produce death by application to the ear, whereas the essential oil of Tobacco would, without doubt, occasion a fatal issue. The term distilment has also called forth a remark from Steevens, which is calculated to support this conjecture; surely, says he, this expression signifies that the preparation was the result of a distillation.

* See "An Essay on the means of lessening Pain, and facilitating certain Cases of difficult parturition, by W. P. Dewes, M. D. 1806, also *Med. Journ.* vol. xviii.

it was successfully exhibited by Dr. Fowler, but as its operation is uncertain and violent, and appears to be very analogous to that of *Digitalis*, which is far more safe and manageable, it has been very judiciously discarded from practice. The external application of Tobacco in the form of cataplasm or infusion, has been applied to several species of cutaneous disease, but even in this state it is liable to exert its virulent effects. A woman applied to the heads of three children afflicted with *tinea capitis*, a liniment consisting of powdered tobacco and butter, soon after which they experienced vertigo, violent vomiting, and fainting. (*Ephemerides des Curieux de la Nature*, Dec. ii. An: i. p. 46.) A case has just occurred in this country of a child whose death was occasioned by her having swallowed a portion of half-smoked tobacco, which was taken from the pipe of her father, and in which there no doubt existed a quantity of essential oil, which had been separated by the act of smoking. It is a curious fact, that the juice of the green leaves instantly cures the stinging of nettles.

ADULTERATIONS. When it exhales a fetid odour, we may infer that it has been badly prepared, and not deprived of all its mucus; when pungent, the presence of some deleterious drug is indicated: *Cascarilla* is very usually added to impart a peculiar flavour; *Nitre* is also employed for the sake of making it kindle more rapidly, and to impress a lively sensation on the tongue: its vapour is of course very injurious to the lungs: its presence may be detected by treating a suspected sample with hot water, and after filtering the solution through charcoal, setting it aside in order that it may yield its crystals by evaporation. Traces of *Lead*, *Copper*, or *Antimony*, may be discovered by boiling Tobacco in strong vinegar, and, after filtering it as before, by assaying it with appropriate tests. *Black Hellebore*, *Alum*, *Sugar*, and *Corrosive sublimate* are amongst the more usual sophistications. *Dried Dock* leaves are also sometimes substituted. **OFFICINAL PREP:** *Infus: Tabacci*. L. *Vinum Nicotian*; *Tabac*: E.

SNUFF. This well known errhine is prepared from the dried leaves of Tobacco; in its manufacture however, numerous additions are made which are kept secret. *Salt* is added for the purpose of increasing its weight; *Urine*, *Muriate of ammonia*, and powdered *Glass*, to heighten its acrimony. The varied flavour of different *Snuffs* is owing to the leaf being in greater or less perfection; or to its having undergone some degree of fermentation; thus, for instance, the *Macauba Snuff* of Martinique is principally indebted for its acknowledged superiority to the fermentation which the Tobacco undergoes, from being moistened with the best cane juice; other kinds are excited into fermentation by moistening them with molasses and water.

Snuff possesses all the powers of Tobacco; the celebrated Santeuil experienced vomiting and horrible pains, amidst which he expired, in consequence of having drank a glass of wine, into which had been put some Spanish Snuff.*

* **CEPHALIC SNUFF.** The basis of this errhine, is powdered *Asarum*, diluted with some vegetable powder.

TAMARINDI PULPA. L. (TAMARINDUS INDICA.)

TAMARINDUS : FRUCTUS. D.

FRUCTUS CONDITUS. E.

The Pulp or preserved Fruit of the *Tamarind*.*

QUALITIES. *Taste*, sweetish acid ; *Odour*, none. CHEMICAL COMPOSITION. 3j of Tamarinds is composed of Citric acid grs. 45, Malic acid grs. 2, Super-tartrate of potass grs. 15, together with sugar, gum, jelly, fecula, and woody fibre. USES. A pleasant febrifuge may be formed by infusing Tamarinds in water or milk ; they improve the taste of the more nauseous cathartic. OFFICINAL PREP : *Confectio Cassiæ*. L.E.D. *Infus. Tamarinds : cum Senna*. E.D. CAUTION. Copper vessels should never be employed for the preparation of any compound which contains *Tamarinds*.

TARAXACI RADIX. L.E.

(Leontodon Taraxacum.) Dens Leonis.

Dandelion.

QUALITIES. *Odour*, none ; *Taste*, bitter, and somewhat sweet and acidulous. CHEMICAL COMPOSITION. The active principles appear to consist of extractive, gluten, a bitter principle (*not resinous*), and tartaric acid. SOLUBILITY. Water extracts its virtues much better than spirit. INCOMPATIBLE SUBSTANCES. *Infusion of Galls*, *Nitrate of Silver*, *Oxy-muriate of Mercury*, *Acetate of Lead*, and *Sulphate of Iron* occasion precipitates in its solutions. MED. USES. It has long enjoyed the reputation of proving beneficial in obstructions of the liver, and in visceral diseases ; Bergius extols its use in these complaints, and recommends the recent root to be boiled in whey or broth. Dr. Pemberton has more recently added his testimony to its value ; he observes that he has seen great advantage result from using the extract in chronic inflammation, and incipient scirrhus of the liver, and in chronic derangement of the stomach. FORMS OF EXHIBITION. In that of extract, or in decoction made by boiling 3j of the sliced root in oj of water down to oss, adding to the strained liquid 3j of Cream of tartar ; the recent full grown root only should be used. Dose, f3jj, twice or thrice a day. OFFICINAL PREP : *Extract : Taraxaci*. The roots are roasted and used at Gottingen by the poorer people for coffee, from which a decoction of them properly prepared can hardly be distinguished.† The leaves of this plant are blanched, and very commonly used on the continent as a sallad.

* Tamarind, from *Timmer* a Date, and *Hend* India, *Timmerhend*, i. e. Date of India.

† Various substances have been proposed at different times as substitutes for Coffee. In the "Fourth Century of Observations" in the "Miscellanea Curiosa," we find a critical dissertation on the (Cahve) Coffee of the Arabians ; and on European Coffee, or such as may be prepared from grain or pulse. Dillenius gives the result of his own preparations made with Pease, Beans, and Kidney Beans, but says that that made from Rye comes the nearest to true Coffee, and was with difficulty distinguished from it. This fact is curious, in as much as a spurious Coffee has been lately vended, which is nothing more than roasted Rye. The article is well known by the name of HUNT'S ECONOMICAL BREAKFAST POWDER."

TEREBINTHINA. L.E.D. *Turpentine.*

Most species of *Pinus* * may be made to yield (and many of them produce spontaneously) a remarkable resinous juice, usually called *Turpentine*; an appellation, however, which more properly belongs to the product of a different genus, called by Linnæus *Pistachia*, which contains the true *Terebinthus* † of the ancients.

QUALITIES. *Consistence*, semi-fluid and tenacious, but becoming more or less concrete by age; *Odour*, aromatic; *Taste*, pungent, austere, and astringent. It is inflammable. **SOLUBILITY.** It is entirely soluble in rectified spirit, but not at all in water; although it becomes miscible with that fluid, by the mediation of the yelk or the white of an egg, but more elegantly by that of vegetable mucilage, and forms a milky liquor. It is capable of entering into union with fixed oils. **CHEMICAL COMPOSITION.** Resin, and an essential oil, the proportions of which vary according to the species of Pine from which it is obtained. They all, however, possess the same general chemical, as well as medicinal properties, viz. When internally taken, says Dr. Maton, they seem to warm the *viscera*, raise the pulse, and impart additional excitement to the whole vascular system; applied externally, they increase the tone of the part, counteract indolence of action, and deterge, as it were, ill-conditioned ulcers. *Internal ulcerations* indeed, especially of the urinary passages, as well as laxities of the seminal and uterine vessels, are supposed to be diminished by the exhibition of preparations of this nature. They certainly appear to act in a peculiar manner on the urinary organs, impregnating the water with a violet smell, and there are strong grounds for believing that its volatile element, developed by the powers of digestion, passes into the circulation, and is eliminated by the kidneys, whose secreting vessels are thus stimulated *by its contact*. (See page 95.) Pulmonary complaints, as obstinate coughs and asthmatic affections, have been said to give way to medicines of this class; yet, in modern practice, recourse is rarely had to them in such cases, and their exhibition is even considered hazardous. The ancients were accustomed to medicate their wines with various Terebinthinate substances, for the effect of which, see *Vinum*.

The particular preparations of Turpentine most employed in medicine, will be noticed under the different species.

1. **TEREBINTHINA CANADENSIS. L.** (*Pinus Balsamea. Resina Liquid.*) *Canada Turpentine*, or *Canada Balsam.* ‡ This is a transparent whitish juice, brought to this country from Canada, and apparently, says Dr. Maton, not very different in its qualities from the celebrated *Balm of Gilead*, § so high in esteem among the eastern nations, and so strongly recommended in a variety of complaints. Hitherto, however, it has not been much employed in England. Its odour is agreeable, and its taste strong and pungent.

* See "Some account of the Medicinal and other Uses of various Substances prepared from Trees of the genus *Pinus*, by W. G. MATON, M.D. &c. being a Supplement to Mr. Lambert's splendid work on that genus.

† The *Τερεβινθος* of Theophrastus (lib. 3. c. 3.) and Dioscorides; (lib. 1, c. 76.) from which the word *Terebinthus* seems to have been derived.

‡ The term Balsam is very improperly applied to this substance, since it contains no Benzoic Acid.

§ The product of the *Amyris Gileadensis*, and probably the *Balsamum Judaicum*, *Syriacum e Mecca*, *Opobalsamum*, &c. of the older writers.

2. *TEREBINTHINA CHIA. L. (Pistachia Terebinthus.) Chio, or Cyprus Turpentine.* The superiority of this species to all the products of the pine tribe, was well known to, and described by, most of the ancient writers on the materia medica. It is pellucid, with a bluish-green cast.

3. *TEREBINTHINA VULGARIS. L. (Pinus Sylvestris. Scotch Fir.) Common Turpentine. Horse Turpentine.* This species is more coarse and dense than any other kind, and has an opaque light brown colour; its consistence may be compared to that of honey; the taste is very acrid, hot, and disagreeable, and the smell much less pleasant than either the *Venice* or the *Strasburg* turpentine. It is the kind which, as its name implies, is most commonly employed, and although inferior in quality to that of the turpentine tree, *Pistachia Terebinthus* (*Chio* or *Cyprus*), the *Larch*, *Pinus Larix* (*Venice Turpentine*), and the *Silver Fir*, *Pinus Picea* (*Strasburg Turpentine*), especially for internal use, yet it is too often substituted for them in the shops of the druggist. The Colleges of London and Edinburgh direct the common turpentine to be used chiefly in external applications, for which it was also much employed by the ancients. Celsus mentions "*Resina liquida pinea*," as entering into the composition of many of his "*Malagmata*," and the "*Resina liquida*" of other writers would appear to be of the same kind. The *Unguentum Elemi compositum* contains this resinous juice as a principal ingredient.

4. *TEREBINTHINA VENETA. (Pinus Larix.)* The Larch. Venice Turpentine.* This resin is by most writers, and in the shops, esteemed the best, after that of *Pistachia Terebinthus*, of those juices commonly called *Turpentine*s. It is usually thinner than any other kind, of a pale yellowish colour, and of a hot, pungent, bitterish taste; the smell is strong, and far from being agreeable. Although it bears the name of *Venice Turpentine*, very little of it is exported from the Venetian Territories; but it is probable that the merchants of that country were the first who substituted it for the genuine Turpentine of Cyprus. The resinous juice of the *Larch* is said to remain always, or at least a very long time, in a state of liquidity; a property which is particularly adverted to by Pliny.† As a Diuretic, the *Venice Turpentine* has been generally preferred to all the other kinds; and it is said to relax the bowels more, for which reason *Riverius*‡ considers it as being safer than other irritating diuretics.

5. *TEREBINTHINA ARGENTORATENSIS. (Pinus Picea.) Strasburg Turpentine.* This resin is generally of a middle consistence between that of the *Terebinthus* and the *Larix*: more transparent and less tenacious than either; in colour yellowish brown; in smell more agreeable than any other turpentine, except the Cyprian; in taste the bitterest, yet the least acrid.

Form of Exhibition. The Turpentine may be either made into Pills with powdered liquorice root, or suspended in water by the intervention of egg or mucilage; for which purpose, 3j requires the yolk of one egg, or 3iss of gum arabic. *Dose*, gr. x to 3j.

* A fluid extract, prepared by decoction from the twigs of this species of Fir, is the well known Essence of Spruce, which, when fermented with molasses, forms the popular beverage, called "Spruce Beer," (*Cerevisia Pini Laricis*.)

TRUE RIGA BALSAM, Beaumé de Carpathes, from the shoots of the *Pinus Cembra*, previously bruised, and macerated for a month in water.

This same fir also affords BRIANÇON TURPENTINE.

HUNGARIAN BALSAM.—A spontaneous exudation from the *P. Pumilio*, or *Mugho Pine*.

† Lib. 16, c. 10.

‡ Prax. Med. Lib. 14. c. 1.

TEREBINTHINÆ OLEUM. L.E.D.

Oil of Turpentine.

QUALITIES. *Form*, a limpid and colourless liquid, whose specific gravity is only $\cdot 792$; *Odour*, strong, penetrating, and peculiar; *Taste*, hot, bitter, and pungent. **CHEMICAL COMPOSITION.** It is an essential oil, possessing, however, peculiar habitudes with respect to alcohol, being readily dissolved by *hot* alcohol, but separating again in drops, as the spirit cools; in the cold it is sparingly soluble in the strongest alcohol, and separates from it on standing; but it dissolves completely in six parts of sulphuric æther. It is not acted upon by the alkalies, except by long trituration, when it is converted into a species of resin.* **MED. USES.** It acts according to the dose, either on the *primæ viæ* producing catharsis, or on the kidneys exciting diuresis; thus its operation offers another illustration of the views which I have so frequently urged during the progress of the present work; it furnishes a striking example of the important influence of quantity, or *dose*, in determining the specific operation of a remedy; thus *two fluid-drachms* of the oil may so excite the urinary organs as to produce even bloody urine, and the other ill effects described by Boerhaave and Lange; whereas *six fluid-drachms* or a *fluid-ounce*, will stimulate the bowels, and produce scarcely any apparent effect upon the kidneys.

As a medicine acting powerfully on the first passages, its value seems only to have been lately appreciated; in Tænia, it may be said to act almost as a specific remedy, discharging it in all cases, *dead*. In obstinate constipation, depending on affections of the brain, I have lately had several opportunities of witnessing its beneficial effects: in an unfortunate instance of *Hydrocephalus acutus* in a boy of thirteen years of age,† it brought away an accumulation of feculent matter almost incredible as to quantity, after the total failure of the strongest doses of ordinary purgatives; and I believe, if its dose be sufficiently large, that it may generally be administered with perfect safety and confidence. Dr. Latham has long regarded it as a valuable medicine in Epilepsy, in which cases it may in the first instance prove beneficial by unloading the bowels, and subsequently in producing an affection of the head peculiar to its use; and, which generally succeeds a large dose, it is an approach to intoxication, but is unaccompanied with that hilarity and elevation of thought that so usually follow the potation of spirituous liquors. In small doses it produces diuresis, and is used with much advantage in sciatica and lumbago.‡ Its use in diseases of the kidneys originating from ulcerations, and obstructions in those organs, has been very highly extolled. Cheyne, in his Essay on the gout, recommends it as a specific in Sciatica; upon this subject my own experience so completely confirms the truth of Dr. Maton's observations, that I shall here insert them. "If," says he, "I may be allowed to offer the result of my own practice, its effects are in a few instances successful in the removal of that disease; and even those cases

* STARKEY'S SOAP. This compound is effected by a long and tedious trituration of alkali and oil of turpentine.

† This case was occasioned by a violent whirling of the body in a frolic; the circumstances attending it are so interesting that I shall take an opportunity of submitting the details to the profession. See Dr. Yeat's work on Hydrocephalus.

‡ See "A Memoir on the employment of Terebinthinous Remedies in Disease," by James Copland, M. D. in the Medical and Physical Journal for 1821, p. 185.

which I have seen cured under its use, appeared to be rather of the symptomatic than the idiopathic kind; it is reasonable to presume that the sciatic nerve, from its origin and course, may owe some of its morbid affections to an obstructed ureter, as well as to a rheumatic diathesis. *Form*: 50. Hunter spoke of oil of turpentine as a styptic, and it has been administered in the Almond emulsion in cases of internal hemorrhage of an active nature. We should however be very careful how we make such an experiment. This oil has the effect of communicating the odour of violets to the urine of those who take it, and, what is still more extraordinary, to those even who merely expose themselves for a short time to its effluvia;* a mixture of ℥x of this oil with fʒj of almond oil, introduced upon cotton into the ears, is serviceable in cases of deafness resulting from a diseased action of the ceruminiferous glands; it is also employed as a local stimulant in a variety of cases: and in cholic, and obstinate constipation, it is sometimes exhibited in the form of an enema. In America, oil of Turpentine, in doses of a drachm every hour or two, has been successfully administered in cases of Yellow Fever, when, says Dr. Chapman, it appears to be soothing in its effects, removing the sense of heat and irritation in the stomach, subduing the force of vascular action and general excitement, and inducing at once a condition of more comfort and security. Orfila also recommends it as the best corrective of inflammation in the stomach from acrid poisons. In this country it has been very successfully employed in cases of Melæna, and in Puerperal fever. As a stimulating liniment its advantages are considerable, see *Liniment: Terebinth*: In Germany, Norway, and some parts of the Russian empire, this essential oil is frequently used as a remedy for lesions of the tendons and other bruises.† Dose as an anthelmintic, fʒss—fʒij, repeated every eight hours until the worm is ejected; in these large quantities it is more convenient, as well as more efficacious, to administer it like castor oil, floating upon some liquid aromatic vehicle:‡ by rubbing up Oil of Turpentine with mucilage, we do but render it more pungent, and difficult to swallow. As a diuretic or stimulant it may be given in the form of an electuary, in doses of from ℥x to fʒj. It may be also employed as a very active clyster, made by carefully incorporating one or two table spoonsful of the oil with the yolk of an egg, and adding to it a pint of thin mucilage. This terebinthinate clyster is well calculated to relieve a paroxysm of flatulent cholic. OFFICIAL PREP. *Liniment. Terebinth.* L. The Pharmacopœias direct the rectification of the oil by redistillation,§ when it is commonly called *Spirit of turpentine*, but it appears to be an unnecessary refinement. Dr. Nimmo has proposed the following process for purifying the oil intended for medicinal use, by which it is

* Kaauw de Persp. N. 430.

† THE GUESTONIAN EMBROCATION FOR RHEUMATISM. R. Ol. Terebinth: fʒiss—Ol: Oliv: fʒiss:—Acid: Sulp. dilat: fʒiij.

‡ SCOURING DROPS. The peculiar odour which distinguishes oil of turpentine, may be destroyed by the addition of a few drops of some fragrant volatile oil, as that of lemons: a combination of this kind is commonly sold under the name of Scouring Drops, for the purpose of removing paint, oil, or grease from cloth.

§ DUTCH, or HAERLEM DROPS. The basis of this nostrum consists of the residue of this redistillation, which is a thick, red, resinous matter, to which the name of Balsam of Turpentine has been given; a preparation, however, is frequently vend- ed as "Dutch Drops," which is a mixture of oil of turpentine, tincture of guaiacum, spirit of nitric ether, with small portions of the oils of amber and cloves.

said to have its disagreeable flavour lessened without sustaining any loss of efficacy. To eight parts of the oil, add one part of the strongest alcohol, and let them be well agitated together. In a few minutes a separation takes place; the oil, unless very impure, falls to the bottom, and the alcohol, having discharged the impurities, floats at the top. Pour off the alcoholic portion, add a similar quantity of alcohol, and proceed as before. If this be repeated three or four times, the oil will become nearly tasteless, almost inodorous, and when evaporated will leave no residuum. But pure as the oil may be thus rendered, it speedily returns to its original condition.

TIGLII OLEUM. L. Oil of Tiglium.

Croton Tiglium. Oleum e Seminibus expressum.

The *Croton Tiglium* is a native of the island of Ceylon, and is found in Malabar, China, CochinChina, and the Molucca Islands. Every part of the plant would seem to be endowed with medicinal activity; the *root* acts as a drastic purgative, and when pulverized, and exhibited in the dose of a few grains, is considered at Amboyna and Batavia, as a specific for dropsy; the *wood* (*lignum Pavanæ*) produces, when administered in small doses, a diaphoretic effect, and in larger ones it proves drastic; the *leaves* are also purgative, and when dried and powdered are supposed to afford an antidote against the bite of the *Cobra del Capella*. The *seeds*, however, are the parts which have been more generally employed in medicine, the effects of which appear to have been well known for nearly a thousand years.* They were early introduced into Europe, and long known under the names of *Grana Molucca*—*Tilii Grana*—and *Grana Tiglia*.† It appears that they were at first very frequently administered, but their extreme acrimony and violence,‡ and probably the accidents which arose from their injudicious use, soon banished the article from medical practice; in India, however, these seeds are still employed as an effectual purgative, after first undergoing the process of roasting, or baking, for the purpose of removing the shell, rendering the nut pulverulent, and at the same time of moderating the acrimonious qualities.§ The expressed oil of these seeds does not appear to have been obtained in a separate form until a later period; Lemery speaks of it, and Geoffroy in directing its dose cautions us against giving more than 3j!—he probably meant a drop. Its use has very lately been revived, and there can be little doubt but that under proper restrictions, it may become a valuable acquisition to the practitioner. The profession is indebted for its late introduction or rather revival, to Mr. E. Conwell of the East India Company's Medical Service, on the Madras Establishment, who,|| having for

* Serapion the younger, one of the earlier Arabian writers on the *Materia Medica*, describes them as bearing some analogy to "Pine nuts."

† The reader will find an account of the Botanical Literature of this plant, by J. Frost, Director of the Medico-Botanical Society, in the 17th volume of the *Medical Repository*, p. 461.

‡ Rumphius, (*Herb : Amboinense*) in speaking of the *Grana Molucca*, observes that women who are desirous of getting rid of their husbands, give them four grains at one dose.

§ See Ainslie's *Materia Medica of Hindostan*.

|| I state this fact on the authority of a communication made by order of the Court of Directors of the East India Company, to the College of Physicians, enclosing the extract of a letter from Mr. Conwell.

many years prescribed it with advantage, introduced a quantity of it for trial in London, through the medium of his friend, Mr. Short, of Ratcliff Highway.

QUALITIES. This expressed oil has a yellow colour, a faint odour, and an acrid taste ; these qualities however will be found to vary in different samples ; but the fact, as Dr. Nimmo* has justly observed, may be fairly explained, without suspecting the existence of any fraud, by supposing that the seeds have undergone a different degree of torrefaction, in order to separate the oil from the farinaceous part. **CHEMICAL COMPOSITION.** The recent experiments of Dr. Nimmo have very satisfactorily shewn that this oil consists of 45 parts of an *Acrid purgative principle*, and 55 of a fixed oil resembling that of olives, and not possessed of any cathartic property. The acrid principle appears to reside in a resinous matter soluble in alcohol and sulphuric æther, and in volatile and fixed oils. I have lately repeated some of Dr. Nimmo's experiments on a recently imported sample of oil, and with similar results. The acrid principle appears to bear a strong analogy to that which I separated from elaterium, and as I gave to this latter principle the term *Elatin*, it seems to me that we might with much propriety, apply the name *Tiglin* to the former, especially as it does not appear to possess any of the characters and habitudes of a salifiable basis ; at all events the adoption of such a term will obviate the necessity of circumlocution in our descriptions. **SOLUBILITY.** By alcohol the oil undergoes a ready decomposition ; the *Tiglin* is dissolved together with a very minute quantity of the oily part. Ether and oil of turpentine dissolve the whole ; a fact which enables us, by digesting the seeds in these menstrua, to obtain the article in as genuine and certainly in a much more uniform, condition, than by the processes of torrefaction and expression, as practised in India ; for this fact we are also indebted to Dr. Nimmo. **MED. USES.** As far as I have been able to ascertain the fact, this oil does not appear to produce any effects which cannot be commanded by other drastic purgatives ; its value depends upon the facility with which it may be administered ; in some cases it is amply sufficient to touch the tongue, in others, a drop or two will be required. In maniacs, and in cases where the administration of bulky medicines is extremely difficult, it would seem to offer a decided advantage.† **FORMS OF EXHIBITION.** It has been usually given in this country in the proportion of from one to two drops, in the form of pills. Dr. Nimmo's discovery with respect to the chemical composition of the oil, very naturally suggested to him the mode of administering it in the form of an alcoholic tincture (*Tinctura Tiglii*), and he has found by experience that such a preparation furnishes the means of readily apportioning the dose to the various circumstances of the case ; thus he found that in administering a tincture‡ in doses equivalent to the number of drops decomposed, the same effects were produced as have been attributed to the entire oil. **ADULTERATIONS.**

* Journal of Science and the Arts. No. xxvi.

† I understand that to the Veterinary Surgeon this oil has proved an article of great utility, as it uniformly purges the horse, and may be employed, for that purpose, in those cases in which Aloes would be inadmissible.

‡ In making such a tincture we should employ a fluid-drachm of Rectified Spirit, to two drops of the oil. They should be digested for some time and then filtered. With all the care that can be used, a certain portion of the spirit will be evaporated, and half a fluid-drachm of the tincture may be thus considered as nearly equivalent to a drop and a half of the oil.

Much has been said upon the fraudulent admixture of this comparatively expensive article with the cheaper fixed oils : and we believe with much truth ; a circumstance which will of necessity prevent the general use of the article ; and occasion very different reports with respect to its value and activity. Dr. Nimmo however proposes a method of detecting such adulteration, by a process suggested by the results of his experiments upon its composition, and whose rationalé will be easily understood after the chemical history that has been just presented.

“ Let a very light phial be counterpoised in an accurate balance ; pour into it 50 grains of the suspected oil, add alcohol (which has been previously digested* upon olive oil,) agitate them well, pour off the solution, and add more alcohol as before, until the dissolved portion is diffused in such a proportion of alcohol that each half drachm measure shall contain equal to one dose of the oil of *Tigllium* for an adult. By afterwards placing the phial near a fire to evaporate what remains of the alcohol in the bottle, *if the residuum be to that which has been abstracted by the alcohol as 55 to 45, the oil is genuine.* If olive, or any other oil little soluble in alcohol, has been employed as the adulterating agent, it is evident that the residuum will be in a larger proportion ; but should *Castor Oil* have been employed for that purpose, the proportion of the residuum will be smaller even than in the genuine medicine.”

TINCTURÆ. L.E.D. *Tinctures.*

These consist of alcohol, proof spirit, or spirit of greater or less density, holding in solution one or more of those proximate principles of vegetable or animal matter which are soluble in that menstruum, viz. *Sugar, resin, extractive, tannin, cinchonia, camphor, volatile oils, morphia, emetin, conein, elatin, tiglin, and several acids.* The proper solvent of those bodies, termed *gum-resins*, appears to be proof spirit. The compilers of the *Codex Medicamentarius* of Paris, have defined the different degrees of spirituous strength requisite for the full and perfect extraction of the active elements of different bodies with great truth and nicety ; thus they direct for these purposes a spirit of three different standards, viz. 36 (*Sp. gr.* .837,) 32 (.856) 22, (.915) of Beaumé's hydrometer ; with the first are prepared the *resinous* tinctures ; with the second those wherein the *resinous, extractive, or gummy* elements, hold nearly an equal place ; and with the third those in which the latter predominate. We are moreover indebted to this committee for having set at rest a question which has been long doubtful, whether the addition of alkaline agents increases the extractive powers of the spirit ? They have indeed ascertained by experiment, that the reverse not frequently obtains ; for instance, they found that a smaller proportion of *guaiacum* was dissolved by the spirit of ammonia than by alcohol of the same strength, and that the quantity of matter dissolved from the *root of Valerian* was the same in both cases. Very active substances, soluble in alcohol, are those which are particularly adapted for tinctures, since they furnish preparations

* The object of this preliminary step is to saturate the alcohol with a fixed oil, that it may not dissolve any portion of that in the *Tigllium*, and thus confuse the results. The quantity of fixed oil which alcohol is capable of dissolving is extremely small, and will not in the least degree injure the alcoholic solution for subsequent medicinal use.

which are efficient in small doses, and very manageable in extemporaneous prescription, such are the tinctures of *Opium*, *Digitalis*, *Hyoscyamus Scilla*, &c. and from the chemical analysis of *Elaterium*, there can be no doubt but that a very active and useful tincture of that substance might be introduced into practice : while Dr. Nimmo has very clearly proved that the active matter of the *Croton Tiglium* may be thus concentrated, see *Tiglii Oleum*. On the contrary, substances of little activity, except in large doses, are the least adapted for this form of exhibition, as in such cases the solvent will act more powerfully on the living system than the principles which it may hold in solution, and when continued for any length of time, will lay the foundation of the pernicious custom of dram-drinking ; such tinctures, however, are not without their value in combination ; they sometimes increase the efficacy, and often correct the operation or disguise the flavour, of the medicines with which they may be united ; for example, the cathartic tinctures in *Formula 70*, augment the purgative powers of the combination, at the same time that they correct its unpleasant operation ; many other illustrations are presented in the different formulæ, for the explanation of which I must refer the student to the *Key Letters*. The addition of a tincture has likewise the effect of preserving decoctions and infusions from spontaneous decomposition, the *compound tincture of Cardamoms* answers such an object in the *compound decoction of Aloes*. Tinctures are sometimes made with æther, but they are generally more strongly characterised by the nature of the menstruum than by that of the substance dissolved in it ; indeed æther is used in these cases, not to dissolve substances which would resist the action of alcohol and water, but for the sake of its own direct action on the body ; thus the Edinburgh pharmacopœia directs an *Æthereal Tincture of Aloes*, which is more penetrating and stimulant than the alcoholic tinctures ; the London College, with the exception of the *Aromatic Spirit of Æther*, does not recognize any preparation of this nature : I have already alluded to the *Æthereal Tincture of Digitalis* of the French Codex, than which nothing can be more injudicious, for the digitalis does not amount to more than 1-70th part of the tincture, and must therefore be entirely counteracted by the stimulant effects of the menstruum. The same objection cannot be urged against the æthereal tinctures of *Castor*, *Musk*, and *Amber*, since in these cases, the subject and the menstruum concur in their mode of operation.

Tinctures derive their names from the substances which impart activity to them, and as the medicinal history of each substance is detailed under its proper head, it will be unnecessary to dwell at any length upon the individual virtues of these tinctures.

1. Prepared with Rectified Spirit.

TINCTURA ASSAFŒTIDÆ. L.D. Dose, f3ss to f3j.

———— BENZOES COMP. L.E.D. *Balsamum Traumaticum*. P.L. 1745. This is a combination of Benzoin, Storax, and Tolu, with aloes ; it is regarded as a stimulating expectorant, and has been used in chronic catarrh and confirmed asthma, but it is now very rarely employed, except as an application to wounds and languid ulcers. It is sold under the name of *Friar's Balsam* ; and with respect to the use of this preparation as a *Styptic*, the public have fallen into a serious error ; fresh wounds it must necessarily injure, not only by its stimulating qualities, but by the sepa-

ration of the resins which take place on its intermixture with the blood ; these form a substance, which absolutely prevents what is most desirable in such case,—the sides of the wound coming in contact and uniting by the first intention. *Dose.* As an internal remedy from f3ss to f3ij, triturated with yolk of egg, or mucilage, to suspend it in water.

TINCTURA CASTOREI. L.E. *Dose,* ℥xx to f3ij. See Form. 20, 23, 25, 76, 97, 136.

TINCTURA CASTOREI COMPOSITA. E. This is much more active than the preceding tincture, as it contains assafœtida, and its menstruum is ammoniated alcohol. *Dose,* ℥xv to f3j.

TINCTURA CINCONE AMMONIATA. L. In this preparation we have the tonic powers of the bark combined with the stimulus of the Ammonia. *Dose,* f3ss to f3ij. Acids and Acidulous Salts are of course incompatible with it.

TINCTURA GUAIACI. L.E.D. A simple solution of guaiac. *Dose,* f3i—f3ij.

TINCTURA GUAIACI AMMONIATA. This is a solution of the guaiac in the aromatic spirit of ammonia, and is consequently more stimulating than the preceding one, and more efficacious as a sudorific ; after arterial action is properly reduced, it is certainly one of our best remedies in rheumatism. *Dose,* f3j to f3ij, at bed-time, and its effects should be promoted by some warm beverage. It is worthy of remark, that nitrous acid and the spirit of nitric æther occasion an extraordinary decomposition of these tinctures, separating the guaiacum into coagulated masses, and imparting to the whole an intense bluish green colour. I find that chlorine has the same effect ;* but the sulphuric and muriatic acids produce no disturbance, although all acids and acidulous salts must be considered as incompatible with it. If equal parts of quick lime and powdered guaiacum be rubbed together, and a quantity of water be poured over them, and the mixture be allowed to stand until it becomes fine, we shall obtain a solution of this substance, which will mix in any proportion with aqueous vehicles without decomposition, and to which the aromatic spirit of ammonia may be subsequently added with effect.

TINCTURA TOLUIFERÆ BALSAMI. E.D. This is only useful as an adjunct, to impart agreeable flavour and fragrance to other remedies.

The above tinctures, when added to water, are instantly decomposed, the practitioner must therefore remember that when he prescribes them in aqueous vehicles, it will be necessary to direct them to be triturated

* The change of colour which Guaiacum undergoes by admixture with other bodies, not only affords a test by which we may appreciate its purity, but at the same time it becomes a reagent by which we may assay the virtues of other vegetable substances. According to the experiments of M. Taddy and Rudolphi, it appears that GUAIACUM in powder, is an excellent test for vegetable gluten, forming with it a fine blue colour, whence it affords the means of determining the quality of wheat flour. From the experiments of M. Planche, it moreover appears that there is a series of vegetable roots which, when fresh, are capable of producing a blue colour, if introduced into an alcoholic solution of Guaiacum : so that we may hereafter be furnished with a chemical test that will at once appreciate their freshness, which is undoubtedly one of the greatest desiderata of pharmaceutical science.

A communication has appeared from Mr. A. T. Thomson, in which he proposes Guaiacum as a test for the freshness of Colchicum. I have, however, never been able to succeed with it, to my satisfaction.

with some viscid liquor, as mucilage, previous to the addition of the water, in order to suspend the resinous precipitate.

2. *Tinctures prepared with Spirit above Proof.*

TINCTURA ALOES COMPOSITA. L.D. *Elixir Proprietatis.* P.L. 1720. Tincture of Myrrh is the menstruum of the Aloes in this preparation, to which Saffron is added. *Dose*, f3j to f3ij. *Form.* 16, 97.

TINCTURA MYRRHÆ. L. The strength of the spirituous solvent has been very judiciously increased in the *Editio Altera* of the London Pharmacopœia, by which means a brighter tincture is obtained. It is rarely used except in astringent and detergent gargles, or as an external application to foul ulcers; diluted with water it presents us with an excellent lotion for spongy gums.*

3. *Tinctures prepared with Proof Spirit.*

TINCTURA ANGUSTURÆ. D. See *Cuspariæ Cortex*.

TINCTURA AURANTII. L.D. An agreeable adjunct to bitter infusions. *Dose*, f3ij to f3iij.

TINCTURA CALUMBÆ. L.D. A valuable stomachic. *Form.* 32, 35, 154, 155, 159. *Dose*, f3i—f3iij.

TINCTURA CAMPHORÆ COMPOSITA. *Tinctura Opii Camphorata.* P.L. 1787. *Elixir Paregoricum.*† P.L. 1745. This preparation had undergone both change of name and composition in the last Pharmacopœia; its old name was thought improper from its similarity to that of *tincture of opium*, and the oil of aniseed has been omitted on account of its disagreeable flavour; still, however, these perpetual changes are most distressing; the tincture, as it is now prepared, is very different from that which has been so long and so generally sold under the name of *Paregoric Elixir*, and the chemist is therefore obliged to keep both the preparations, and to send the one or the other, according as it may be required by the old or new name. One fluid-ounce contains nearly two grains of Opium and of benzoic acid, and about one grain and a quarter of camphor. In *doses* of f3j to f3iij, it is anodyne.

TINCTURA CANTHARIDES. D. This tincture is highly stimulating, acting with great energy upon the urinary organs; it therefore offers a resource in gleet, fluor albus, incontinence of urine, &c. it has also proved serviceable as a highly stimulating diuretic, in cases of *Hydrops Ovarii*. See *Form.* 116. *Dose*, ℥x to f3j, given in some demulcent infusion; it is likewise employed with advantage as a stimulating embrocation and rubefacient, in conjunction with soap or camphor liniment. Externally it has

* HUDSON'S PRESERVATIVE FOR THE TEETH AND GUMS. Equal parts of Tincture of Myrrh, Tincture of Bark, and Cinnamon water, to which are added Arquebusade and Gum Arabic.

GREENOUGH'S TINCTURE FOR THE TEETH. The following receipt is given on the authority of Mr. Grey. Of Bitter Almonds, 2 oz. Brazil Wood and Cassia Buds, equal parts, half an ounce; root of the Florentine Iris, 2 dr.: of Cochineal, Salt of Sorrel, and Alum, equal parts, one drachm; Rectified Spirit, 2 pints; Spirit of Horse Radish, half an ounce.

RUSPINI'S TINCTURE FOR THE TEETH. This consists of the root of the Florentine Iris, eight ounces: Cloves, one ounce; Rectified Spirit, two pints; Ambergris, one scruple.

† From *παραγορεω*, *lenio*, to assuage pain.

been used in the cure of Sinuses, and fistulous openings, in the proportion of three fluid-drachms to a pint of water.*

TINCTURA CAPSICI. L. It is an excellent stimulant. See *Capsici Baccæ*. Dose, ℥x to f3i.

TINCTURA CARDAMOMI COMPOSITA. L. An agreeable cordial, and adjunct to bitter infusions. See *Form.* 47, 51.† Dose, f3i to f3ij.

TINCTURA CASCARILLÆ. L.D. It is added with much effect to different stomachic infusions. See *Form.* 33, 39, 41. Dose, f3i to f3ij.

TINCTURA CATECHU. L.E.D. A warm and grateful astringent; very useful as an adjunct to cretaceous mixtures in diarrhœa, &c. See *Form.* 51, 52, 58. Dose, f3i to f3ij.

TINCTURA CINCIONÆ. L.E.D. Used as an adjunct to the decoction or infusion of the bark. See *Form.* 126, 127. Dose, f3j to f3ss. It should be preserved in a place which is not very cold; for a low temperature precipitates the Morphia; this inconvenience, however, is obviated by the addition of a little acetic acid, without diminishing the efficacy of the tincture.

TINCTURA CINCIONÆ COMPOSITA. This resembles the celebrated tincture of Huxham, and although it contains less cinchona than the simple tincture, yet from the addition of aromatics it is more grateful and stomachic. Dose, f3j to f3ss.

TINCTURA CINNAMOMI. L.D. See *Form.* 101.

TINCTURA CINNAMOMI COMPOSITA. L.E.D. As this is a combination of aromatics with cinnamon, it is more grateful and stomachic than the simple tincture. Dose, f3 to f3j.

TINCTURA CONII MACULATI. E. As *Concin* is perfectly soluble in spirit, this tincture constitutes a very elegant and efficient form for the exhibition of *Hemlock*; I have frequently experienced its effects, when added to febrifuge mixtures, with satisfaction. The London college has not hitherto admitted it into the list of tinctures, which is to be regretted.

TINCTURA CROCI. E.D. It has no medicinal use, independent of its colour.

TINCTURA DIGITALIS. L.E.D. It is a very useful form for the exhibition of this valuable plant. Dose, ℥x, cautiously increased. See *Digitalis Folia*, and *Form.* 32.

TINCTURA GENTIANÆ COMPOSITA. L.E. An elegant stomachic bitter, but less eligible as a remedy than the infusion. Dose, f3i—f3ij.

TINCTURA HELLEBORI NIGRI. This preparation was strongly advised by Dr. Mead, in uterine obstructions. Dose, ℥xxx to f3j. See *Hellebori Radix*.

TINCTURA HUMULI. L.E. It is supposed to possess the tonic and narcotic properties of the hop. Dose, f3ss to f3ij.

TINCTURA HYOSCYAMI. L. This is a much more powerful narcotic than the preceding tincture; and it is not liable to affect the head, nor to produce that disturbance in the biliary secretions which so inevitably follows the use of opium. Dose, f3ss to f3ij.

* MATTHEW'S INJECTION. This once celebrated remedy for *Fistula in Ano*, was nothing more than a diluted Tincture of *Cantharides*.

† SOLOMON'S BALM OF GILEAD. An aromatic tincture, of which *Cardamoms* form a leading ingredient, made with brandy. Some practitioners have asserted that *Cantharides* enter its composition.

TINCTURA JALAPÆ. L.E. As the activity of Jalap does not reside in any one principle, but depends upon the combination of its gum, extractive and resin, *proof spirit* is of course its appropriate solvent; and the resulting tincture is therefore an active purgative, but it is rarely administered except as an *adjuvant* to cathartic combinations. *Dose*, f3j to f3ss. See *Form.* 70, 76.

TINCTURA KINO. L.E.D. This is little less than a solution of *Tannin*; it is however less astringent than the tincture of *Catechu*. *Dose*, f3i to f3ij.

TINCTURA OPII. L.E.D. This is at once a most convenient and elegant form for the exhibition of opium; ℥xix contain one grain of opium. See *Opium*, and *Form.* 5, 7, 8, 20, 28, 52, 75, 76, 107, 110, 117, 127, 136, 156, 172. As an external application, when rubbed upon the skin it produces anodyne effects, and it is said that these effects are very much increased by combining it with acetic acid; an *acetate of morphia* is probably thus produced.

TINCTURA QUASSIÆ EXCELSÆ. E.D. The bitter principle of this root, *Quassin*, is completely extracted by *proof spirit*. *Dose*, f3j.

TINCTURA RHEI. L.E.D. Less purgative, but more astringent and aromatic than the infusion. That made with the *East Indian* variety, is of a deeper colour, with a tinge of brown. *Dose*, f3ss to f3j.

TINCTURA RHEI COMPOSITA. L. A cordial, used principally as an adjunct to saline purgatives. *Dose*, f3vj to f3j, to produce purgative effects; from f3j to f3ij, to act as a stomachic.

The *Edinburgh Pharmacopœia* directs two compound tinctures of *Rhubarb* for similar purposes, viz. *Tinct. Rhei et Aloes*; and *Tinct. Rhei et Gentianæ*.

TINCTURA SCILLÆ. L.E.D. *Dose*, ℥x to xxx. See *Form.* 65, 109, 139.

TINCTURA SENNÆ. L.E. *Dose*, f3ij to 3j. See *Form.* 70. *Dose*, f3ij to f3j.

TINCTURA SENNÆ COMPOSITA. E. In this tincture, the *Senna* is quickened by *Jalap*. *Dose*, f3ij to f3j.*

TINCTURA SURPENTARIÆ. L.E.D. *Dose*, f3ij to f3iij. It is principally employed as a stimulating adjunct to the infusion or decoction of *Cinchona*, in typhoid fevers. OFFICIAL PREP. *Tinct. Cincon. comp. L.* *Dose*, f3i to f3iij.

TINCTURA VALERIANÆ. L.D. It is only used as an adjunct to the infusion of *Valerian*.

TINCTURA VALERIANÆ AMMONIATA, L.D. This tincture is not more highly charged with the principles of the *Valerian* than the foregoing one, but as the ammonia corresponds with it in virtue, it is probably more powerful. *Dose*, f3i to f3ij. See *Form.* 23, 25.

TINCTURA ZINGIBERIS. L.D. A highly stimulating preparation. See *Form.* 33. *Dose*, f3ss to f3ij.

TINCTURA FERRI AMMONIATI. L.

As this is merely a spirituous solution of the *Ferrum Ammoniatum*, the

* **DAFFY'S ELIXIR.** This is the *Tinctura Sennæ Composita*, with the substitution of treacle for sugar-candy, and the addition of aniseeds and elecampane root. Different kinds of this nostrum are sold under the names of **DICEY'S DAFFY**, and **SWINTON'S DAFFY**; but they differ merely in some subordinate minutiae, or unimportant additions.

title of tincture is improperly applied to it; it seems moreover to be a very superfluous preparation.

TINCTURA FERRI MURIATIS. L.E.D.

QUALITIES. *Colour*, brownish yellow; *Taste*, styptic; *Odour*, very peculiar. **CHEMICAL COMPOSITION.** It is an alcoholic solution of muriate of iron; the iron being in the state of *per-oxide*. **INCOMPATIBLE SUBSTANCES.** *Alkalies* and their carbonates; the infusions of astringent vegetables; *mucilage of gum arabic*: by this latter substance it is precipitated in gelatinous flakes. **MED. USES.** It is one of the most active preparations of iron which we possess, and it moreover appears to exert a specific influence upon the urinary organs.* Mr. Cline informs us that ℥x, given every ten minutes, until some sensible effect is produced, afford in dysuria speedy relief; in hemorrhage from the bladder, kidneys, or uterus, it acts as a powerful styptic. See *Form.* 35, 60, 97, 114. Externally, it is very efficacious in destroying venereal warts, either used alone, or diluted with a small portion of water. *Dose*, ℥x to f3ss, or f3j.†

TORMENTILLÆ RADIX. L.E.D.

Tormentilla Officinalis.

Tormentil Root.

QUALITIES. This root is knotty, externally blackish, internally reddish; *Odour*, slightly aromatic; *Taste*, austere and styptic. **CHEMICAL COMPOSITION.** Its active matter is chiefly *Tannin*, and except galls and catechu, it appears to contain a larger proportion than any other vegetable astringent.‡ **SOLUBILITY.** Boiling water extracts all its virtues, as also does spirit. **INCOMPATIBLE SUBSTANCES.** *Solutions of Isinglass, the Salts of Iron; Alkalies and Alkaline Earths.* **MED. USES.** It has been chiefly used in diarrhœa, and it is very efficacious in that which is so frequently attended on Phthisis. Dr. Fordyce recommends its union with Ipecacuan, by which combination, he observes, we shall astringe the vessels of the intestines, and at the same time relax those of the skin. **FORMS OF EXHIBITION.** In substance, or in decoction made by boiling 3j of the root in oiss of water until reduced to oj. *Dose*, of the substance in powder, 3ss to 3j; of the above decoction f3j thrice a day. **OFFICIAL PREP.** *Pulv. Cret. Comp. L.*

TOXICODENDRI FOLIA. L.E.

(*Rhus Toxicodendron.*)

Sumach Leaves, or Poison Oak.

QUALITIES. Its leaves are inodorous, but have a sub-acrid taste. **CHEMICAL COMPOSITION.** Gallic acid, tannin, and a certain acrimonious mat-

* The following remarks, with which I have lately been favoured by Dr. Davy, appear interesting. "In the few cases which I have tried this remedy for the retention of urine, I have seen no good effects produced, until it excited nausea. For this purpose I have found it advantageous to give it in a little tepid water; upon chemical examination I could not discover that it ever passed off by the urine; the fæces, however, are uniformly coloured black by it, whence I conclude it must be evacuated through the bowels. In order to prevent its tendency to constipate the bowels, I have found it necessary to give some aperient, as castor oil, speedily after its exhibition." May not this latter circumstance explain the reason of his not having detected it in the urine? (See page 97.)

† DE LA MOTTE'S GOLDEN DROPS. An Æthereal solution of Iron.

‡ It has, for this reason, been substituted for oak bark in the tanning of leather.

ter, upon which the virtues of the plant depend, and which, according to Van Mons, is disengaged from the leaves in the state of gas during the night, or while they do not receive the direct rays of the sun. **MED. USES.** Dr. Alderson of Hull introduced the leaves of this plant to notice, in whose hands they proved successful in several cases of Paralysis; the same results however have not been obtained by other physicians; the plant has therefore fallen into disuse, and might, in deference to public opinion, be removed from the materia medica. When applied externally it has been known to produce an erysipelatous affection of the skin; a remarkable instance of which lately occurred at the Botanic garden at Chelsea, where a person merely rubbed his eye after having casually touched the plant in question.

TUSSILAGO. (*Tussilago Farfara*.—*Folia, Flores.*) *Coltsfoot*.*

This plant has been regarded as a powerful expectorant from the earliest ages; it is at present only valued for the mucilage which it affords; a handful of the leaves boiled in oij of water, until reduced to oij, will furnish, by the addition of a little sugar candy, a very grateful demulcent.

VALERIANÆ RADIX. L.E.D.

(*Valeriana Officinalis. Sylvestris.*)

Valerian Root.

QUALITIES. *Odour*, strong, peculiar, and unpleasant; *Taste*, warm, bitter, and sub-acrid. **CHEMICAL COMPOSITION.** Extractive, gum, resin, fecula, tannin, and a peculiar essential oil which seems to contain camphor, and on which its virtues probably depend. **SOLUBILITY.** Its active matter is extracted by boiling water, alcohol, and the solutions of the pure alkalies. **INCOMPATIBLE SUBSTANCES.** *The salts of iron.* **MED. USES.** It is antispasmodic, tonic, and emmenagogue; and it is highly beneficial in those diseases which appear to be connected with a morbid susceptibility of the nervous system, as in hysteria, hemicrania, and in some species of epilepsy; and it would appear that its virtues in such complaints may be frequently increased by combining it with cinchona. **FORMS OF EXHIBITION.** The form of powder is the most effectual, and next to this a strong tincture made with proof spirit; by decoction its powers are considerably impaired, and consequently the extract is an inefficient preparation. **Dose** of the powder ʒj to 3j; when the flavour disgusts, the addition of a small portion of *mace* or *cinnamon* will be found to disguise it. See *Form.* 25, 31, 38. **OFFICIAL PREPARATION.** *Infus. Valerian. D. Tinct. Valerian. L.D. Tinct. Valerian. ammoniat. L.D.* **ADULTERATIONS.** The roots of a species of *crowfoot* are sometimes mixed with those of valerian; they may be distinguished by a caustic taste on chewing them; the roots have also often a disagreeable smell from the urine of cats, who are allured and delighted by their odour; and they are sometimes inert, from not having been taken up at a proper season, or from not having been carefully preserved.

* **BRITISH HERB TOBACCO.** The basis of which is Coltsfoot; this appears to have had a very ancient origin, for the same plant was smoked through a reed in the days of Dioscorides, for the purpose of promoting expectoration, and was called by him *βρυιον*, from *βρῆ*, tussis, whence *Tussilago*.

ESSENCE OF COLTSFOOT. For an account of this nostrum, see page 315.

VERATRI RADIX. L.E. (Veratrum Album.)

HELLEBORUS ALBUS. D.

White Hellebore Root.

QUALITIES. *Odour*, strong and disagreeable; *Taste*, bitter, and very acrid; by drying, the odour is dissipated, and in this state it is found in the shops. **SOLUBILITY.** Its active principles are soluble in water, alcohol, and the alkalies. **CHEMICAL COMPOSITION.** Pelletier and Caven-
 tou have lately discovered in this vegetable a new alkaline principle, white, crystalline, and acrid, to which they have given the name of *Veratria*: it appears to exist in combination with gallic acid. **MED. USES.** The effects of this root are extremely violent and poisonous; the ancients employed it in various obstinate cases, but they generally regarded it as their last resource; it acts as a violent emetic and cathartic, producing bloody stools, great anxiety, tremors, and convulsions. Etmuller says, that the external application of the root to the abdomen will produce vomiting; and Schroeder observed the same phenomenon to take place in a case where it was used as a suppository, and its juice has been applied to the purpose of poisoning arrows; notwithstanding these effects however the veratrum has been very safely and successfully administered in cases of mania, epilepsy, lepra, and gout:* but the most ordinary use of white hellebore is as a local stimulant; as an adjunct to errhine powders; or in the form of decoction, as a lotion; or mixed with a lard, as an ointment in scabies,† and herpetic eruptions: great caution however is required in its application, for several authors affirm that, as an errhine, it has caused abortions, floodings which could not be restrained, and fatal hemorrhages from the nose. **DOSE**, gr. iij to v, obtunded by the addition of twelve times its weight of starch, a pinch of which may be taken for several successive evenings; for internal administration it ought not to exceed gr. ij. **OFFICIAL PREP.** *Decoct. Veratri. L. Tinct. Veratri albi. E. Unguent, Veratri. L. Unguent. Sulphur. comp. L.*

VINUM. *Wine.*

The term wine is more strictly and especially applied to express the fermented juice of the *Grape*, although it is generally used to denote that of any sub-acid fruit. The presence of *Tartar* is perhaps the circumstance by which the grape is most strongly distinguished from all the other sub-acid fruits that have been applied to the purpose of wine-making. The juice of the grape, moreover, contains within itself all the princi-

* In the first edition of this work, I stated the probability of the Veratrum being the active ingredient of the EAU MEDICINALE, and, upon the authority of Mr. James Moore, I inserted a formula for its preparation; subsequent enquiry, however, has shewn the fallacy of this opinion; but the fact of the medicinal efficacy of the Veratrum, when combined with opium, in the cure of gout, remains incontrovertible. One of the two Sweating Powders of WARD was a combination of the Veratrum and Opium. It is certainly a very singular coincidence, that recent experiments should have shewn that the active principle of Colchicum is identical with that which gives efficacy to the hellebore, viz. Gallate of Veratria. The fact itself offers a striking instance of medical experience having anticipated the discoveries of chemistry, while it affords a powerful case in support of the arguments which I have urged in the first part of this work, p. 55.

† EDINBURGH OINTMENT. The principal ingredients of which are the White Hellebore and Muriate of Ammonia.

ples essential to vinification, in such a proportion and state of balance as to enable it at once to undergo a regular and complete fermentation, whereas the juices of other fruits require artificial additions for this purpose; and the scientific application and due adjustment of these means, constitute the art of making wines.* It has been remarked, that all those wines that contain an excess of malic acid are of a bad quality, hence the grand defect that is necessarily inherent in the wines of this country, and which leads them to partake of the properties of cider, for in the place of the *tartaric*, the *malic acid* always predominates in native fruits.

The characteristic ingredient of all wines is *Alcohol*, and the quantity of this, and the condition or state of combination in which it exists, are the circumstances that include all the interesting and disputed points of medical inquiry. Daily experience convinces us that the same quantity of alcohol, applied to the stomach under the form of natural wine, and in a state of mixture with water, will produce very different effects upon the body, and to an extent which it is difficult to comprehend; it has, for instance, been demonstrated that Port, Madeira, and Sherry, contain from one-fourth to one-fifth their bulk of alcohol, so that a person who takes a bottle of either of them, will thus take nearly half a pint of alcohol, or almost a pint of pure brandy! and moreover that different wines, although of the same specific gravity, and consequently containing the same absolute proportion of spirit, will be found to vary very considerably in their intoxicating powers; no wonder then that such results should stagger the philosopher, who is naturally unwilling to accept any tests of difference from the nervous system, which elude the ordinary resources of analytical chemistry; the conclusion was therefore drawn, that alcohol must necessarily exist in wine in a far different condition from that in which we know it in a separate state, or in other words, that its elements only could exist in the vinous liquor, and that their union was determined, and consequently alcohol produced, by the action of distillation. That it was the *product*, and not the *educt* of distillation, was an opinion which originated with Rouelle, who asserted that alcohol was not completely formed, until the temperature was raised to the point of distillation; more lately the same doctrine was revived and promulgated by Fabbroni, in the memoirs of the Florentine Academy. Gay Lussac has, however, silenced the clamorous partisans of this theory, by separating the alcohol by distillation at the temperature of 66° *Fah.* and by the aid of a *vacuum*, it has since been effected at 56° : besides, it has been shewn that by precipitating the colouring matter and some of the other elements of the wine by *sub-acetate of lead*, and then saturating the clear liquor with *sub-carbonate of potass*, the alcohol may be completely separated without any elevation of temperature; and by this ingenious expedient Mr. Brande has been enabled to construct a table, exhibiting the proportions of combined alcohol which exist in the several kinds of wine: no doubt therefore can remain upon this subject, and the fact of the difference of effect, produced by the same bulk of alcohol, when presented to the stomach in different states of combination, adds another striking and instructive illustration to those already enumerated in the course of this work, of the extraordinary powers of chemical combination in modifying the activity of

* For an account of which the reader is referred to a most ingenious and interesting Essay by Dr. Macculloch, entitled "Remarks on the Art of making Wine, with suggestions for the application of its principles to the improvement of Domestic Wines."

substances upon the living system. In the present instance, the alcohol is so combined with the extractive matter of the wine, that it is probably incapable of exerting its full specific effects upon the stomach, before it becomes altered in its properties, or, in other words, *digested*; and this view of the subject may be fairly urged in explanation of the reason why the intoxicating effects of the same wine are so liable to vary in degree, in the same individual, from the peculiar state of his digestive organs at the time of its potation.* Hitherto we have only spoken of *pure* wine, but it is essential to state that the stronger wines of Spain, Portugal, and Sicily, are rendered marketable in this country by the addition of *Brandy*, and must consequently contain *uncombined* alcohol, the proportion of which however will not necessarily bear a ratio to the quantity added, because, at the period of its admixture, a renewed fermentation is produced by the scientific vintner, which will assimilate and combine a certain portion of the foreign spirit with the wine: this manipulation, in technical language, is called *fretting-in*. The free alcohol may, according to the experiments of Fabbroni, be immediately separated by saturating the vinous fluid with *sub-carbonate of potass*, while the combined portion will remain undisturbed: in ascertaining the fabrication and salubrity of a wine, this circumstance ought always to constitute a leading feature in the inquiry; and the tables of Mr. Brande would have been greatly enhanced in practical value, had the relative proportions of *uncombined* spirit been appreciated in his experiments, since it is to *this*, and not to the *combined* alcohol, that the injurious effects of wine are to be attributed. "It is well known," observes Dr. Macculloch, "that diseases of the liver are the most common, and the most formidable of those produced by the use of *ardent* spirits; it is equally certain that no such disorders follow the intemperate use of *pure* wine, however long indulged in: to the concealed and unwitting consumption of spirit, therefore, as contained in the wines commonly drunk in this country, is to be attributed the excessive prevalence of those hepatic affections which are comparatively little known to our continental neighbours." Thus much is certain, that our ordinary wines contain no alcohol, but what is disarmed of its virulence, by the prophylactic energies of combination.

The odour, or *bouquet*, and flavour which distinguish one wine from another, evidently depend upon some volatile and fugacious principle, soluble in alcohol; this in sweet and half fermented wines, is immediately derived from the fruit, as in those from the *Frontignan* and *Muscat* grapes; but in the more perfect wines, as in *Claret*, *Hermitage*, *Rivesaltes*, and *Burgundy*, it bears no resemblance to the natural flavour of the fruit, but is altogether the product of the vinous process; and in some wines it arises from the introduction of flavouring ingredients, as from almonds in *Madeira* wines, as well as in those of *Xeres* and *Saint Lucar*, and hence their well known nutty flavour. Among the ancients it was formerly, and in modern Greece it is to this day, the fashion to give a resinous flavour, by the introduction of *Turpentine* into the casks.† These

* This may also explain why bitters, under certain circumstances, have been found to counteract the effects of wine, as in the instance of the *Poculum Absinthiatum*, of which the ancients entertained so high an opinion. See page 71.

† "Resinata bibis vina, Falerna fugis."—Martial.

Pliny (lib: 14. c. 14.) mentions a Wine under the name of *Myrrhina*, which was so called on account of its being impregnated with *Myrrh*.

wines are supposed to assist digestion, to restrain ulcerous, and other morbid discharges, to provoke urine, and to strengthen the bowels; but Dioscorides also informs us that they were known to produce vertigo, pain in the head, and many evils not incidental to the same quantity of vinous liquor when free from such admixtures.*

Wines admit of being arranged into four classes.†

1. SWEET WINES; which contain the greatest proportion of extractive and saccharine matter, and generally the least ardent spirit, though this is often rather disguised than absent; as in these wines a proportion of sugar has remained unchanged during the process of vinification, they must be considered as the results of an imperfect fermentation, and are in fact mixtures of wine and sugar; accordingly, whatever arrests the progress of fermentation, must have a tendency to produce a sweet wine; thus boiling the *must* or drying the fruit will, by partially separating the natural leaven and dissipating the water occasion such a result as is exemplified by the manufacture of the wines of Cyprus, the *vino cotto* of the Italians, and the *vinum coctum* of the ancients, by that of *Frontignac*, the rich and luscious wines of *Canary*, the celebrated *Tokay*, *Vino Tinto* (Trent of Hungary) the Italian *Montefiascone*, the Persian *Schiras*, the *Malmsey wines* of *Candia*, *Chio*, *Lesbos*, and *Tenedos*, and those of the other islands of the Archipelago. The wines of the ancients, as Chaptal observes, were so concentrated by boiling, that they rather deserve the name of extracts of syrups, than that of wines; they must have been very sweet, and but little fermented; apparently, to remedy this, they were kept for a great length of time; according to Aristotle and Galen, seven years was the shortest period necessary for keeping wine before it was fit to drink, but wines of a century old were not uncommon at the tables of the luxurious

This custom explains the origin and meaning of the *Thyrus* of Bacchus, which appears to have been a spear entwined with leaves or a fillet, and surmounted with a Fir cone; thus,



* See Dioscorides, lib. 5, c. 35, 36, 37, 38, 39.

† An interesting and highly embellished work upon the subject of Wines, has lately been published by Dr. Henderson.

citizens of ancient Rome, and Horace boasts of his drinking *Falernian*, born as it were with him, or which reckoned its age from the same consuls.*

2. SPARKLING OR EFFERVESCING WINES, as Champagne, are indebted for their characteristic properties to the presence of carbonic acid; they rapidly intoxicate, in consequence of the alcohol, which is suspended in, or combined with the gas, being thus applied in a sudden and very divided state to a large extent of nervous surface; for the same reason, their effects are as transitory as they are sudden.†

3. DRY AND LIGHT. These are exemplified by the more esteemed German wines, *Hock*, *Rhenish*, *Mayne*, *Moselle*, *Necker*, and *Elsass*, and those highly flavoured wines, *Burgundy*, *Claret*, *Hermitage*, &c. They contain a very inconsiderable degree of ardent spirit, and combine with it the effect of an acid.

4. DRY AND STRONG, as *Madeira*, *Port*, *Sherry*, &c. The name *Sec*, corruptly written *Sack*, signifies dry; the *Sec* wine prepared at Xeres‡ in Spain, is called, according to our orthography, *Sherris* or *Sherry*. In the manufacture of Sherry, *Lime* § is added to the grapes, a circumstance, observes Dr. Macculloch, apparently conducive to its well known dry quality, and which probably acts by neutralizing a portion of *malic* or *tartaric* acid.

* "O Nata mecum consule Manlio.—Od: xxi. Lib: 3.

The Odes of Horace abound with manifestations of the same taste, thus,

"I pete———"

Et Cadum Marsi memorem duelli."—Od: xiv. Lib: 3.

Here Horace sends his Slave for a cask of the wine on which the Marian war was recorded, and which must therefore have been sixty-eight years old.

In ode xxviii. book 3, we find him calling for

"Bibuli Consulis amphoram."

Now, as the poet was born in the Consulate of Manlius, as above stated, which happened A. U. C. 688, and Bibulus was consul in 694, the wine must have been hoarded from the time Horace was six years of age.

Wine however might, according to the opinion of our Poet, be too old; he terms wine of this description "Languidiora Vina," and Plautus compares old wine which has lost its relish and strength, to a man who has lost his teeth by age, *Vinum vetustate edentulum*."

Nestor's wine was eleven years old. Od. γ. 390.

The Romans had their wine-cellars at the top of their houses; thus Horace,

"descende Corvino jubente."

The object of such an arrangement was that the wine might ripen sooner by the smoke, for their fires were made in the middle of their rooms, with an opening above to let out the smoke, which is described as rolling to the top of the house, in the Eleventh Ode of the Fourth Book.

"Rotantes vertice fumum."

† From the noxious effects which some persons experience from potations of Champagne, it has been conjectured that this wine must possess some narcotic principle like that which exists in many species of Fungi. This, however, is extremely improbable.

‡ *Ξηρος* signifies dry. This is a curious coincidence.

§ The sack of Shakespeare was probably Sherry; a conjecture which receives additional strength from the following passage:

Falstaff.—"You rogue, here's *lime* in this Sack too: There is nothing but roguery to be found in villainous man: yet a coward is worse than a cup of sack with lime in it; a villainous coward."

Huldrick Van Speagle, in his "Famous Historie of most Drink," says "Sack is no hypocrite, for any man who knows what an Anagram is will confesse that it is contained within the littoral letters and limmits of its own name, which is to say, CASK, i. e. SACK." See Taylor's Translation of the "Work of the painful and industrious Huldricke Van Speagle, a grammatical Brewer of Lubeck. A. D. 1637."

By the adulteration and medication of wines, three principal objects are attempted, viz, 1. *To give them strength*, which is effected by adding any ardent spirit ; but the wine is slowly decomposed by it. 2. *To perfect or change their colour*. It is very usual to change *white* wines, when they have grown brown or rough, into *red* wines, by means of sloes, or other colouring matter. 3. *To lessen or remove their acidity*. It is well known that lead in different forms has frequently been employed for this purpose ; the practice however is attended with most dangerous consequences ; but which Dr. Macculloch is inclined to believe has been over-rated, since the compounds which this metal forms with the tartaric and malic acids are insoluble ; but against this argument, the decisive results of experience may be opposed, and Fourcroy conceived that by the addition of Vinegar, a soluble triple salt, an *aceto-tartrate of lead*, was produced. The fraud may be easily detected by the test* invented by Dr. Hahnemann. The ancients, it appears, were acquainted with this property in lead, for, according to Pliny, the Greeks and Romans improved the quality of their wines by immersing a plate of lead in them.† Wine, as a pharmaceutical agent, has been employed to extract several of the principles of vegetables, and to dissolve certain mineral bodies : as a solvent, however, it is liable to many serious objections, as inequality of strength and uncertainty of composition ; thus sound and perfectly fermented dry wine, as *Sherry*, is frequently unable to dissolve iron, while tartarized antimony is instantly decomposed by every other. As a menstruum, to obtain an extract, it is quite inadmissible on account of the residuum which it leaves by evaporation. From such considerations the London College have at length substituted a weak spirit for the wine formerly employed, although the term "*Vinum*" is still retained in the Pharmacopœia, to obviate those embarrassments which must ever attend a change of name, with a corresponding change of properties. The Committee were fully prepared to expect the captious objections which are urged against this measure, but as the name is *chemically* and *medicinally* correct, the etymologist may be fairly allowed to enjoy his assumed triumph without molestation.

VINUM ALOES. L.E.D. This solution contains all the virtues of the Aloes, and is more agreeable than the tincture. It is a warm stomachic in doses of fʒj to fʒij, and a stimulating purgative when given from fʒj—fʒij.

By referring to the Pharmacopœia, it will be perceived that alcoholic menstrea of different strengths, have been employed for the different preparations. The proportions were deduced from careful experiments, and are adapted to the composition of the substances which the spirit is intended to dissolve : *e. g.*

* Expose equal parts of sulphur and powdered oyster shells to a white heat for fifteen minutes, and when cold, add an equal quantity of cream of tartar ; these are to be put into a strong bottle with common water to boil for an hour ; and the solution is afterwards to be decanted into ounce phials, adding 20 drops of muriatic acid to each. This liquor will precipitate the less quantity of lead from wines in a very sensible black precipitate. As iron might be accidentally contained in the wine, the muriatic acid is added to prevent its precipitation.

† Lead will not only correct the acidity of wines, but remove the rancidity of oils ; a property which is well known to Painters, and which affords an expedient for making an inferior oil pass for a good one.

	Proof Spirit.	Water.
Vinum Aloes	1 part	1.
— Antimonii Tartariz :	1 ditto*	1.
— Colchici	1 ditto	2.
— Ferri	1 ditto	1½.
— Ipecacuanhæ	1 ditto	1½.
— Opii	1 ditto	1½.
— Veratri.	1 ditto	1½.

VINUM ANTIMONII TARTARIZATI. L.

LIQUOR ANTIMONII TARTARIZATI. P.L. 1809.

Antimonial Wine.

During the period that I was Censor of the College, I took considerable trouble, in conjunction with my colleagues, to ascertain the state in which this preparation was to be generally met with in the wholesale and retail shops of the metropolis. We were satisfied, during our official visitations, that where *sound* Sherry wine had been employed as a solvent, an efficient and permanent solution was obtained, and that no precipitation of Antimony took place, the sediment which occurred being merely *Tartrate of Lime*, an incidental impurity derived from the *Cream of Tartar* : but in a majority of instances an inferior wine of British manufacture was substituted, in which case the Antimonial Oxyd was universally found in a copious precipitate, in combination with vegetable extractive matter ; and I have even seen this decomposition so complete, that the supernatant liquor would not yield any trace of the antimonial salt. This report has been confirmed by successive Censors, and the College have accordingly endeavoured to remedy the evil, by superseding the use of wine altogether, and of introducing a spirit of equivalent strength. The virtues of this solution are those detailed under the history of *Antimonium Tartarizatum* ; of which two grains are contained in every fluid-ounce of the preparation. The Medicinal Dynameter will shew the proportion of salt in any other given quantity. Dose, ℥x to f3j, in any suitable vehicle, repeated every three or four hours, in which case it acts as a diaphoretic. As an emetic, it may be given to infants in the dose of a tea-spoonful, every ten minutes, until the desired effect is produced. See *Form* : 69, and 117.†

VINUM COLCHICI. This medicated wine is made as follows : Take of the recent bulb of the Colchicum, sliced and bruised, lbj. ; of Proof Spirit, f3iv ; of water f3viii ; let them infuse for fourteen days, and filter for use. There is perhaps no form better calculated to ensure the medical effects of the plant than the one we are now considering. Its dose may be stated to be from ℥xx to f3iss. The virtues of Colchicum have been already noticed, see *Colchici Radix*.

VINUM FERRI. L.D. When prepared according to the London College

* The quantity of rectified spirit and water ordered will be found on admixture to produce a spirit nearly of the above strength.

† WARD'S RED DROP. A strong vinous solution of Tartarized Antimony.

(P.L. 1809.) each pint is stated to contain 22 grains of the red Oxide of Iron; the strength however must in such a case depend upon the quantity of *tartar* contained in the wine. Very dry Sherry is frequently incapable of acting upon the iron until a small proportion of Cream of Tartar be added to it; would it not therefore be advisable to direct at once a given portion of *ferrum tartarizatum* to be dissolved in wine? The Dublin formula is more eligible than that of the former London Pharmacopœia, since it directs the use of *Rhenish* wine instead of Sherry as a solvent, and iron *wire* in preference to iron *filings*; this last circumstance is important, for the purest iron can only be drawn, and this is most easily acted upon by the super-tartrate of potass. These observations are offered to those who still prefer to make the preparation with wine. They can have no relation to the present *Vinum Ferri* of London College, which is prepared with a weak spirit, and which contains tartrate of potass and iron, with an excess of super-tartrate which supplies the place of the acid contained in the wine, and ensures the solution of the tartarized iron in the Spirit. According to the experiments of Mr. Phillips, which I have every reason to believe accurate, the present preparation contains less peroxide of iron than the former did; it will be seen by the Dynameter that f3j contains exactly one grain, which is exactly equivalent to five grains of Tartarized Iron, whereas an equal quantity of the former wine held in solution $1\frac{4}{10}$ gr. which was equivalent to seven grains of the salt. *Med. Uses.* It is the least unpleasant of all the preparations of iron, and its medicinal activity is supported by the testimony of ages, for it is one of the oldest preparations with which we are acquainted. *Dose*, f3ij to f3ss.

VINUM IPECACUANHÆ. L.E.D. The virtues of this root are completely extracted by dilute spirit. *Dose* as an emetic from f3ij to f3ss: as a diaphoretic from ℥xx to xl. See *Form.* 63, 137.

VINUM OPII. L.E.* This is a spirituous solution of the *extract* of Opium combined with various aromatics, which are supposed to modify the effects of the opium, while by the substitution of the extract for the crude opium, it is considered as being less likely to disturb the nervous system. I submit whether the views offered under the history of Wine, respecting the relative effects of combined and uncombined Alcohol, might not lead us, by analogy, to prepare a more efficient *vinum opii*, and a preparation less likely to affect the stomach: by adding the opium to the wine during its state of fermentation, it would enter into intimate union with its elements, in the same way that brandy is incorporated by the technical manipulation of *fretting-in*: this suggestion is also sanctioned by the generally acknowledged superiority of the *Black Drop*, which I have little doubt is indebted for its peculiar efficacy to the state of combination in which the *acetate of morphia* exists in the vinous menstruum. The preparation, when made with wine, as directed in the late Pharmacopœia, is nearly analogous to the celebrated *Liquid Laudanum*† of Syden-

* FORD'S LAUDANUM. This is similar to the *Vinum Opii* of the present Pharmacopœia.

† Laudanum. Paracelsus first bestowed the term Laudanum upon a preparation of Opium, a *LAUDATA ejus efficacia, LAUDATUM medicamentum*.

ham, and its degree of narcotic power is nearly the same as that of the ordinary tincture, as may be seen by referring to the *Medicinal Dynameter*.

VINUM VERATRI. L. Since the discovery of the real nature of the *Eau Medicinale*, this preparation has fallen into comparative disuse, and might have been removed, as we have now introduced the *Vinum Colchici*. It is however a singular circumstance that both these preparations should owe their medicinal powers to the same elementary principle, viz. *Veratria*; and as some practitioners are still addicted to its use, the Committee agreed to let it remain.

ULMI CORTEX. L.E.D. (*Ulmus Campestris*).

Elm Bark.

QUALITIES. *Odour*, none; *Taste*, slightly bitter and mucilaginous. **CHEMICAL COMPOSITION.** Gum, extractive, gallic acid, and super-tartrate of potass. **SOLUBILITY.** Water is its appropriate solvent. **MED. USES.** It has been commended in herpetic eruptions, but in the hands of Dr. Willan and others it has not proved successful; it is one of those articles that might be discarded from our Pharmacopœia with much propriety. **OFFICIAL PREP.** *Decoct: Ulmi. L.D.*

UNGUENTA. L.E.D. *Ointments.*

These are unctuous substances, analogous to *Cerates* except in consistence, which is much less firm, and scarcely exceeds that of butter: formerly ointments were numerous and complicated in their composition, and surgeons adapted with much technical formality different ointments to answer different indications: this practice however has undergone a very judicious reform, and it is now well understood that *in general* all that is required in an ointment is a suitable tenacity and consistence, to keep the parts to which it may be applied soft and easy, and at the same time to exclude from them the atmospheric air; in some cases, however, these simple compositions are made the *vehicles* of more active remedies, as in the following preparations, viz.

UNGUENTUM CANTHARIDIS. L. As the active ingredient in this ointment is derived from an infusion of the Cantharides, it is extremely mild, and frequently inefficacious. The *ceratum cantharidis* furnishes a more certain application.

UNGUENTUM ELEMI COMPOSITUM. L. The elemi and turpentine in this ointment, render it stimulant and digestive.

UNGUENTUM HYDRARGYRI FORTIUS. L. The precise nature* of this compound does not appear to have been known until the late researches†

* According to the experiments of M. Vogel, (*Annales de Chimie*, t. lxiv. p. 220.) this ointment is nothing more than metallic mercury mixed with grease, the division of which has been carried to such an extent as to impart a blackish colour to the mixture.

† It is to be hoped that a quantity of the ointment will be prepared according to these views, and be submitted to a more extended series of experiments. The oxide may be procured by decomposing Calomel by a solution of pure potass, or by pouring a solution of the nitrate of mercury into a caustic alkaline solution; this oxide should be at first triturated with a little lard, in the cold, to make the penetration complete, taking care that the lard be quite free from common salt, or else Calomel will be the ultimate result: the mixture is then to be submitted to the ac-

of Mr. Donovan, (*Annals of Philosophy*, November, 1819,) which promise to lead to a more uniform, efficacious, and economical mode of preparing it; for they* shew that in the officinal ointment, the mercury exists in two different conditions, -- in the state of metal, *mechanically mixed*, as asserted by Vogel, and in that of an oxide, *chemically combined* with the lard, and that the medicinal activity of the ointment exclusively resides in this latter portion, the presence of metallic mercury not only being useless but injurious, by obstructing the absorption of the active compound of the oxide. Mr. Donovan accordingly formed a direct chemical combination, by continually agitating together lard and black oxide of mercury at the temperature of 350° *Fah* : for two hours. At the end of the process it appeared that every ounce of lard had dissolved, and combined with 21 grains of oxide; and from the trials which have been made respecting its activity, it would seem to be as efficient as the officinal ointment, and moreover that it may be introduced by inunction in one third of the time. The investigation is highly important, for it not only offers the means of preparing a mercurial ointment more economically, but one more active and manageable, and less liable to that want of uniformity in strength, which must always attend a preparation in which so much labour is required for its completion; for independent of that variation in strength which will arise from imperfect triture, it is by no means an uncommon practice to use chemical means, which are not admissible, to facilitate the process, such as the addition of *Sulphur*, which is found to abridge very considerably the labour requisite for the extinction of the mercury, but it converts a portion of the metal into a *Sulphuret*, and diminishes the power of the unguent. There is however a method of facilitating the process, which is not liable to any apparent objection, but the theory of its operation is obscure; it consists in adding to the half-prepared ointment a portion of that which has been long kept; which appears to act as a *leaven* to the whole mass.

The following table exhibits the relative quantity of mercury contained in each of the different ointments directed by the British Pharmacopœiæ, and in that prepared according to the process of Donovan.

One drachm	{ stronger ointment contains of Mercury, 30 grs.
of the Lond :	{ weaker ointment 10 —
of the Edinb :	{ common ointment 12 —
of the Dub :	{ stronger ointment 30 —
	{ weaker ointment 20 —
of that prepared according to Donovan	2½ —

Mercurial ointment furnishes the most prompt, and least exceptionable

tion of heat, and it is very important to attend to the necessary temperature, for at 212° the oxide and lard will not unite, at 600° the oxide will be decomposed and the mercury volatilized, at 500° and 400° the oxide is partially decomposed, some red oxide being formed and mercury reduced; the proper temperature is between 300° and 320° , at which it should be maintained for an hour, and the ointment should be stirred until cold.

* Four ounces, troy, of mercurial ointment, prepared six months before, were kept at 212° , when it separated into two distinct strata, viz. the upper one which was light grey, and extremely active as a medicine, and the under one, which upon being triturated with magnesia, yielded a large proportion of metallic mercury, and which was not found to possess any activity.

mode of impregnating the system. The external method of administering mercury, says Mr. John Hunter, is always preferable to the internal, because the skin is not nearly so essential to life as the stomach, and therefore is capable in itself of bearing much more than the stomach. The inunction is generally performed by rubbing 3ss to 3j on some part of the body where the cuticle is thin, generally on the inside of the thigh, except perhaps in cases of chronic hepatitis, when it is more usually applied to the region of the liver, care being taken that the friction is continued until every particle of the ointment disappears; and for obvious reasons, the operation ought if practicable to be performed by the patient himself. Where it has been an object to saturate the system with mercury as quick as possible, I have witnessed the advantage of confining, by means of slips of bladder, a drachm of mercurial ointment in each axilla, in addition to the mercurial friction. Camphor, turpentine, and other stimulants, have been sometimes added to the ointment, with a view of promoting its absorption; this however is an erroneous practice, since these acrid ingredients soon produce pustules on the skin, which prevent the continuance of the friction; the warm bath is a more certain and less objectionable *adjuvant*, many practitioners therefore advise the body to be immersed in a warm bath, once and again, before the course is commenced, and to repeat it once or twice a week during its continuance; the length of time to be employed in a course of mercury, and the quantity to be given, are circumstances that must in every case be left to the discretion of the practitioner. Mercury, when introduced into the body, acts as a powerful stimulant, and pervades every part of the system; hence it is the most powerful evacuant belonging to the *Materia Medica*; from its stimulant operation, exerted directly or indirectly, we are able to explain its utility in the cure of disease, and it may be made to act according to management and circumstances, as a tonic, antispasmodic, diuretic, cathartic, sialogogue, emmenagogue, or alterative, but its most important operation is that displayed in removing the diseases induced by the syphilitic poison, although its *modus operandi* is still buried amongst the many other arcana of physic. The mode of directing and controlling the influence of mercury in the cure of the venereal disease is now very generally understood, and it is to be hoped that a full confidence in its anti-syphilitic powers is as universally maintained, in spite of the late opinions which tended to depreciate its value and to question its necessity; there is however no advantage to be gained, as was once imagined, by exciting profused salivation. On its next important application, that of curing chronic affections of the liver and dropsy, a remark which has been suggested to me by the results of practice, may not be unacceptable. I think I have generally observed, that when the remedy has been pushed to such an extent as to excite the salivary glands to excessive secretion, the urinary organs cease to participate in its stimulating action, and *visè versa*, for the mouth is rarely affected when the mercury runs off by the kidneys; this may suggest a precaution of some practical moment in the treatment of dropsy, and it will be generally judicious to accompany the administration of this metal with certain diuretics, in order to direct its operation to the kidneys;* and it would seem, that for such an object those diu-

* Whenever it is our object to direct the mercurial impression to any particular organ, we should if possible rouse its excitability by some specific stimulus. An ex-

retic medicines should be preferred that act *primarily* on the organs, as alkalies and their combinations, squill, &c. : the success of such a plan of treatment will also depend greatly upon the exact period at which these remedies are administered ; it will for instance be right to wait until the system is, to a certain degree, under mercurial influence. It is hardly necessary to observe, that if the mercury runs off by the bowels, we shall be deprived of all, or of a great share of, the benefit to be expected. In certain cases, the lymphatic vessels seem to resist the admittance of mercury, and to refuse the conveyance of it to the general circulation : I have already thrown out some vague hints upon the subject, in the first part of this work (p. 160), and I must refer the reader to some farther remarks, which I apprehend bear upon this question, under the following article.

UNGUENTUM OXIDI HYDRARGYRI CINEREI. E. This consists of a mixture of *one part* of grey oxide of mercury, and *three parts* of axunge : it was reasonable to suppose, *a priori*, that as the whole of the mercury in this ointment is oxidized, its adoption would supersede the necessity of the labour required for the preparation of the common mercurial ointment, and at the same time afford a combination of equal if not superior efficacy ; but experience has not justified the conclusion, for it has been found to possess little or no activity ; the consideration of it is therefore introduced into this work, not on account of its utility, but as an object upon which I may pause with advantage, to offer those observations which its history is so well calculated to call forth and illustrate. The circumstance which renders this preparation inert, will now receive a satisfactory explanation from the experiments of Mr. Donovan, as related in the preceding article ; in short, it is a *mechanical mixture* instead of a *chemical combination* ; and I beg again to urge the importance of this distinction, and to offer the present example as a farther illustration of the views I have already submitted upon the subject. By subjecting this ointment for some hours to a heat of 300°, it would without doubt become an active preparation. It is probable that the lymphatics offer less resistance to the ingress of a mineral body into the system when it is presented to them in combination with some animal substance, which must alone be regarded as their peculiar stimulus, and the only matter which they are destined perpetually to receive and convey ; for the same physiological reason, the lacteals may probably take up iron with greater readiness when in combination with vegetable matter, than when introduced into the stomach in the more purely mineral form.

UNGUENTUM HYDRARGYRI MITIUS. L. This weaker preparation is sometimes preferred, as it irritates the skin less ; it is however principally used as a topical dressing to venereal sores, and as an application to kill vermin on the body.

UNGUENTUM HYDRARGYRI NITRATIS. L.E.D. vulgo *Citrine Ointment*. It is stimulant, detergent, and alterative ; when diluted with an equal quantity of simple ointment or almond oil, it may be almost regarded as

ception, however, to this doctrine would seem to offer itself in the fact, that children at the period of dentition are not readily salivated : *a priori*, we should have certainly supposed that a predisposition to a flux of saliva, would have produced a contrary effect. As it is, we can only conclude that those organs are not disposed to take on any action that may be incompatible with, or adverse to, that of dentition.

a specific in ophthalmia tarsi, smeared upon the cilia every night at bedtime.

UNGUENTUM HYDRARGYRI NITRICO-OXYDI. L. An excellent stimulant application, well adapted for giving energy to indolent ulcers. If mixed any ointment containing resin, it loses its red colour, passing through olive green to black, which depends upon the conversion of the red into black oxide of mercury.

UNGUENTUM HYDRARGYRI PRÆCIPITATI ALBI. L. Stimulant and detergent. It is said to be very efficacious in certain inveterate forms of the Itch. With the addition of Carbonate of Potass, it has been much extolled in various cutaneous affections.*

UNGUENTUM PICIS LIQUIDÆ. L.E.D. *Tar Ointment.* This ointment has been much extolled for the removal of tetter, and for the cure of tinea capitis.

UNGUENTUM RESINÆ NIGRÆ. L. olim, *Ung. Basilicum † nigrum.* Digestive stimulant.

UNGUENTUM SAMBUCL. L.D. It possesses no advantage over the simple ointment.

UNGUENTUM SULPHURIS. L.E.D. This ointment is a mechanical mixture of Lard and Sulphur, although it would appear that a small proportion of the latter exists also in a state of chemical combination. **MED. USES.** A specific in the itch. Dr. Bateman proposes a combination, equally efficacious, but which has not the same disagreeable smell; viz. "Take of sub-carbonate of potass, *half an ounce*; rose water, *one ounce*; red sulphurate of mercury, *one drachm*; essential oil of Bergamot, *half a fluid-drachm*; sublimed sulphur, hog's lard, of each *eleven ounces*. Mix them." Jasser's Ointment also, as altered in the Prussian Pharmacopœia, is an excellent application in Psora, viz. *Rx Sulphur: Sublim: 3ij, Zinci Sulphat: 3ij, Ol: Lauri, et Arung. q, s, ut fiat Unguentum.*

UNGUENTUM SULPHURIS COMPOSITUM. L. More stimulating than the simple ointment, from the addition of white hellebore; it is however frequently found to excite too much irritation.

UNGUENTUM VERATRI. L.D. It is used for the cure of scabies, but is less certain than the ointment of sulphur.

UNGUENTUM ZINCI. L.E.D. Astringent and stimulant; very beneficial in some species of ophthalmia, smeared upon the tarsi, every night.

Very efficient preparations may be also constructed by adding together equal weights of lard and narcotic vegetable powders, as those of *Conium*, *Digitalis*, *Belladonna*, &c.

The addition of a small quantity of powdered white sugar will frequently prevent ointments becoming rancid.

* The Unguentum Werholfii, so long celebrated on the Continent, was a combination of this kind.

† Basilicon, i. e. the *Royal Ointment*.

BAILEY'S ITCH OINTMENT. This is a very complicated combination; containing Nitre, Alum, Sulphate of Zinc, and Cinnabar, made into an ointment with Olive oil and Lard, and perfumed with the essential oils of Anise Seeds, Origanum, and Lavender; and coloured with Alkanet root.

The Indians use an ointment in inveterate itch, which is said to prove very successful, and consists of finely powdered *Cocculus Indicus* mixed with a little warm Castor oil.

UVÆ URSI FOLIA. L.E.D. (Arbutus Uva Ursi.)

*Uva Ursi, Bear-berry, or Trailing Arbutus.**Bear's Whortle-berry, Wild Cranberry, &c.*

QUALITIES. *Odour*, slight, resembling that of hyson tea; *Taste*, bitterish, and sub-astringent. **CHEMICAL COMPOSITION.** Tannin, mucilage, gallic acid, extractive, resin, and traces of lime. **SOLUBILITY.** Both water and alcohol extract its virtues. **MED. USES.** The ancients employed it on account of its astringency, the moderns, however, have exhibited it for various diseases, more especially for those affecting the bladder and urinary organs, and, it would seem, without any theory respecting its *modus operandi*: but it has at length fallen into disrepute, and probably with justice; it occasionally renders the urine of a blackish colour, a fact which is not easily to be explained. When it is administered, the form of powder is preferred, and in doses from ℥j to ʒj. The leaves of the *Vaccinium Vitis Idæa* (Red WhortleBerry,) are sometimes substituted for those of *Uvæ Ursi*: but they may be easily distinguished; *botanically*, by the net work appearance of their veins above, and by their dots underneath; *chemically*, by their infusion neither precipitating the solution of isinglass, nor that of sulphate of iron.

ZINCI OXYDUM. L.E.D.

Oxide of Zinc.

This is occasionally used internally as a tonic, and may be exhibited in the form of pill. It is however principally employed externally, as a mild but efficient astringent; viz. *Ung: Zinci*. **ADULTERATIONS.** Dr. Roloff of Magdeburgh has lately discovered the casual presence of *Arsenic** in this oxide; by boiling the substance in distilled water, and assaying the solution with the ammoniaco-nitrate of silver, its presence may be instantly recognized; *Chalk* may be detected by sulphuric acid, exciting an effervescence; and *White Lead*, by its forming an insoluble sulphate of lead. It ought to be volatile.

ZINCI SULPHAS. L.E.D.

Sulphate of Zinc, olim, White Vitriol.

QUALITIES. *Form*, crystals, which are four-sided prisms, terminated by four-sided pyramids; they are slightly efflorescent; *Taste*, styptic, metallic, and slightly acidulous. **CHEMICAL COMPOSITION.** One proportional of oxide, and one proportional of acid; its crystals contain seven proportionals of water. **SOLUBILITY.** It is soluble in 2.5 times its weight of water at 60°, and in less than its own weight of boiling water, but is quite insoluble in alcohol. **INCOMPATIBLE SUBSTANCES.** *Alkalies; earths; hydro-sulphurets; astringent vegetable infusions; Milk.* **MED. USES.** Tonic, astringent, and, in large doses emetic, (*Form. 66.*) As an emetic it ope-

* I have been lately informed by a practical chemist, that he has occasionally found this hydrogen, when produced by zinc and dilute acid, to contain a portion of Arsenuretted hydrogen; a fact which confirms the assertion of Roloff.

rates directly, and offers therefore a prompt resource in cases of poison, or where an immediate discharge from the stomach is required; it appears to differ from most remedies of this nature, in not proving diaphoretic in similar doses: in spasmodic* coughs it is administered with the best effects, especially when combined with camphor or myrrh, (*Form.* 59 :) in affections of the chest attended with inordinate secretion, I have witnessed much benefit from its exhibition, particularly when presented in the form of lozenge; and, when dissolved in water, in the proportion of grs. ij to fʒj, it forms a useful injection in flour albus, &c; in small doses its internal exhibition is also useful in Leucorrhæa. When combined with opium it is well calculated to obviate that atony, and those frequent discharges of fæces, without pain, that take place in the protracted stages of dysentery. As an external application it is very generally employed in the proportion of grs. x to eight fluid-ounces of water. The supposed ill effects consequent on the application of preparations of lead to a great surface, have determined some practitioners to substitute in their place, solutions of sulphate of zinc, but not with the same effect; for to that very property, which may occasionally render saturnine lotions dangerous, is their virtue to be attributed; see *Liquor Plumbi Sub-acetatis*. Dose, as an emetic from grs. x. to ʒss—as a tonic, and astringent, from grs. j to ij. OFFICIAL PREP. *Liquor*: Alum: comp. L. (B) *Solutio Sulphatis Zinci*. E. *Solutio Acetatis Zinci*. E. (I). *Tinct*: Acetatis Zinci. D. (I). ADULTERATIONS. The white vitriol of commerce ought never to be used in medicine, without previous purification, since it generally contains the sulphates of copper and iron.

ZINGIBERIS RADIX. L.E.D. (Zingiber Officinale.)

Ginger.

CHEMICAL COMPOSITION. Volatile oil, fecula, and resino-extractive matter; on the first of these principles its well known flavour and odour depend; but its pungency resides in the last. SOLUBILITY. Water, alcohol, and æther, extract its virtues. MED. USES. It is highly stimulant, and is therefore frequently beneficial in flatulant cholic, dyspepsia, and gout: it is however more generally employed as an adjunct to other remedies, to promote their efficacy or to correct their operation, (see *Form.* 92, 94, 112, 153,) and it is found that it does not produce the ill effects of those spices, whose virtues reside in an acrid oil. Dose, of the powders grs. x to ʒj. OFFICIAL PREP. *Syrup*: Zingib: L.E.D. *Syrup*: Rhamni: L. (E.) *Tinct*: Zingib: L.D.† *Tinct*: Cinnamom:

* The various quack remedies advertised for the cure of the whooping cough are either Opiates, or medicines composed of sulphate of zinc. The nostrum sold under the name of Anti-per-tussis, contains this metallic salt as its principal ingredient.

† OXLEY'S CONCENTRATED ESSENCE OF JAMAICA GINGER.—A mere solution of Ginger in Rectified spirit.

GINGER BEER POWDERS.—White sugar. ʒj ʒij, ginger grs. v. sub-carbonate of soda grs. xxvj, in blue paper. Tartaric acid grs. xxx, in each white paper. These proportions are directed for half a pint of water.

GINGER BEER. The following is the receipt by which this popular beverage is prepared. Take of lump sugar half a pound; of cream of tartar half an ounce; Bruised Ginger an ounce; boiling water one gallon. Ferment for twenty-four hours with yeast.

comp : L. (**B**) *Acid. Sulphuric* : aromat : E. *Confectio Opii*. L. *Confectio Scammon* : L.D. (**E**) *Infus. Sennæ. co.* L. (**E**) *Pulvis Cinnamom* : comp : L.E.D. (**B**) *Pulv. Scammon* : comp : L.D. (**E**) *Pulv. Sennæ.* comp : L. (**E**) *Pil : Aloes* : D. *Pill : Scillæ comp* : L.D. *Vinum Aloes.* L.E.D. ADULTERATIONS. The powder is rarely met with in any tolerable degree of purity : there are two varieties of ginger in the market, viz. *Black*, produced by scalding the root, and afterwards hastily drying it in the sun ; and the *White*, being that which has been carefully washed, scraped, and gradually dried.

PRESERVED GINGER.—That from India is almost transparent, while that manufactured in Europe is always opaque and fibrous.

THE END.

THE HISTORY OF THE
CITY OF BOSTON
FROM THE FIRST SETTLEMENT
TO THE PRESENT TIME
IN TWO VOLUMES
BY NATHANIEL BENTLEY
VOL. I.
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The first settlement of the city of Boston was made in the year 1630, by a company of Puritan emigrants, who were invited by the Massachusetts Bay Company to settle in the colony. They arrived in the month of September, and found the site of the city already occupied by a few Indian natives. The Puritans, however, were not content with the Indian habitations, but chose a new site on the neck of land between the city and the harbor, and there they built their first houses and churches. The city grew rapidly, and in the year 1639 it was incorporated as a city by the Massachusetts General Court. In the year 1689, the city was again incorporated, and in the year 1780 it was again incorporated, and in the year 1822 it was again incorporated.

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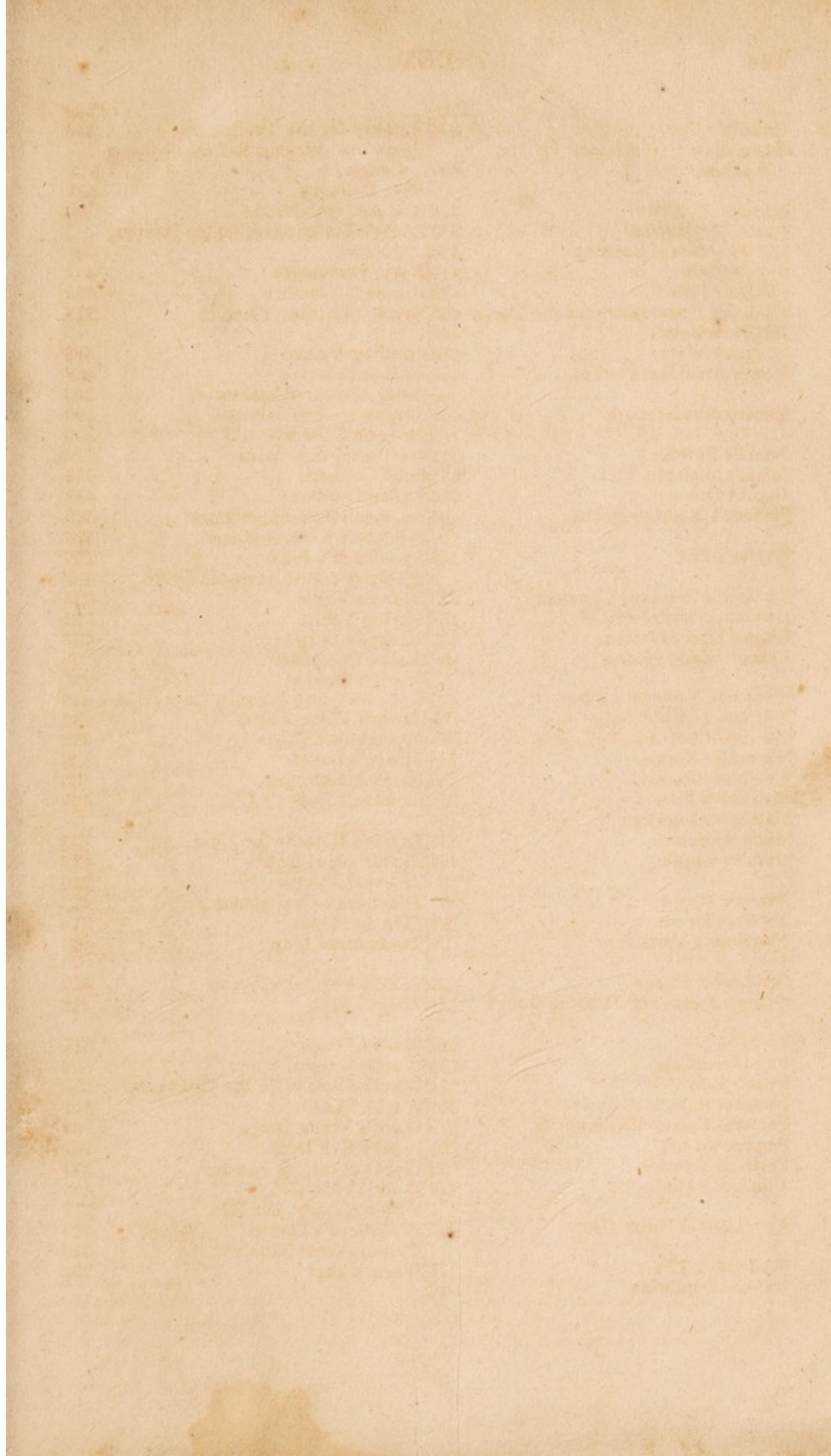
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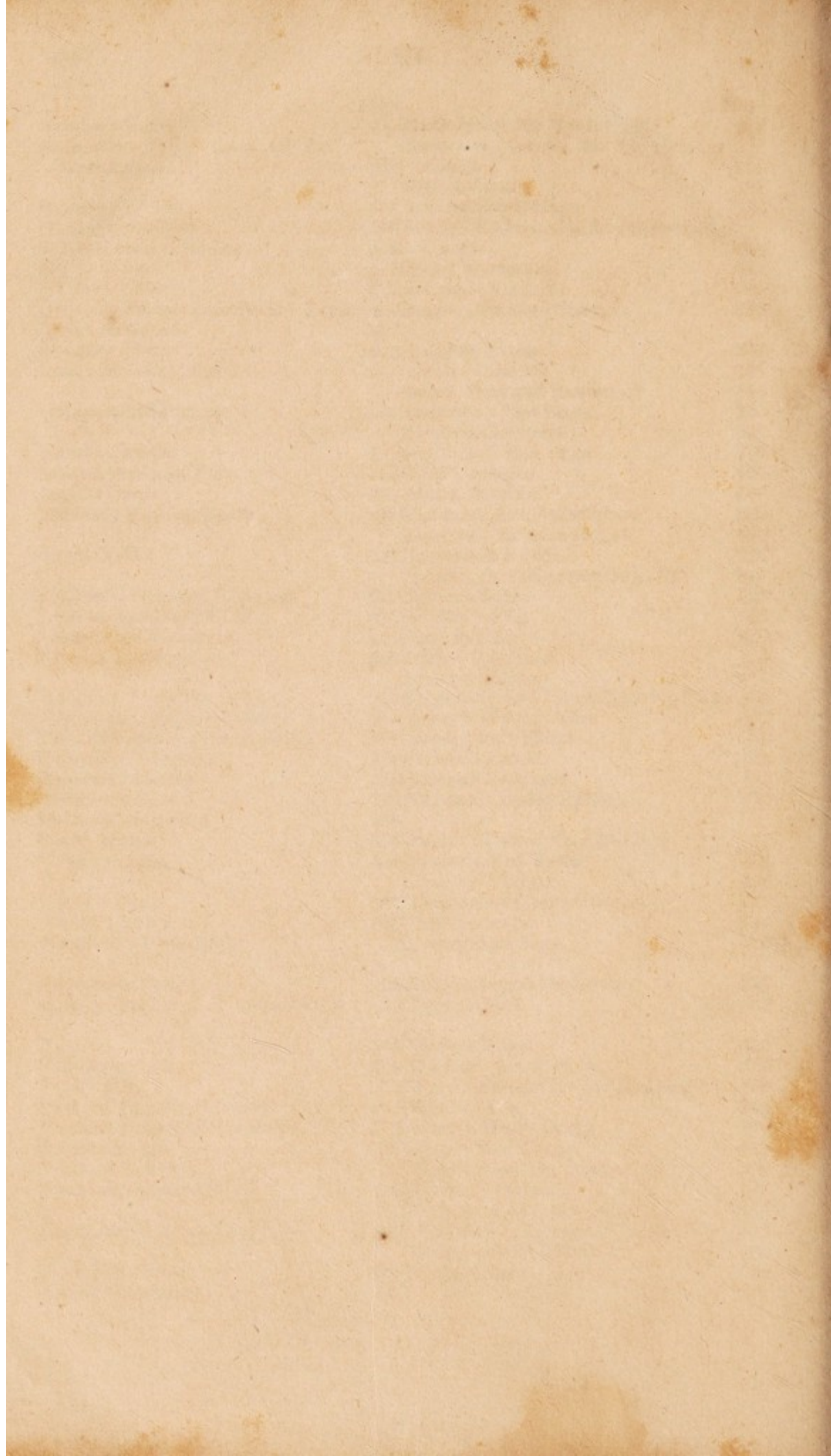
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